Prepared for:
Essex Region Conservation Authority
311-360 Fairview Avenue West
Essex, ON N8M 1Y6

Prepared by:
Stantec Consulting. Ltd.
100 – 300 Hagey Boulevard
Waterloo ON N2L 0A4

Master Plan Report (Volume 2)

Upper Little River Watershed Drainage and Stormwater Management Master Plan, Class Environmental Assessment, Windsor and Tecumseh, Ontario

April 2023

Master Plan Report
Upper Little River Watershed Drainage and Stormwater Management Master Plan, Class Environmental Assessment, Windsor and Tecumseh, Ontario

April 2023

List of Appendices

Volume 2:

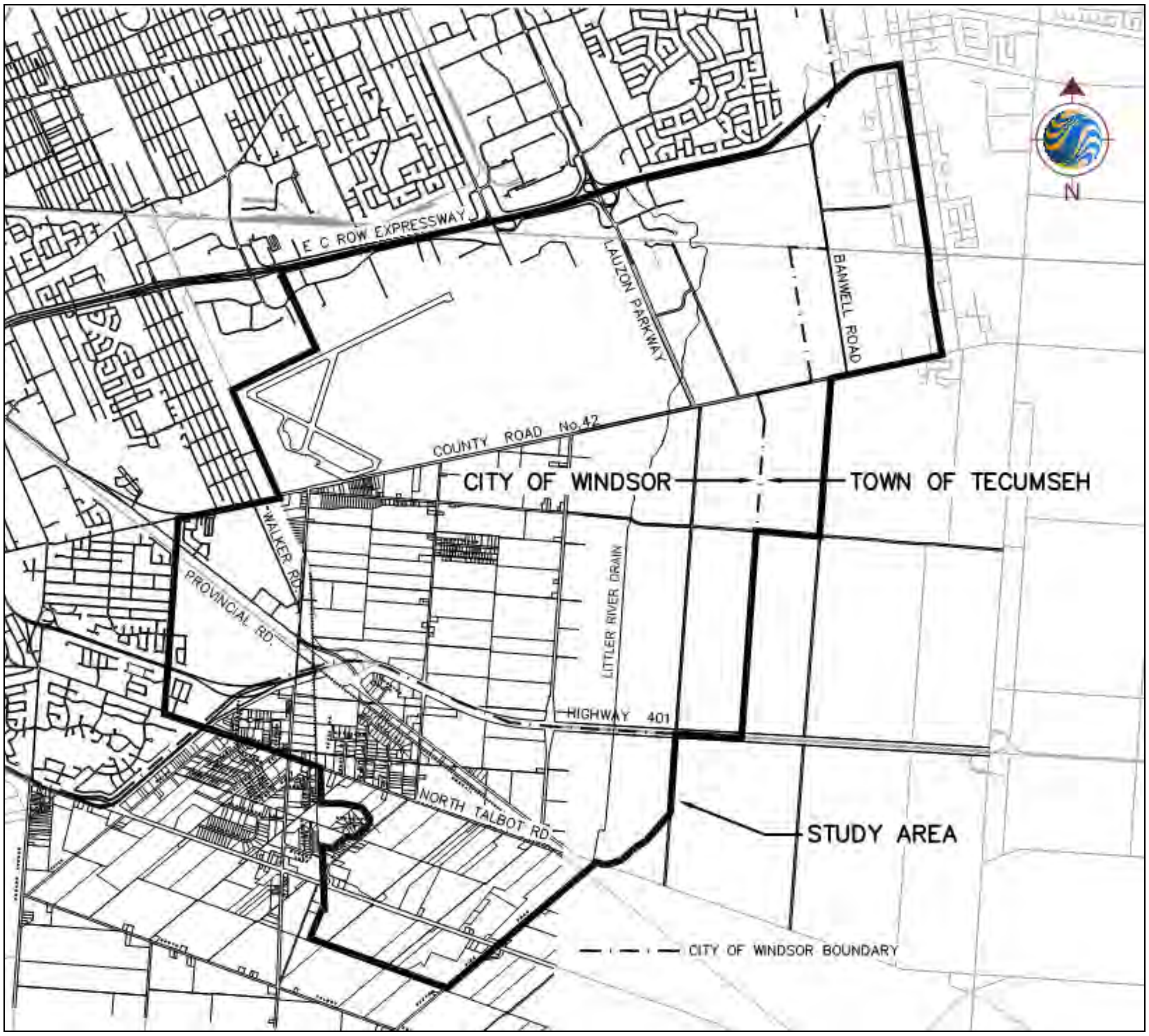
APPENDIX B

Public Notice Intent

ESSEX REGION CONSERVATION AUTHGORITY
NOTICE OF STUDY COMMENCEMENT

UPPER LITTLE RIVER WATERSHED MASTER DRAINAGE PLAN & STORMWATER MANAGEMENT PLAN

The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh has initiated a Master Plan Study in accordance with Phases 1 & 2 of the Municipal Class Environmental Assessment (EA) process. This Study will determine the stormwater management infrastructure requirements for the Upper Little River Watershed area to service existing and future development.



If you have any questions or wish to be added to the study mailing list, please contact:

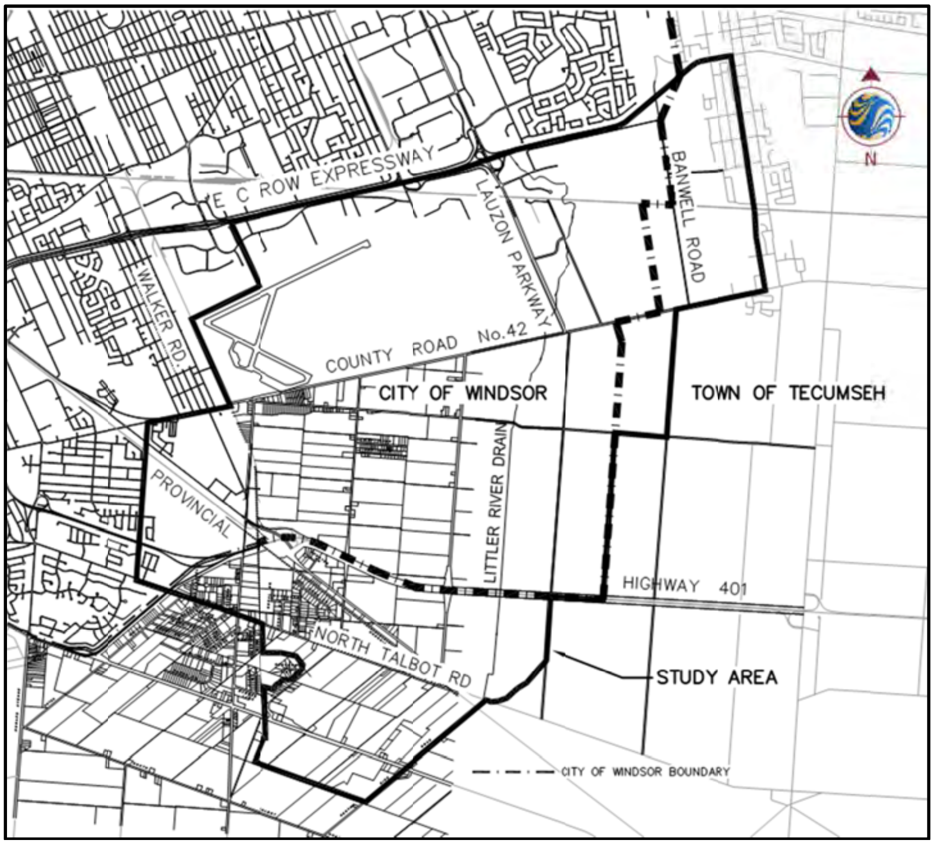
Jeremy Wychreschuk, M.A.Sc., P. Eng.
Director of Watershed Engineering
Essex Region Conservation Authority
360 Fairview Avenue West
Essex, Ontario, N8M 1Y8
Tel: (519) 776-5209
Fax: (519) 776-8688
jwychreschuk@erca.org

Jayson Innes, M.A.Sc., P. Eng.
Project Manager
Stantec Consulting Ltd.
49 Frederick Street
Kitchener, Ontario, N2H 6M7
Tel: (519) 585-7282
Fax: (519) 579-8664
jayson.innes@stantec.com

ESSEX REGION CONSERVATION AUTHORITY
NOTICE OF PUBLIC INFORMATION CENTRE No. 1

UPPER LITTLE RIVER WATERSHED MASTER DRAINAGE PLAN & STORMWATER MANAGEMENT PLAN

The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh has initiated a Master Plan Study in accordance with Phases 1 & 2 of the Municipal Class Environmental Assessment (EA) process. This Study will determine the storm water management infrastructure requirements for the Upper Little River Watershed area to service existing and future development.



A Public Information Centre (P.I.C.) will take place to provide further information to the public regarding the project and to receive input and comments. Displays of study information will be available for review introducing the project and outlining the Environmental Assessment requirements. Representatives from the Essex Region Conservation Authority, the City of Windsor, the Town of Tecumseh, and Stantec Consulting will be present to discuss issues and concerns.

The Public Information Centre (P.I.C.) No.1 is scheduled for Tuesday, May 29, 2012 at the Forest Glade Community Centre – 3215 Forest Glade Drive from 3:00p.m. – 5:00p.m. & 6:00p.m. – 8:00p.m.

If you have any questions or wish to be added to the study mailing list, please contact:

Jeremy Wychreschuk, M.A.Sc., P. Eng.
Director of Watershed Engineering
Essex Region Conservation Authority
360 Fairview Avenue West
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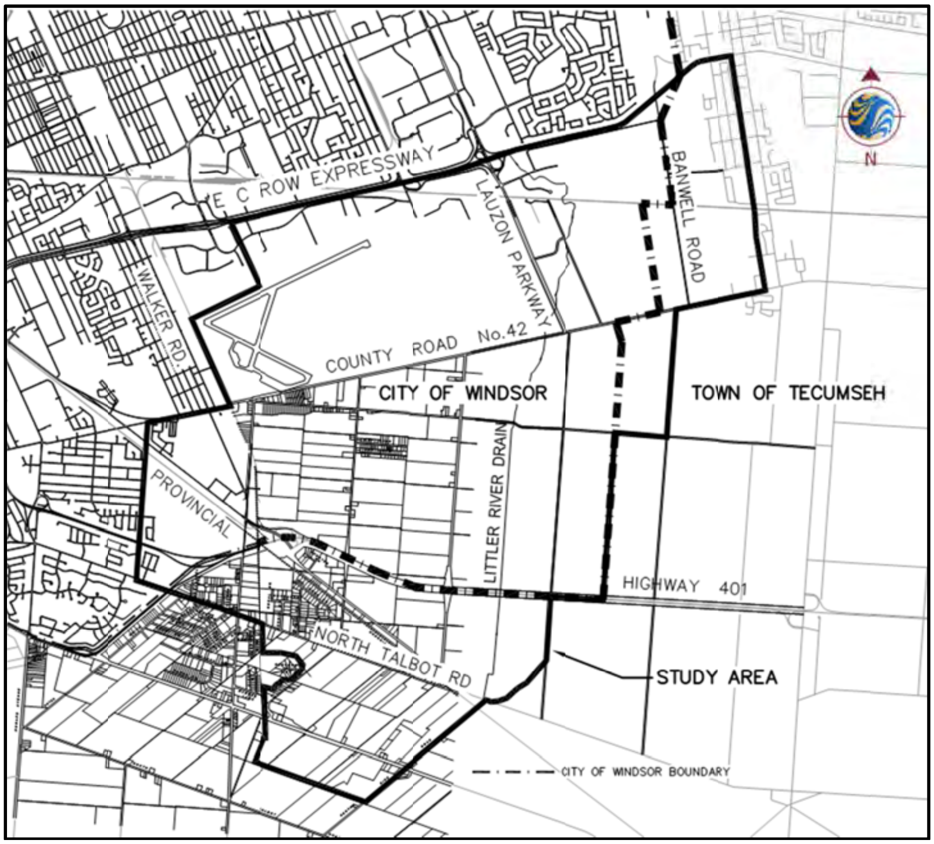
Kitchener, Ontario, N2H 6M7
Tel: (519) 585-7282
Fax: (519) 579-8664
jayson.innes@stantec.com

ESSEX REGION CONSERVATION AUTHORITY
NOTICE OF PUBLIC INFORMATION CENTRE No. 2

UPPER LITTLE RIVER WATERSHED MASTER DRAINAGE PLAN & STORMWATER MANAGEMENT PLAN

The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh has initiated a Master Plan Study in accordance with Phases 1 & 2 of the Municipal Class Environmental Assessment (EA) process. This Study will determine the stormwater management infrastructure requirements for the Upper Little River Watershed area to service existing and future development.



One Public Information Centre (PIC) (May 29, 2012) has already been held to introduce the project and outline the alternatives and the evaluation criteria. Input received during this PIC was considered in the evaluation of the preferred alternative. The purpose of the second PIC will be to review the preliminary preferred alternative for stormwater management controls and to discuss the rehabilitation opportunities. Representatives from the Essex Region Conservation Authority, the City of Windsor, the Town of Tecumseh, and Stantec Consulting will be present to discuss issues and concerns.

The Public Information Centre (P.I.C.) No.2 is scheduled for Monday, October 22, 2012 at the Windsor Christian Fellowship – 4490 7th Concession Road from 3:00p.m. – 5:00p.m. & 6:00p.m. – 8:00p.m.

If you have any questions or wish to be added to the study mailing list, please contact:

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Welcome to the
Upper Little River
Stormwater Master Plan
Class Environmental Assessment

Public Information Centre

May 29, 2012



Please sign in

Take an information sheet to record your thoughts
as you review the display material

City and Town staff and the study team are available
to discuss your questions and concerns

Public input will influence this study;
please take time to fill out a comment sheet

Essex Region Conservation Authority

Stantec

The City of Windsor

Tecumseh

Study Purpose

Problem Statement

Future development is expected within the Upper Little River Watershed in the near future. Stormwater management infrastructure will be required to control runoff from this future development such that there are no adverse impacts to downstream areas due to flooding, erosion, or water quality. A Master Drainage and Stormwater Management Plan is proposed including both City of Windsor and Town of Tecumseh lands to coordinate and guide future development in this area. The preferred alternative will provide a balance of relevant natural, social, technical and economic criteria to establish appropriate drainage and stormwater management requirements at a watershed level that meets the needs of area stakeholders.

Project Objectives

The purpose of this Class EA process is to evaluate options and determine a preferred alternative for the provision of stormwater management controls for the developing lands within the Upper Little River Watershed while allowing for future enhancement of the watercourse and stream corridor. The objectives of this project are:

- To determine a preferred option for stormwater management infrastructure within the Upper Little River Watershed, while taking into account; flood control, water quality, erosion control, aquatic habitat, aesthetics, safety, and recreational uses
- To carry out a Class Environmental Assessment
- To complete a preliminary design for the preferred option

Key Issues and Challenges

The current state of the watershed presents several key challenges and opportunities:

- The watershed suffers from recurring flooding and sediment build-up issues
- Waterfowl are attracted to typical stormwater management facilities, increasing the probability of bird strikes at the Windsor Airport
- Municipal Drains may be removed or modified in order to accommodate the proposed development plan, impacting fish habitat
- Develop corridors and linkages to minimize fragmentation of the natural habitat and recreational areas

Upper Little River
Stormwater Master Plan Class Environmental Assessment

Class Environmental Assessment (EA) Process

Class EA Phase 1

Identify Problem or Opportunity
- Identify Need
- Initiate Consultations
  - Community
  - Agencies
- Establish Task Force and Technical Steering Committee

Background Review
- Obtain and review background documentation and initiate agency contact
- Identify data gaps to be addressed during the site inventory/investigations

Class EA Phase 2

Site Inventory/ Investigation
- Undertake natural heritage investigation
- Undertake geotechnical/ hydrogeological investigation
- Undertake hydrology/ hydraulics investigation
- Aquatic habitat assessment
- Incidental wildlife surveys
- Fluvial geomorphology
- Identify opportunities and constraints

Evaluation of Alternatives
- Complete impact assessment
- Identify alternatives
- Public Information Centre (PIC) #1
- Evaluate alternatives
- Select preferred alternative

Preliminary Design/ Environmental Study Report
- Implementation Plan
- Preliminary design of preferred alternative
- Recommendations on further study if required
- PIC #2
- Develop a monitoring, maintenance and mitigation plan

Documentation

Environmental Screening Report
- Prepare first draft ESR
- Revise and prepare second draft ESR
- Finalize ESR
- Notice of Completion
- 30-day Public Review
- Approval by councils

We Are Here

Project Initiation	Field Inventory	Opportunity/ Constraints	PIC #1	Evaluation & Selection	PIC #2	Finalize EA/ Master Plan
July 2011	November 2011	February 2012	May 2012	July 2012	Fall 2012	Fall 2012

Essex Region Conservation Authority

Stantec

The City of Windsor

Upper Little River
Stormwater Master Plan Class Environmental Assessment

Study Area

Legend

STUDY AREA

EXISTING WATERCOURSE

OVERLAND FLOW / TILE DRAIN

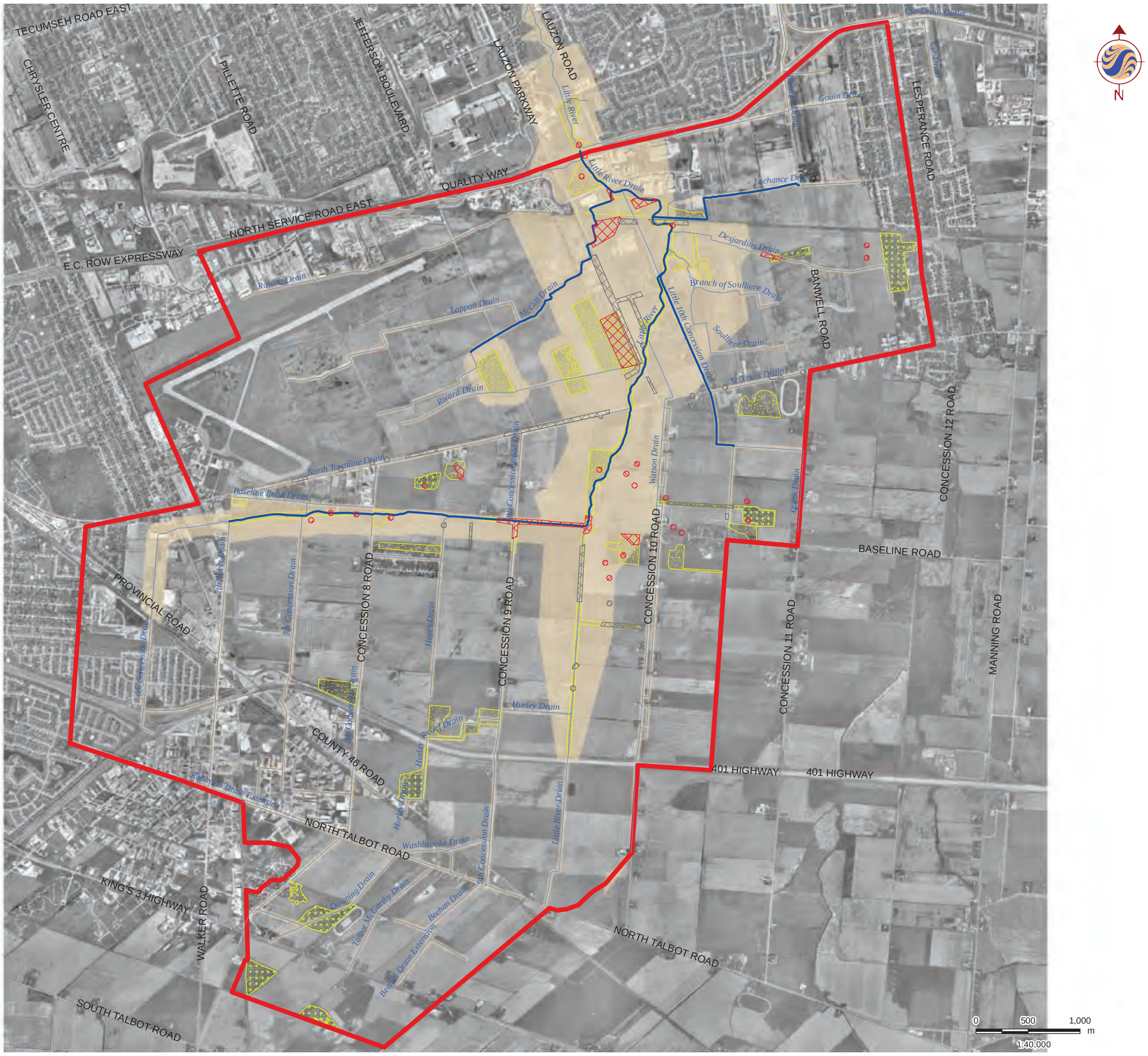
CITY OF WINDSOR / TOWN OF TECUMSEH BOUNDARY

Essex Region Conservation Authority

Stantec

The City of Windsor

Significant Natural Areas



Legend

- Watercourse
- Study Area
- Fish Habitat Reach
- Significant Plant Species Observed
- Significant Wildlife Species Observed
- Habitat Areas
- Woodland
- Limit of Regulated Area

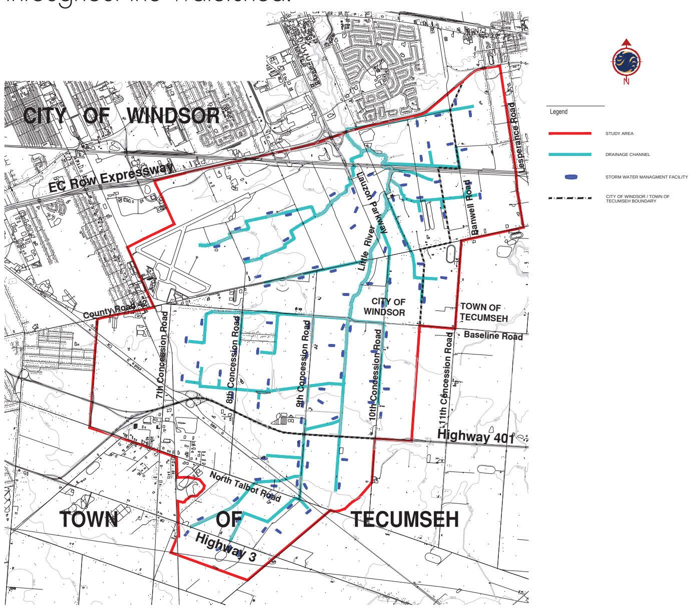
Description of Alternatives

Alternative #1
The "Do-Nothing" Approach

The "Do-Nothing" alternative includes no stormwater management controls for the developing areas in the Upper Little River.

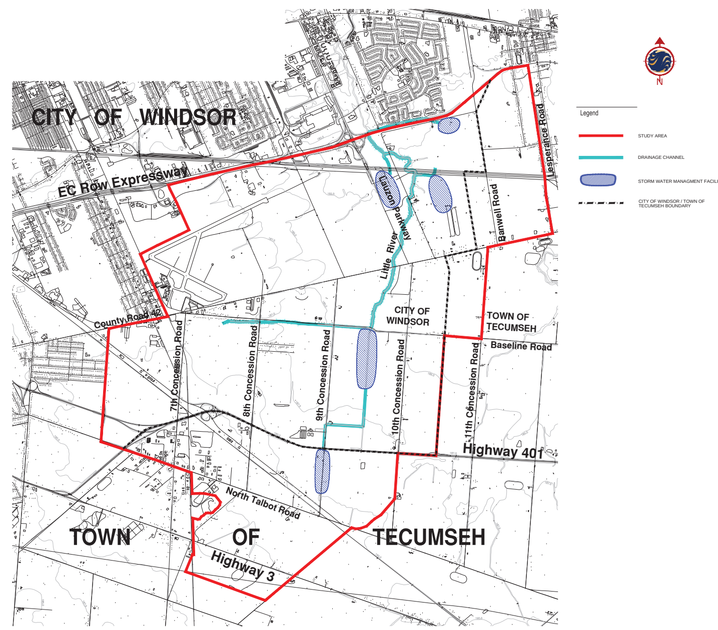
Alternative #2
Water Quality and Erosion Control Only, no Flood Control

For this alternative, the proposed development will have only water quality treatment and erosion control, with no flood control. Many small water quality facilities would be scattered throughout the watershed.



Alternative #3
Communal On-line SWM Facilities

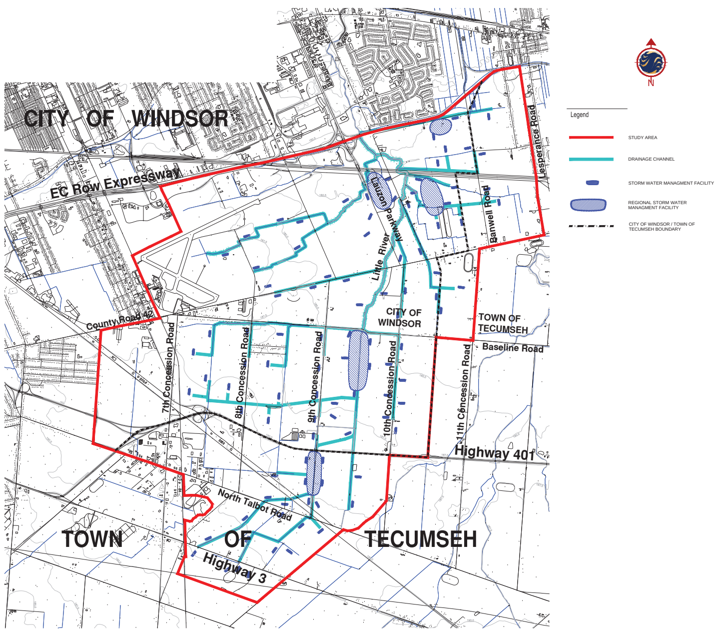
This alternative analyzes the potential to minimize the number of stormwater management facilities required to serve the study area by consolidating all water quality, erosion and flood controls at a few locations throughout the watershed.



Description of Alternatives

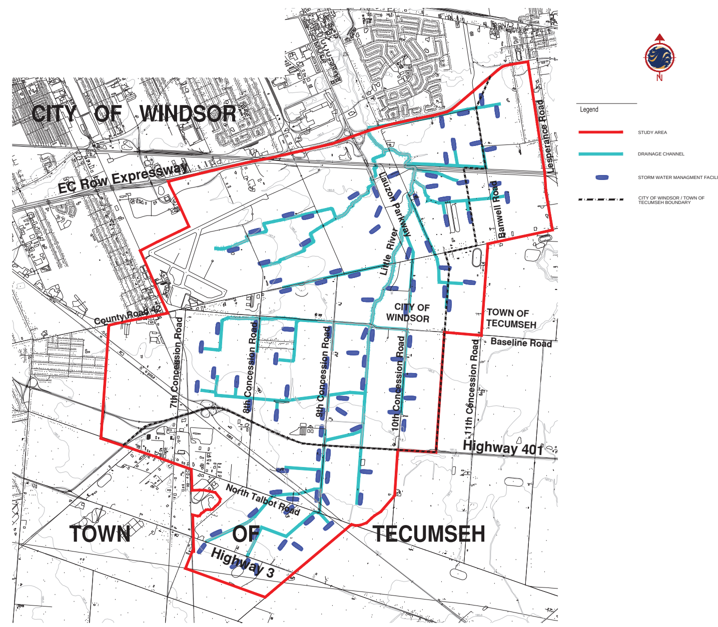
Alternative #4
Communal Flood Control and Distributed Water Quality and Erosion Control

This alternative analyzes the scenario where a few large flood control facilities are located within the study area (similar locations to Alternative #3), but many small water quality and erosion controls are distributed throughout the area (similar locations to Alternative #2).



Alternative #5
Distributed Stormwater Management Controls

This alternative considers the potential for stormwater management controls to be distributed throughout the study area, and each facility would be required to provide water quality, erosion and flood controls.



Upper Little River

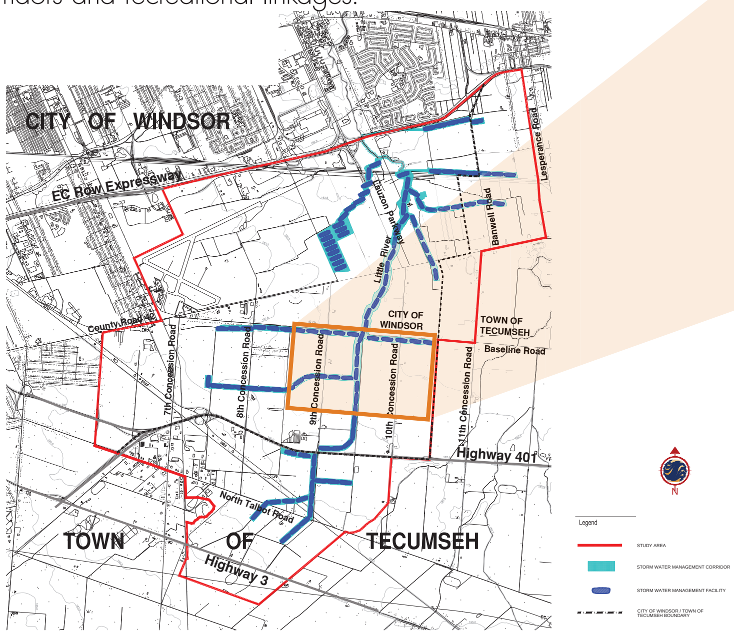
Stormwater Master Plan Class Environmental Assessment

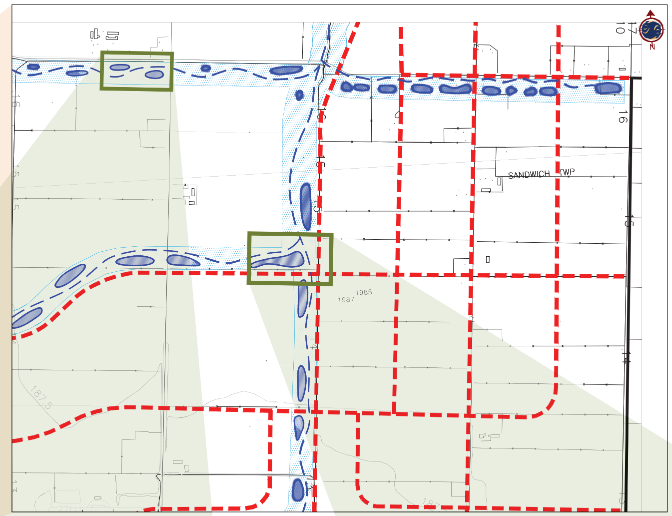
Description of Alternatives

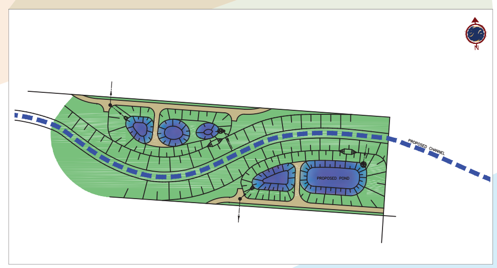
Alternative #6

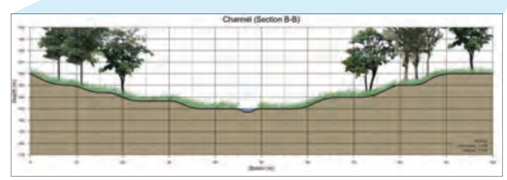
Grouped Stormwater Management Controls

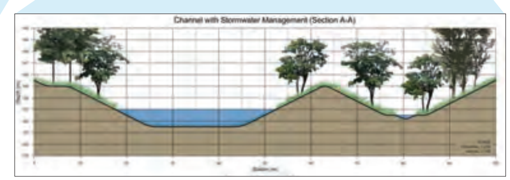
This alternative considers the potential for stormwater management controls to be grouped into stormwater management corridors. Each facility would be required to provide water quality, erosion and flood controls. The facilities are aligned to promote natural corridors and recreational linkages.











Essex Region Conservation Authority

Stantec

The City of Windsor

Tecumseh

Evaluation Criteria

Evaluation Methodology

For each alternative the project team will:

- Apply the evaluation criteria using the measures outlined above
- The measures will be converted to an assigned score based on the rank of relative preferences of the alternatives
- The scores will then be totaled and normalized by category (so that each category is weighted equally) to provide an overall score for each alternative
- Alternatives with higher scores are considered more preferred or feasible than those with lower scores
- The initial evaluation will be based on an equal weighting of criteria categories
- A sensitivity analysis will be conducted to determine if the overall scoring of alternatives changes if criteria categories are assigned a different weighting scheme

Upper Little River Watershed Master Drainage Plan EA

EVALUATION CRITERIA		
Criteria	**Description**	**Measure**
Natural Environment		
Terrestrial Resources, Vegetation, and Wildlife Implications	The nature and extent of disturbance to terrestrial habitat, vegetation communities, and wildlife resulting from the construction/operation of the alternative. Alternatives that maintain biodiversity and minimize disturbance to native species, regionally significant species and species with specific habitat requirements are preferred	• Nature of disturbance (direct vs. indirect) • Area (ha) of habitat affected • Nature, significance, and sensitivity of affected area or species
Fisheries Resources and Aquatic Habitat Implications	Implications of disturbance to fish habitat and/or features that sustain habitat conditions resulting from the construction/operation of the alternative. Alternatives that sustain a fishery are preferred	• Nature and extent of disturbance to fish habitat, including opportunities for movement and potential spawning areas • Nature, significance and sensitivity of fish habitat affected • Nature and extent of any disturbance to features that sustain fish habitat conditions, including flow regime, groundwater seeps and riparian vegetation
Groundwater and Base Flow Implications	Impact of the alternative on groundwater levels and base flows in the Upper Little River Watershed. Alternatives that maintain or enhance groundwater and base flow are preferred.	• Nature and significance of changes to base flow • Nature and extent of impact to groundwater levels and well use
Surface Water Quality	Impact of the alternative on in-stream water quality	• Number of proposed stormwater management control measures and their location within the study area • Nature and significance of changes to the overall water quality system
Economic Environment		
Total Capital Cost	Relative overall capital costs, including restoration/enhancement costs for the alternative. Lower cost alternatives are preferred	• Capital costs of alternative relative to other alternatives
Total Maintenance Cost	Relative annual costs for operation & maintenance activities for the alternative. Lower cost alternatives are preferred	• Operation & maintenance costs of the alternative relative to other alternatives
Technical Environment		
Ability to Provide Required Flood Protection	The ability of the alternative to maintain/enhance the existing level of flood protection. Alternative must satisfy flood protection requirements	• Flood protection to required levels provided
Ease of Construction/ Implementation	The ability of the alternative to be easily implemented on a technical, regulatory, and practical basis. Alternatives that are easier to construct/implement are preferred	• Type of structure/construction required • Permitting/approval requirements • Difficulty of construction/implementation (access, site-specific conditions, coordination between facilities)
Ability to Meet Agency Requirements	The ability of the alternative to meet MOE, Municipalities, Essex Region Conservation Authority, Windsor Airport requirements	• Nature and location of controls • Nature and location of water bodies in relation to the Windsor Airport
Social/Cultural Environment		
Aesthetics	The ability of the alternative to maintain or enhance the appearance of the existing and newly created local natural areas and stormwater management control measures. Alternatives that maintain or improve existing aesthetic values are preferred	• Nature and location of encroachment within existing natural areas • Nature and location of stormwater management control measures
Health and Safety	The potential risk or liability to community and operations staff health and safety resulting from: • Flood events • Recreational use • Operation and maintenance Alternatives that maintain or improve safety are preferred	• Nature and location of risk • Public accessibility to risk areas • Flood control operational requirements
Recreational Opportunities	The ability of the alternative to maintain, enhance, and manage recreational opportunities within the study area. Alternatives that maintain or enhance opportunities are preferred	• Nature and location of stormwater management control measures relative to recreational areas including trails, sports fields, and other recreational infrastructure
Cultural Heritage/Archaeology	The ability of the alternative to protect potential archaeological resources within the study area. Alternatives that avoid or protect potential locations are preferred.	• Proximity of stormwater management areas to existing archaeological finds • Nature of potential disturbance

The Next Steps

Comments from today's Public Information Centre
will be received until

June 15, 2012

The alternatives will be evaluated and a
preliminary solution will be recommended

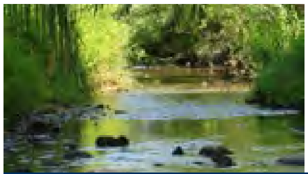
June 2012 to September 2012

Comments from reviewing agencies will be incorporated
into the decision making process

PUBLIC INFORMATION CENTRE #2
Fall 2012

Thank You for Attending

If you have any questions about this study
feel free to ask any member of the Study Team.



Upper Little River
Stormwater Master Plan Class Environmental Assessment

INTRODUCTION
The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh has initiated a Master Plan Study in accordance with Phases 1 & 2 of the Municipal Class Environmental Assessment (EA) process. This Study will determine the stormwater management infrastructure requirements for the Upper Little River Watershed area to service existing and future development. This information brief provides an overview of the study, key activities and schedule.

PROBLEM STATEMENT
Future development is expected within the Upper Little River Watershed in the near future. Stormwater management infrastructure will be required to control runoff from this future development such that there are no adverse impacts to downstream areas due to flooding, erosion, or water quality. A Master Drainage and Stormwater Management Plan is proposed including both City of Windsor and Town of Tecumseh lands to coordinate and guide future development in this area. The preferred alternative will provide a balance of relevant natural, social, technical and economic criteria to establish appropriate drainage and stormwater management requirements at a watershed level that meets the needs of area stakeholders.

DECISION-MAKING PROCESS
The study will be in accordance with the Municipal Engineers' Association document entitled "Municipal Class Environmental Assessment" October 2000, as amended in 2007.

The Class EA process includes public and review agency consultation, an evaluation of alternatives, an assessment of the impacts of the proposed alternatives, and identification of a preferred solution.

PROJECT OBJECTIVES
The purpose of this Class EA process is to evaluate options and determine a preferred alternative for the provision of stormwater management controls for the developing lands within the Upper Little River Watershed while allowing for future enhancement of the watercourse and stream corridor. The objectives of this project are:

- To determine a preferred option for stormwater management infrastructure within the Upper Little River Watershed, while taking into account; flood control, water quality, erosion control, aquatic habitat, aesthetics, safety, and recreational uses
- To carry out a Class Environmental Assessment
- To complete a preliminary design for the preferred option

Class EA Phase 1		Class EA Phase 2			Documentation
Identify Problem or Opportunity	**Background Review**	**Site Inventory/ Investigation**	**Evaluation of Alternatives**	**Preliminary Design/ Environmental Study Report**	**Environmental Screening Report**
• Identify Need • Initiate Consultations - Community - Agencies • Establish Task Force and Technical Steering Committee	• Obtain and review background documentation and initiate agency contact • Identify data gaps to be addressed during the site inventory/investigations	• Undertake natural heritage investigation • Undertake geotechnical/ hydrogeological investigation • Undertake hydrology/ hydraulics investigation • Aquatic habitat assessment • Incidental wildlife surveys • Fluvial geomorphology • Identify opportunities and constraints	• Complete impact assessment • Identify alternatives • Public Information Centre (PIC) #1 • Evaluate alternatives • Select preferred alternative	• Implementation Plan • Preliminary design of preferred alternative • Recommendations on further study if required • PIC #2 • Develop a monitoring, maintenance and mitigation plan	• Prepare first draft ESR • Revise and prepare second draft ESR • Finalize ESR • Notice of Completion • 30-day Public Review • Approval by councils

We Are Here

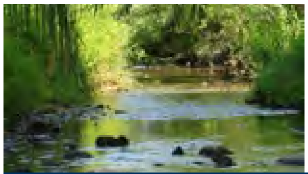
Project Initiation	Field Inventory	Opportunity/ Constraints	PIC #1	Evaluation & Selection	PIC #2	Finalize EA/Master Plan
July 2011	November 2011	February 2012	May 2012	July 2012	Fall 2012	Fall 2012

Essex Region Conservation Authority

Stantec

The City of Windsor

Tecumseh



Upper Little River
Stormwater Master Plan Class Environmental Assessment

THE STUDY AREA

The Upper Little River Stormwater Master Plan will focus the portion of Little River located upstream of the E.C. Row Expressway, including the Windsor Airport.

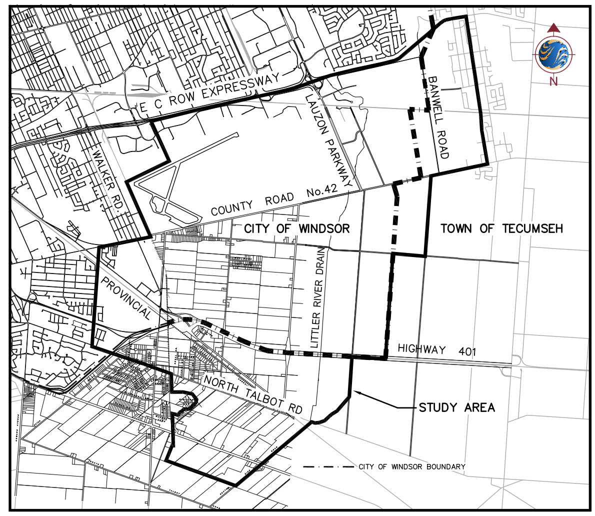
PROJECT ACTIVITIES

A review of background information and field reconnaissance has been completed. Some of the key issues and challenges include:

- The watershed suffers from recurring flooding and sediment build-up
- Waterfowl are attracted to typical stormwater management facilities, increasing the probability of bird strikes at the Windsor Airport
- Municipal drains may be removed or modified in order to accommodate the proposed development plan, impacting fish habitat
- Develop corridors and linkages to minimize fragmentation of the natural habitat and recreational area

A comprehensive list of stormwater management alternatives has been generated and includes various locations and levels of treatment. Enhancement opportunities have also been identified and include improvements to the watercourse, water quality, and trail systems.

Evaluation criteria have been developed to measure the relative benefit of each of the alternatives/opportunities within the Study Area



NEXT STEPS

- Comments from today's PIC will be received until June 15, 2012
- Comments received from review agencies and the public will be incorporated into the decision-making process
- Alternative solutions will be evaluated
- A preliminary preferred solution will be recommended
- PIC #2 will be held to present preferred alternative
- Finalize EA Report

For additional information, please contact:

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Director of Watershed Engineering
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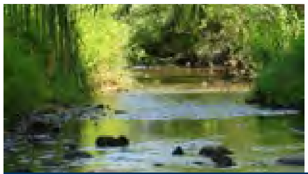


COMMENT SHEET

Please take a few minutes to complete this brief comment sheet. Your contribution will assist the study team with the collection of background information and in ensuring that all appropriate alternatives and opportunities are considered and that the criteria to be used for the evaluation is appropriate. Completed comment sheets will be carefully considered during the next stage of the study.

1. Are there other stormwater management alternatives that should be considered through this process?

   ☐ YES ☐ NO Please comment: ______________________________

2. Are there other enhancement opportunities that should be considered through this process?

   ☐ YES ☐ NO Please comment: ______________________________

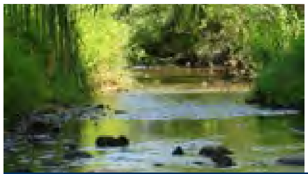
3. The proposed evaluation criteria include technical, natural, social/cultural and economic considerations within the study area. Pleaser provide your comments, questions or concerns with the proposed evaluation criteria.

   Please comment: ______________________________

4. It is proposed that the evaluation criteria categories (technical, natural, social/cultural and economic) will be given equal weighting in the evaluation exercise. Please indicate your preference for an equal weighting of evaluation criteria categories and/or provide another weighting scheme (check all that apply).

   ☐ I support the proposed equal weighting
   ☐ I offer an alternative weighting for consideration by the project team

Evaluation Criteria Category	Proposed Equal Weighting	Please Consider This Alternative
Technical Environment	25%	
Natural Environment	25%	
Social/Cultural Environment	25%	
Economic Environment	25%	



Upper Little River
Stormwater Master Plan Class Environmental Assessment

5. The Upper Little River Stormwater Master Plan is following the process outlined for Master Plan Class Environmental Assessment studies. Do you have any questions, comments or concerns about the decision-making process that is to be followed?

   ☐ YES ☐ NO Please comment: ____________________

6. How would you describe the nature of your interest in the study?
   - ☐ Member of the general public
   - ☐ Resident/landowner within the Study Area
   - ☐ Member of an Interest Group (please specify) ____________________
   - ☐ Agency representative (please specify) ____________________

7. Do you have any additional comments or information that you feel would be helpful to the project team?

   Please comment: ____________________

8. Please provide your name and contact information (optional).

   ____

Are you on the project mailing list? ☐ YES ☐ NO, please add my name and contact information to the mailing list

Your completed Comment Sheet will be included in the Class EA report, which will be made public at the completion of this study. Please check the box below if you wish to have your comments included anonymously.

☐ Please withhold my name and contact information from publication in the Class EA report.

You may leave this completed Comment Sheet in the box provided at the registration table for this Information Centre or you may send it by June 15, 2012 to:

Jeremy Wychreschuk, M.A.Sc., P. Eng.
Director of Watershed Engineering
Essex Region Conservation Authority
360 Fairview Avenue West, Essex
Ontario, N8M 1Y8
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Thank you for your participation in this study.

Essex Region Conservation Authority Stantec The City of Windsor

Upper Little River
Stormwater Master Plan Class Environmental Assessment

COMMENT SHEET

Please take a few minutes to complete this brief comment sheet. Your contribution will assist the study team with the collection of background information and in ensuring that all appropriate alternatives and opportunities are considered and that the criteria to be used for the evaluation is appropriate. Completed comment sheets will be carefully considered during the next stage of the study.

1. Are there other stormwater management alternatives that should be considered through this process?

   ☐ YES ☐ NO Please comment:

2. Are there other enhancement opportunities that should be considered through this process?

   ☐ YES ☐ NO Please comment:

3. The proposed evaluation criteria include technical, natural, social/cultural and economic considerations within the study area. Please provide your comments, questions or concerns with the proposed evaluation criteria.

   Please comment: I think the weighting can only be evaluated if the details of each alternative is made known.

4. It is proposed that the evaluation criteria categories (technical, natural, social/cultural and economic) will be given equal weighting in the evaluation exercise. Please indicate your preference for an equal weighting of evaluation criteria categories and/or provide another weighting scheme (check all that apply).

   ☐ I support the proposed equal weighting
   ☐ I offer an alternative weighting for consideration by the project team

Evaluation Criteria Category	Proposed Equal Weighting	Please Consider This Alternative
Technical Environment	25%	
Natural Environment	25%	
Social/Cultural Environment	25%	
Economic Environment	25%	

Upper Little River
Stormwater Master Plan Class Environmental Assessment

5. The Upper Little River Stormwater Master Plan is following the process outlined for Master Plan Class Environmental Assessment studies. Do you have any questions, comments or concerns about the decision-making process that is to be followed?

   ☐ YES ☐ NO Please comment: ______________________________

6. How would you describe the nature of your interest in the study?
   - ☐ Member of the general public
   - ☐ Resident/landowner within the Study Area
   - ☐ Member of an Interest Group (please specify) ______________________
   - ☐ Agency representative (please specify) ______________________

7. Do you have any additional comments or information that you feel would be helpful to the project team?

   Please comment: ______________________________

8. Please provide your name and contact information (optional).

   ____

Are you on the project mailing list? ☐ YES ☐ NO, please add my name and contact information to the mailing list

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☐ Please withhold my name and contact information from publication in the Class EA report.

You may leave this completed Comment Sheet in the box provided at the registration table for this Information Centre or you may send it by June 15, 2012 to:

Jeremy Wychreschuk, M.A.Sc., P. Eng.
Director of Watershed Engineering
Essex Region Conservation Authority
360 Fairview Avenue West, Essex
Ontario, N8M 1Y8
Tel: (519) 776-5209
Fax: (519) 776-8688
jwychreschuk@erca.org

Jayson Innes, M.A.Sc., P. Eng.
Project Manager
Stantec Consulting Ltd.
49 Frederick Street
Kitchener, Ontario, N2H 6M7
Tel: (519) 585-7282
Fax: (519) 579-8664
jayson.innes@stantec.com

Thank you for your participation in this study.

Essex Region Conservation Authority Stantec The City of Windsor

Upper Little River
Stormwater Master Plan Class Environmental Assessment

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1. Are there other stormwater management alternatives that should be considered through this process?

   ☐ YES ☑ NO Please comment: Alternative #6 should be implemented with some ~~mi~~ changes listed under section 2.

2. Are there other enhancement opportunities that should be considered through this process?

   ☑ YES ☐ NO Please comment: ~~#~~ Straight lines for drains if possible. Minimal number of 90° turns. Join the central & eastern airport wood lot.

3. The proposed evaluation criteria include technical, natural, social/cultural and economic considerations within the study area. Please provide your comments, questions or concerns with the proposed evaluation criteria.

   Please comment:

4. It is proposed that the evaluation criteria categories (technical, natural, social/cultural and economic) will be given equal weighting in the evaluation exercise. Please indicate your preference for an equal weighting of evaluation criteria categories and/or provide another weighting scheme (check all that apply).

   ☑ I support the proposed equal weighting

   ☐ I offer an alternative weighting for consideration by the project team

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Technical Environment	25%	
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Upper Little River
Stormwater Master Plan Class Environmental Assessment

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☐ YES ☑ NO Please comment:

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   - ☑ Member of an Interest Group (please specify)
   - ☐ Agency representative (please specify)

7. Do you have any additional comments or information that you feel would be helpful to the project team?

Please comment: Good presentation. Lay persons should be able to grasp the different concepts.

8. Please provi[illegible]ional).

Are you on the project mailing list? ☐ YES ☑ NO, please add my name and contact information to the mailing list

not sure, so please put my name on list.

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Essex Region Conservation Authority   Stantec   The City of Windsor   Tecumseh

Upper Little River
Stormwater Master Plan Class Environmental Assessment

COMMENT SHEET

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1. Are there other stormwater management alternatives that should be considered through this process?

☑ YES ☐ NO Please comment: large regional wetland(s) with sufficient vegetation to deter waterfowl should be seriously considered - would be a tremendous regional asset(s)

2. Are there other enhancement opportunities that should be considered through this process?

☑ YES ☐ NO Please comment: ↑ this alternative would have many enhancement benefits/opportunities of low flow augmentation, water quality, habitat + recreation

3. ✓ The proposed evaluation criteria include technical, natural, social/cultural and economic considerations within the study area. Please provide your comments, questions or concerns with the proposed evaluation criteria.

Please comment:

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☑ I support the proposed equal weighting

☐ I offer an alternative weighting for consideration by the project team

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Essex Region Conservation Authority

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The City of Windsor

Upper Little River
Stormwater Master Plan Class Environmental Assessment

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   - ☐ Resident/landowner within the Study Area
   - ☑ Member of an Interest Group (please specify) ______________
   - ☑ Agency representative (please specify) ______________

7. Do you have any additional comments or information that you feel would be helpful to the project team?

   Please comment: ______________________________

8. Please provide your name and contact information (optional).

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Upper Little River
Stormwater Master Plan Class Environmental Assessment

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1. Are there other stormwater management alternatives that should be considered through this process?

   ☒ YES ☐ NO Please comment: SERPENTINE WETLAND DESIGN BETWEEN THE AIRPORT WOODLANDS (PROV. SIGNAFICANT WETLANDS) PSWs AT AIRPORT SHOULD BE CONNECTED.

2. Are there other enhancement opportunities that should be considered through this process?

   ☒ YES ☐ NO Please comment: MEANDERING STREAM COURSE INSTEAD OF 90° L's AND STRAIGHT DRAINS.

3. The proposed evaluation criteria include technical, natural, social/cultural and economic considerations within the study area. Please provide your comments, questions or concerns with the proposed evaluation criteria.

   Please comment:

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   ☒ I support the proposed equal weighting
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Essex Region Conservation Authority Stantec The City of Windsor

Upper Little River
Stormwater Master Plan Class Environmental Assessment

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   ☐ YES ■ NO Please comment: ______

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   - ☐ Agency representative (please specify) ______

7. Do you have any additional comments or information that you feel would be helpful to the project team?

   Please comment: I WILL EMAIL COMMENTS TO JEREMY + JAYSON BELOW.

8. Please provide your name and contact information (optional).

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Upper Little River
Stormwater Master Plan Class Environmental Assessment

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1. Are there other stormwater management alternatives that should be considered through this process?

   ☐ YES ☐ NO Please comment: ______________________

2. Are there other enhancement opportunities that should be considered through this process?

   ☐ YES ☐ NO Please comment: PLEASE KEEP THE WOODLOTS JOIN THE AIRPORT WOODLOTS

3. The proposed evaluation criteria include technical, natural, social/cultural and economic considerations within the study area. Please provide your comments, questions or concerns with the proposed evaluation criteria.

   Please comment: ______________________

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Essex Region Conservation Authority Stantec The City of Windsor

Upper Little River
Stormwater Master Plan Class Environmental Assessment

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Essex Region Conservation Authority Stantec THE CITY OF WINDSOR TECUMSEH

Welcome to the

Upper Little River

Stormwater Master Plan
Class Environmental Assessment

Public Information Centre #2

October 22, 2012

Please sign in

Take an information sheet to record your thoughts
as you review the display material

City and Town staff and the study team are available
to discuss your questions and concerns

Public input will influence this study;
please take time to fill out a comment sheet

Essex Region Conservation Authority

Stantec

The City of Windsor

Study Purpose

Problem Statement

Future development is expected within the Upper Little River Watershed in the near future. Stormwater management infrastructure will be required to control runoff from this future development such that there are no adverse impacts to downstream areas due to flooding, erosion, or water quality. A Master Drainage and Stormwater Management Plan is proposed including both City of Windsor and Town of Tecumseh lands to coordinate and guide future development in this area. The preferred alternative will provide a balance of relevant natural, social, technical and economic criteria to establish appropriate drainage and stormwater management requirements at a watershed level that meets the needs of area stakeholders.

Project Objectives

The purpose of this Class Environmental Assessment (EA) process is to evaluate options and determine a preferred alternative for the provision of stormwater management controls for the developing lands within the Upper Little River Watershed while allowing for future enhancement of the watercourse and stream corridor. The objectives of this project are:

- To determine a preferred option for stormwater management infrastructure within the Upper Little River Watershed, while taking into account; flood control, water quality, erosion control, aquatic habitat, aesthetics, safety, and recreational uses
- To carry out a Class Environmental Assessment
- To complete a preliminary design for the preferred option

Key Issues and Challenges

The current state of the watershed presents several key challenges and opportunities:

- The watershed suffers from recurring flooding and sediment build-up issues
- Waterfowl are attracted to typical stormwater management facilities, increasing the probability of bird strikes at the Windsor Airport
- Municipal Drains may be removed or modified in order to accommodate the proposed development plan, impacting fish habitat
- Develop corridors and linkages to minimize fragmentation of the natural habitat and recreational areas
- Future development will require stormwater management controls and infrastructure

Essex Region Conservation Authority   Stantec   THE CITY OF WINDSOR   TECUMSEH

Class Environmental Assessment (EA) Process

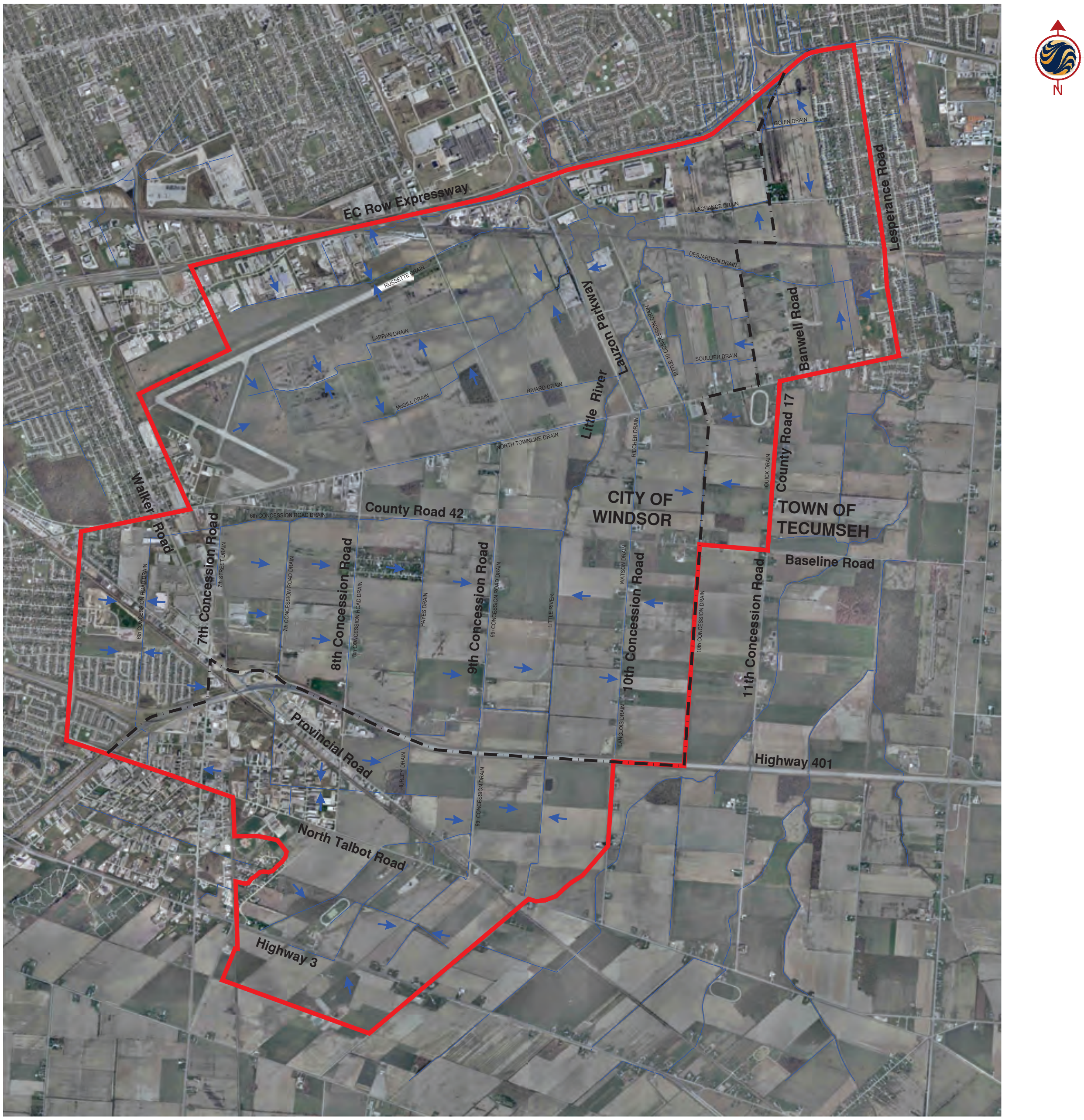
Class EA Phase 1		Class EA Phase 2			Documentation
Identify Problem or Opportunity	**Background Review**	**Site Inventory/ Investigation**	**Evaluation of Alternatives**	**Preliminary Design/ Environmental Study Report**	**Environmental Screening Report**
• Identify Need • Initiate Consultations - Community - Agencies • Establish Task Force and Technical Steering Committee	• Obtain and review background documentation and initiate agency contact • Identify data gaps to be addressed during the site inventory/investigations	• Undertake natural heritage investigation • Undertake geotechnical/ hydrogeological investigation • Undertake hydrology/ hydraulics investigation • Aquatic habitat assessment • Incidental wildlife surveys • Fluvial geomorphology • Identify opportunities and constraints	• Complete impact assessment • Identify alternatives • Public Information Centre (PIC) #1 • Evaluate alternatives • Select preferred alternative	• Implementation Plan • Preliminary design of preferred alternative • Recommendations on further study if required • PIC #2 • Develop a monitoring, maintenance and mitigation plan	• Prepare first draft ESR • Revise and prepare second draft ESR • Finalize ESR • Notice of Completion • 30-day Public Review • Approval by councils

We Are Here

Project Initiation	Field Inventory	Opportunity/ Constraints	PIC #1	Evaluation & Selection	PIC #2	Finalize EA/ Master Plan
July 2011	November 2011	February 2012	May 2012	July 2012	Fall 2012	Winter 2013

Upper Little River
Stormwater Master Plan Class Environmental Assessment

Study Area



Legend

STUDY AREA

EXISTING WATERCOURSE

OVERLAND FLOW / TILE DRAIN

CITY OF WINDSOR / TOWN OF TECUMSEH BOUNDARY

Essex Region Conservation Authority

Stantec

THE CITY OF WINDSOR

TECUMSEH

Significant Natural Areas

Legend

- Watercourse
- Study Area
- Fish Habitat Reach
- Significant Plant Species Observed
- Significant Wildlife Species Observed
- Habitat Areas
- Woodland
- Limit of Regulated Area

Essex Region Conservation Authority

Stantec

The City of Windsor

Description of Alternatives

Alternative #1
The "Do-Nothing" Approach
The "Do-Nothing" alternative includes no stormwater management (SWM) controls for the developing areas in the Upper Little River.

Alternative #2
Water Quality and Erosion Control Only, no Flood Control
For this alternative, the proposed development will have only water quality treatment and erosion control, with no flood control. Many small water quality facilities would be scattered throughout the watershed.

Alternative #3
Communal On-line SWM Facilities
This alternative analyzes the potential to minimize the number of stormwater management facilities required to serve the study area by consolidating all water quality, erosion and flood controls at a few locations throughout the watershed.

Alternative #4
Communal Flood Control and Distributed Water Quality and Erosion Control
This alternative analyzes the scenario where a few large flood control facilities are located within the study area (similar locations to Alternative #3), but many small water quality and erosion controls are distributed throughout the area (similar locations to Alternative #2).

Alternative #5
Distributed Stormwater Management Controls
This alternative considers the potential for stormwater management controls to be distributed throughout the study area, and each facility would be required to provide water quality, erosion and flood controls.

Alternative #6
Grouped Stormwater Management Controls
This alternative considers the potential for stormwater management controls to be grouped into stormwater management corridors. Each facility would be required to provide water quality, erosion and flood controls. The facilities are aligned to promote natural corridors and recreational linkages.

Evaluation Criteria

Evaluation Methodology

For each alternative the project team will:

- Apply the evaluation criteria using the measures outlined above
- The measures will be converted to an assigned score based on the rank of relative preferences of the alternatives
- The scores will then be totaled and normalized by category (so that each category is weighted equally) to provide an overall score for each alternative
- Alternatives with higher scores are considered more preferred or feasible than those with lower scores
- The initial evaluation will be based on an equal weighting of criteria categories
- A sensitivity analysis will be conducted to determine if the overall scoring of alternatives changes if criteria categories are assigned a different weighting scheme

Upper Little River Watershed Master Drainage Plan EA

EVALUATION CRITERIA

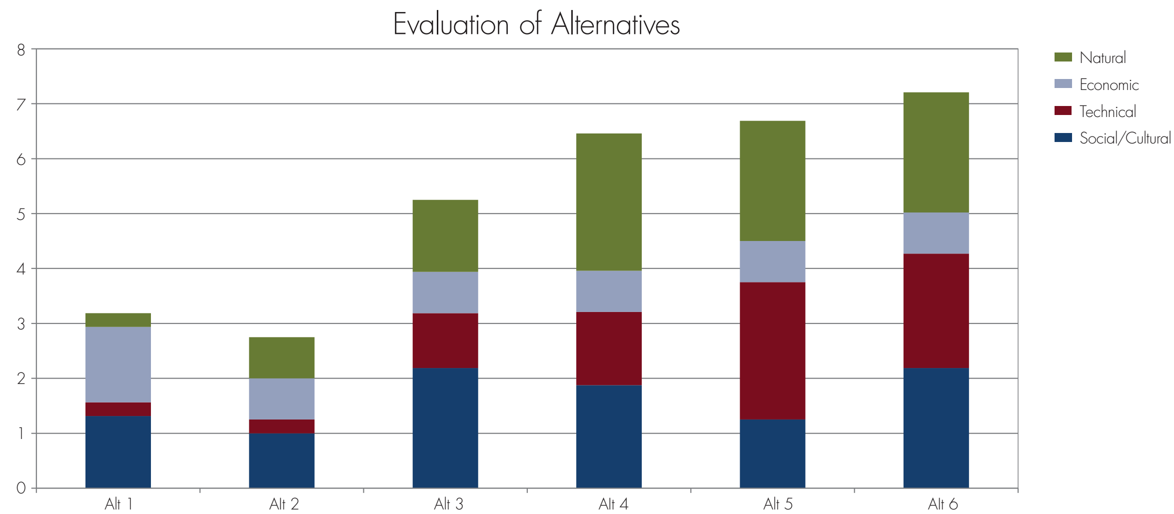
Criteria	Description	Measure
Natural Environment		
Terrestrial Resources, Vegetation, and Wildlife Implications	The nature and extent of disturbance to terrestrial habitat, vegetation communities, and wildlife resulting from the construction/operation of the alternative. Alternatives that maintain biodiversity and minimize disturbance to native species, regionally significant species and species with specific habitat requirements are preferred.	• Nature of disturbance (direct vs. indirect) • Area (ha) of habitat affected • Nature, significance, and sensitivity of affected area or species
Fisheries Resources and Aquatic Habitat Implications	Implications of disturbance to fish habitat and/or features that sustain habitat conditions resulting from the construction/operation of the alternative. Alternatives that sustain a fishery are preferred.	• Nature and extent of disturbance to fish habitat, including opportunities for movement and potential spawning areas • Nature, significance and sensitivity of fish habitat affected • Nature and extent of any disturbance to features that sustain fish habitat conditions, including flow regime, groundwater seeps and riparian vegetation
Groundwater and Base Flow Implications	Impact of the alternative on groundwater levels and base flows in the Upper Little River Watershed. Alternatives that maintain or enhance groundwater and base flow are preferred.	• Nature and significance of changes to base flow • Nature and extent of impact to groundwater levels and well use
Surface Water Quality	Impact of the alternative on in-stream water quality.	• Number of proposed stormwater management control measures and their location within the study area • Nature and significance of changes to the overall water quality system
Economic Environment		
Total Capital Cost	Relative overall capital costs, including restoration/enhancement costs for the alternative. Lower cost alternatives are preferred.	• Capital costs of alternative relative to other alternatives
Total Maintenance Cost	Relative annual costs for operation & maintenance activities for the alternative. Lower cost alternatives are preferred.	• Operation & maintenance costs of the alternative relative to other alternatives
Technical Environment		
Ability to Provide Required Flood Protection	The ability of the alternative to maintain/enhance the existing level of flood protection. Alternative must satisfy flood protection requirements.	• Flood protection to required levels provided
Ease of Construction/ Implementation	The ability of the alternative to be easily implemented on a technical, regulatory, and practical basis. Alternatives that are easier to construct/implement are preferred.	• Type of structure/construction required • Permitting/approval requirements • Difficulty of construction/implementation (access, site-specific conditions, coordination between facilities)
Ability to Meet Agency Requirements	The ability of the alternative to meet MOE, Municipalities, Essex Region Conservation Authority, Windsor Airport requirements.	• Nature and location of controls • Nature and location of water bodies in relation to the Windsor Airport
Social/Cultural Environment		
Aesthetics	The ability of the alternative to maintain or enhance the appearance of the existing and newly created local natural areas and stormwater management control measures. Alternatives that maintain or improve existing aesthetic values are preferred.	• Nature and location of encroachment within existing natural areas • Nature and location of stormwater management control measures
Health and Safety	The potential risk or liability to community and operations staff health and safety resulting from: • Flood events • Recreational use • Operation and maintenance Alternatives that maintain or improve safety are preferred.	• Nature and location of risk • Public accessibility to risk areas • Flood control operational requirements
Recreational Opportunities	The ability of the alternative to maintain, enhance, and manage recreational opportunities within the study area. Alternatives that maintain or enhance opportunities are preferred.	• Nature and location of stormwater management control measures relative to recreational areas including trails, sports fields, and other recreational infrastructure
Cultural Heritage/Archaeology	The ability of the alternative to protect potential archaeological resources within the study area. Alternatives that avoid or protect potential locations are preferred.	• Proximity of stormwater management areas to existing archaeological finds • Nature of potential disturbance

Summary of Evaluation

Six alternatives were evaluated for the stormwater management opportunities using the evaluation criteria presented at Public Information Centre #1 and:

Alternative 6 with grouped stormwater management controls located along major transportation and environmental corridors is the preferred solution.

This alternative has the highest combined score as shown in the chart. It ranked highest by providing all of the technical requirements for stormwater management and by providing a central core for amenities and trails.



Sensitivity Analysis

The analysis shown above was based on an equal weighting of the four categories of criteria as required for Class Environmental Assessment Studies:

- Natural Environment 25%
- Economic Environment 25%
- Technical Environment 25%
- Social/Cultural Environment 25%

To determine whether the preferred solution changed if the categories were weighted differently, four sensitivity analyses were completed as follows:

1. Natural Environment as more important
   Natural – 40%, Economic – 20%, Technical – 20%, and Social/Cultural – 20%
2. Economic Environment as more important
   Natural – 20%, Economic – 40%, Technical – 20%, and Social/Cultural – 20%
3. Technical Environment as more important
   Natural – 20%, Economic – 20%, Technical – 40%, and Social/Cultural – 20%
4. Social/Cultural Environment as more important
   Natural – 20%, Economic – 20%, Technical – 20%, and Social/Cultural – 40%

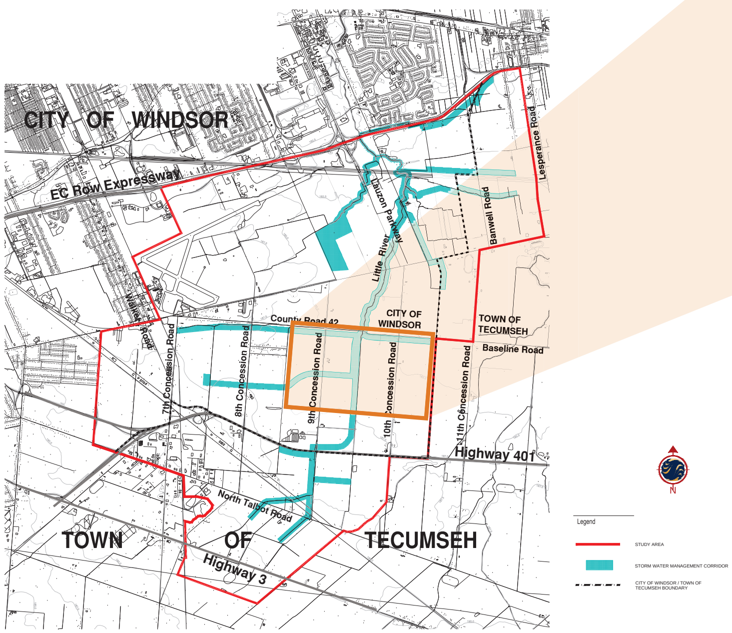
In all cases, Alternative 6 was the preferred alternative.

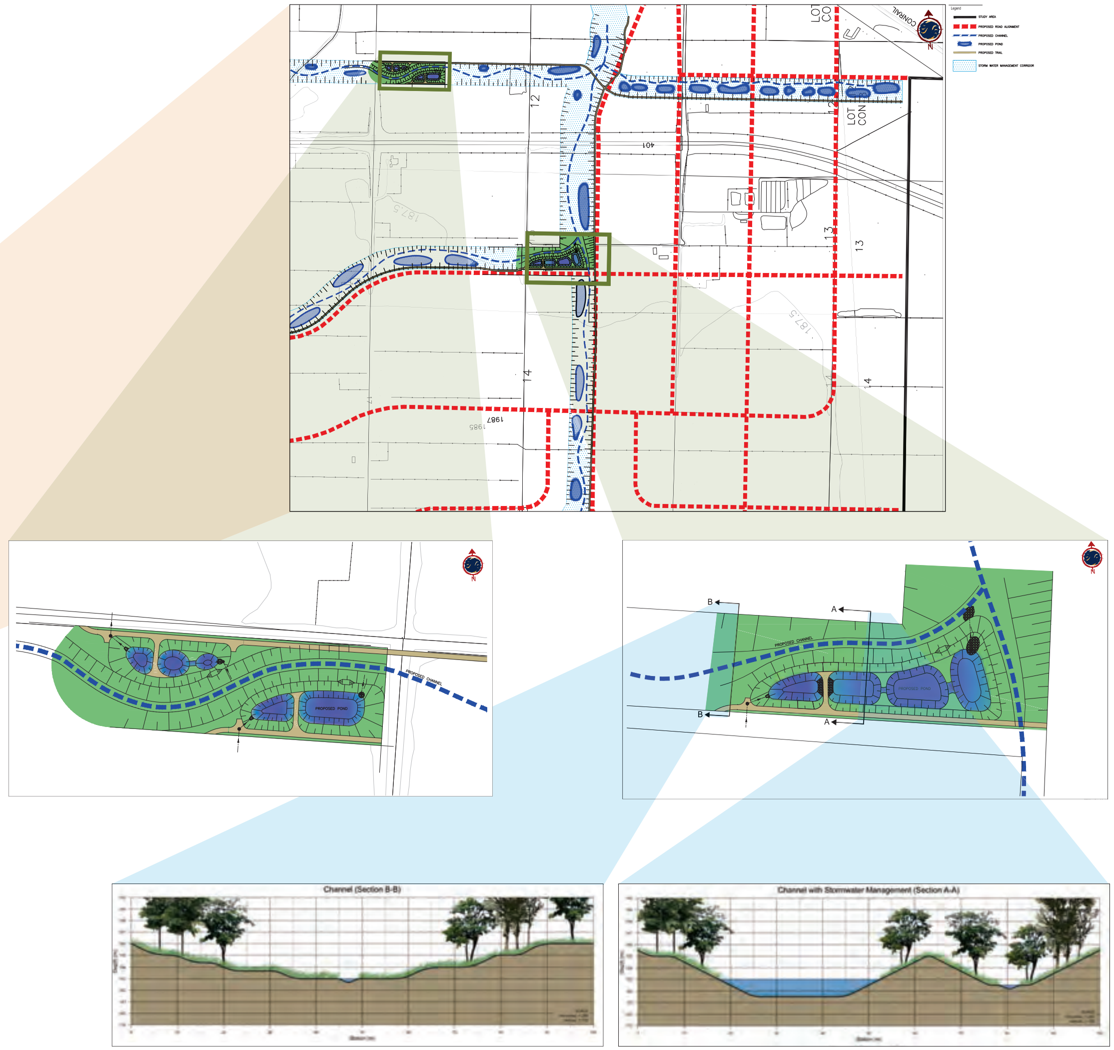
Upper Little River
Stormwater Master Plan Class Environmental Assessment

Preliminary Preferred Alternative

Alternative #6
Grouped Stormwater Management Controls

This alternative considers the potential for stormwater management controls to be grouped into stormwater management corridors. Each facility would be required to provide water quality, erosion and flood controls. The facilities are aligned to promote natural corridors and recreational linkages.



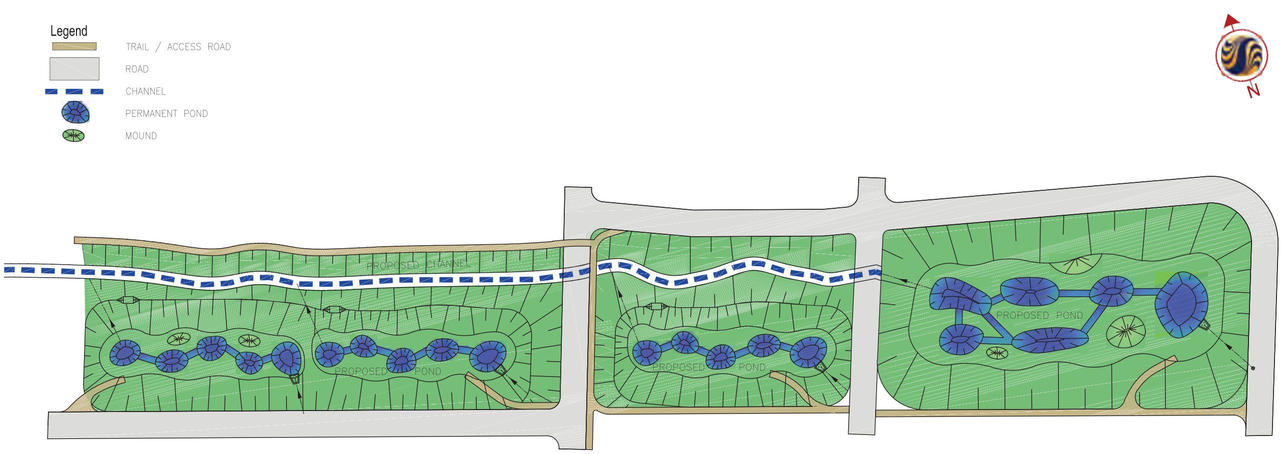


Essex Region Conservation Authority
Stantec
The City of Windsor
Tecumseh

Design Elements

Several key elements included in the proposed design are:

- Create continuity between existing/future woodlots, parks, and stormwater management ponds to allow for the movement of animals and people. These areas will be located near each other to create a continuous area linked by an integrated trail network
- Modification of the existing drainage network. Some drains will be enhanced, while others will be abandoned in favour of storm sewers. Flow will be concentrated in wider riparian channels with enhanced fish habitat
- Due to flat topography across the site, approximately half of the stormwater management ponds will likely require pumping to drain to Little River
- Due to the proximity of the site to the Windsor International Airport, stormwater management ponds will include design features to discourage use by waterfowl including abundant shrubs and trees
- Increased base flow in Upper Little River to enhance fish habitat
- Reduced flood elevations created by wider conveyance channels and storage



The Next Steps

Comments from today's Public Information Centre
will be received until

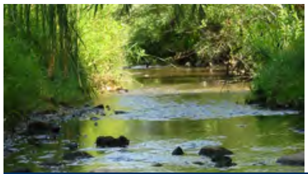
November 5, 2012

Comments from reviewing agencies will be incorporated
into the decision making process

Finalize Environmental Study Report and
File Class Environmental Assessment
Winter 2013

Thank You for Attending

If you have any questions about this study
feel free to ask any member of the Study Team.



Upper Little River
Stormwater Master Plan Class Environmental Assessment

INTRODUCTION

The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh has initiated a Master Plan Study in accordance with Phases 1 & 2 of the Municipal Class Environmental Assessment (EA) process. This Study will determine the stormwater management infrastructure requirements for the Upper Little River Watershed area to service existing and future development. This information brief provides an overview of the study, key activities and schedule.

PROBLEM STATEMENT

Future development is expected within the Upper Little River Watershed in the near future. Stormwater management infrastructure will be required to control runoff from this future development such that there are no adverse impacts to downstream areas due to flooding, erosion, or water quality. A Master Drainage and Stormwater Management Plan is proposed including both City of Windsor and Town of Tecumseh lands to coordinate and guide future development in this area. The preferred alternative will provide a balance of relevant natural, social, technical and economic criteria to establish appropriate drainage and stormwater management requirements at a watershed level that meets the needs of area stakeholders.

DECISION-MAKING PROCESS

The study will be in accordance with the Municipal Engineers' Association document entitled "Municipal Class Environmental Assessment" October 2000, as amended in 2007.

The Class EA process includes public and review agency consultation, an evaluation of alternatives, an assessment of the impacts of the proposed alternatives, and identification of a preferred solution.

PROJECT OBJECTIVES

The purpose of this Class EA process is to evaluate options and determine a preferred alternative for the provision of stormwater management controls for the developing lands within the Upper Little River Watershed while allowing for future enhancement of the watercourse and stream corridor. The objectives of this project are:

- To determine a preferred option for stormwater management infrastructure within the Upper Little River Watershed, while taking into account; flood control, water quality, erosion control, aquatic habitat, aesthetics, safety, and recreational uses
- To carry out a Class Environmental Assessment
- To complete a preliminary design for the preferred option

Class EA Phase 1

Identify Problem or Opportunity
- Identify Need
- Initiate Consultations
  - Community
  - Agencies
- Establish Task Force and Technical Steering Committee

Background Review
- Obtain and review background documentation and initiate agency contact
- Identify data gaps to be addressed during the site inventory/investigations

Class EA Phase 2

Site Inventory/ Investigation
- Undertake natural heritage investigation
- Undertake geotechnical/ hydrogeological investigation
- Undertake hydrology/ hydraulics investigation
- Aquatic habitat assessment
- Incidental wildlife surveys
- Fluvial geomorphology
- Identify opportunities and constraints

Evaluation of Alternatives
- Complete impact assessment
- Identify alternatives
- Public Information Centre (PIC) #1
- Evaluate alternatives
- Select preferred alternative

Preliminary Design/ Environmental Study Report
- Implementation Plan
- Preliminary design of preferred alternative
- Recommendations on further study if required
- PIC #2
- Develop a monitoring, maintenance and mitigation plan

Documentation

Environmental Screening Report
- Prepare first draft ESR
- Revise and prepare second draft ESR
- Finalize ESR
- Notice of Completion
- 30-day Public Review
- Approval by councils

We Are Here

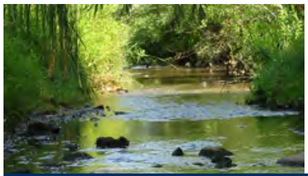
Project Initiation	Field Inventory	Opportunity/ Constraints	PIC #1	Evaluation & Selection	PIC #2	Finalize EA/Master Plan
July 2011	November 2011	February 2012	May 2012	July 2012	Fall 2012	Winter 2013

Essex Region Conservation Authority

Stantec

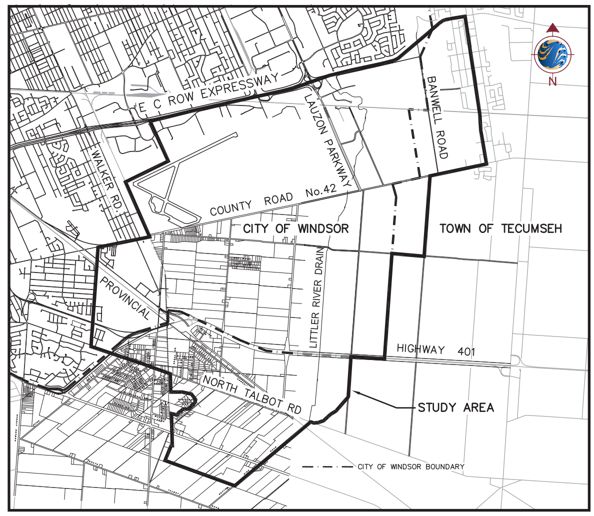
The City of Windsor

Tecumseh



Upper Little River
Stormwater Master Plan Class Environmental Assessment

THE STUDY AREA
The Upper Little River Stormwater Master Plan will focus on the portion of Little River located upstream of the E.C. Row Expressway, including the Windsor Airport.



PROJECT ACTIVITIES
A review of background information and field reconnaissance has been completed and the results are documented. Some of the key findings include:

- Proximity of the site to the Windsor International Airport and bird management concerns influenced the preferred stormwater management solution
- Trails are well used and highly valued by the community
- No endangered species were identified
- Some of the existing municipal drains will be abandoned while others will be enhanced following urban planning strategies

The list of alternatives identified previously has been evaluated and a preliminary solution is proposed:

- Construct stormwater management facilities off-line of Upper Little River to provide mitigation for future development
- Group the facilities into corridors to promote natural corridors and recreational linkages
- Identify trail links to external areas
- Improve water quality and flood impacts along Upper Little River

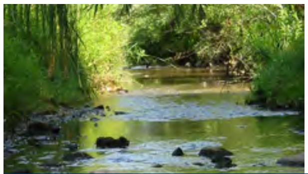
NEXT STEPS
- Comments from today's PIC will be received until November 5, 2012
- Comments received from review agencies and the public will be incorporated into the decision-making process
- Finalize Environmental Study Report and File Class Environmental Assessment

For additional information, please contact:

Stan Taylor, P. Eng.
Director of Source Water Protection
Essex Region Conservation Authority
360 Fairview Avenue West
Essex, Ontario, N8M 1Y8
Tel: (519) 776-5209
Fax: (519) 776-4319
staylor@erca.org

Jayson Innes, M.A.Sc., P. Eng.
Project Manager
Stantec Consulting Ltd.
49 Frederick Street
Kitchener, Ontario, N2H 6M7
Tel: (519) 585-7282
Fax: (519) 579-8664
jayson.innes@stantec.com

Essex Region Conservation Authority　Stantec　The City of Windsor



Upper Little River
Stormwater Master Plan Class Environmental Assessment

COMMENT SHEET

1. The preliminary preferred solution is to construct stormwater corridors along major transportation and environmental corridors off-line of Upper Little River Please provide your comments, questions or concerns below.

2. How would you describe the nature of your interest in the study?
   - ☐ Member of the general public
   - ☐ Resident/landowner within the Study Area
   - ☐ Member of an Interest Group (please specify) ____________
   - ☐ Agency representative (please specify) ____________

3. Do you have any additional comments or information that you feel would be helpful to the project team?
   Please comment: ____________

4. Please provide your name and contact information (optional).

Are you on the project mailing list? ☐ YES ☐ NO, please add my name and contact information to the mailing list

Your completed Comment Sheet will be included in the Class EA report, which will be made public at the completion of this study. Please check the box below if you wish to have your comments included anonymously.

☐ Please withhold my name and contact information from publication in the Class EA report.

You may leave this completed Comment Sheet in the box provided at the registration table for this Information Centre or you may send it by November 5, 2012 to:

Stan Taylor, P. Eng.
Director of Source Water Protection
Essex Region Conservation Authority
360 Fairview Avenue West
Essex, Ontario, N8M 1Y8
Tel: (519) 776-5209
Fax: (519) 776-4319
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Project Manager
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49 Frederick Street
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Tel: (519) 585-7282
Fax: (519) 579-8664
jayson.innes@stantec.com

Thank you for your participation in this study.

Upper Little River
Stormwater Master Plan Class Environmental Assessment

COMMENT SHEET

1. The preliminary preferred solution is to construct stormwater corridors along major transportation and environmental corridors off-line of Upper Little River Please provide your comments, questions or concerns below.
   THE SOURCE(S) / HEADWATERS OF WATERSHED SHOULD BE LABELLED ON THE BASE MAP OF SIGNIFICANT NATURAL AREAS.

2. How would you describe the nature of your interest in the study?
   - ☐ Member of the general public
   - ☐ Resident/landowner within the Study Area
   - ☒ Member of an Interest Group (please specify)
   - ☐ Agency representative (please specify) ______

3. Do you have any additional comments or information that you feel would be helpful to the project team?
   Please comment: ALTERNATIVE #6 IS PREFERRED.
   AIRPORT WOODLANDS NEED TO BE DESIGNATED PSW's ON THE SIGNIFICANT NATURAL AREAS MAP.

4. Please provide your name and contact information (optional).

Are you on the project mailing list? ☒ YES ☐ NO, please add my name and contact information to the mailing list

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☐ Please withhold my name and contact information from publication in the Class EA report.

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360 Fairview Avenue West
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Fax: (519) 579-8664
jayson.innes@stantec.com

Thank you for your participation in this study.

Essex Region Conservation Authority   Stantec   THE CITY OF WINDSOR

Upper Little River
Stormwater Master Plan Class Environmental Assessment

COMMENT SHEET

1. The preliminary preferred solution is to construct stormwater corridors along major transportation and environmental corridors off-line of Upper Little River Please provide your comments, questions or concerns below.
Support options 5 & 6 to facilitate stormwater & flooding management.

2. How would you describe the nature of your interest in the study?
   - ☐ Member of the general public
   - ☐ Resident/landowner within the Study Area
   - ☒ Member of an Interest Group (please specify),
   - ☐ Agency representative (please specify) ______

3. Do you have any additional comments or information that you feel would be helpful to the project team?
Please comment: Good presentation, maps & diagrams.

4. Please provide your name and contact information (optional)

Are you on the project mailing list? ☒ YES ☐ NO, please add my name and contact information to the mailing list

Your completed Comment Sheet will be included in the Class EA report, which will be made public at the completion of this study. Please check the box below if you wish to have your comments included anonymously.

☐ Please withhold my name and contact information from publication in the Class EA report.

You may leave this completed Comment Sheet in the box provided at the registration table for this Information Centre or you may send it by November 5, 2012 to:

Stan Taylor, P. Eng.
Director of Source Water Protection
Essex Region Conservation Authority
360 Fairview Avenue West
Essex, Ontario, N8M 1Y8
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jayson.innes@stantec.com

Thank you for your participation in this study.

Essex Region Conservation Authority
Stantec
The City of Windsor

Upper Little River

Stormwater Master Plan Class Environmental Assessment

COMMENT SHEET

1. The preliminary preferred solution is to construct stormwater corridors along major transportation and environmental corridors off-line of Upper Little River Please provide your comments, questions or concerns below.

   Looking for Morphological Diversity (Wetland Pockets Refuge Pools & Riffles) Riparian Cover & a Meandering Stream to increase Habitat Area.

2. How would you describe the nature of your interest in the study?
   - [x] Member of the general public
   - [ ] Resident/landowner within the Study Area
   - [x] Member of an Interest Group (please specify) ______
   - [ ] Agency representative (please specify) ______

3. Do you have any additional comments or information that you feel would be helpful to the project team?

   Please comment: ______

4. Please provide your name and contact information (optional).

Are you on the project mailing list? [x] YES [ ] NO, please add my name and contact information to the mailing list

Your completed Comment Sheet will be included in the Class EA report, which will be made public at the completion of this study. Please check the box below if you wish to have your comments included anonymously.

[ ] Please withhold my name and contact information from publication in the Class EA report.

You may leave this completed Comment Sheet in the box provided at the registration table for this Information Centre or you may send it by November 5, 2012 to:

Stan Taylor, P. Eng.
Director of Source Water Protection
Essex Region Conservation Authority
360 Fairview Avenue West
Essex, Ontario, N8M 1Y8
Tel: (519) 776-5209
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Fax: (519) 579-8664
jayson.innes@stantec.com

Thank you for your participation in this study.

Essex Region Conservation Authority   Stantec   The City of Windsor   Tecumseh

Upper Little River

Stormwater Master Plan Class Environmental Assessment

COMMENT SHEET

1. The preliminary preferred solution is to construct stormwater corridors along major transportation and environmental corridors off-line of Upper Little River Please provide your comments, questions or concerns below.
   WE LIVE AT THE CORNER OF THE 8TH CONC & BASELINE ROAD. WE WISH TO BE KEPT INFORMED OF ANY DEVELOPMEN AFFECTING OUR LOCATION

2. How would you describe the nature of your interest in the study?
   - ☐ Member of the general public
   - ☑ Resident/landowner within the Study Area
   - ☐ Member of an Interest Group (please specify) ____________
   - ☐ Agency representative (please specify) ____________

3. Do you have any additional comments or information that you feel would be helpful to the project team?
   Please comment: STORM DRAIN PLANS ARE OF INTEREST AS WELL AS WIDENING OF BASELINE RD EAST OF CONCESSION 8

4. Please provide your name and contact information (optional).

Are you on the project mailing list? ☑ YES ☐ NO, please add my name and contact information to the mailing list

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Kitchener, Ontario, N2H 6M7
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Fax: (519) 579-8664
jayson.innes@stantec.com

Thank you for your participation in this study.

Essex Region Conservation Authority

Stantec

The City of Windsor

Essex Region Conservation Authority
sustaining the place for life

THE CITY OF WINDSOR ONTARIO, CANADA

TOWN OF Tecumseh ONTARIO · CANADA

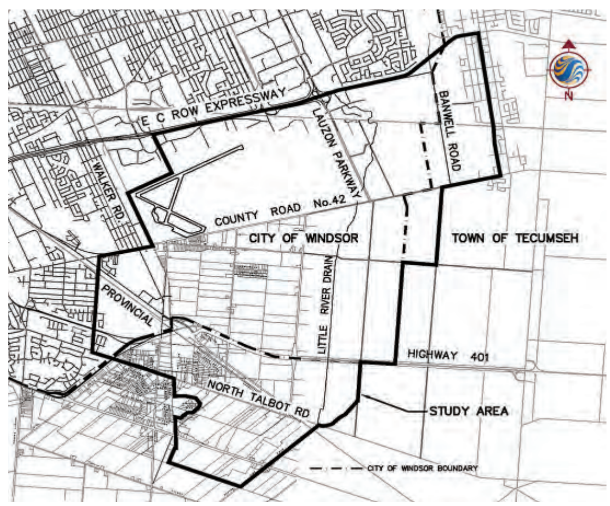
ESSEX REGION CONSERVATION AUTHORITY
NOTICE OF STUDY COMPLETION

UPPER LITTLE RIVER WATERSHED MASTER DRAINAGE PLAN AND STORMWATER MANAGEMENT PLAN

The Study

The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh has completed a Master Plan Study in accordance with Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process. The preferred alternative includes stormwater management facilities that provide controls for more than one property and are located near other facilities along corridors.

Public Consultation



This study was completed in accordance with the planning and design process of the *Municipal Class Environmental Assessment* (June 2000, as amended in 2007, 2011, and 2015) under the *Ontario Environmental Assessment Act.* The Class EA process includes public and review agency consultation, an evaluation of alternatives, an assessment of the impacts of the proposed alternative, and identification of a preferred solution. Based on input received from the public as well as from technical agencies and other stakeholders, the Project Team has prepared the Environmental Study Report (ESR) for this study. The ESR is being placed on the public record for a 30-day review period at www.citywindsor.ca, www.tecumseh.ca, or by visiting the following locations during normal business hours.

City of Windsor Office of the City Clerk 350 City Hall Square West, Suite 203 Windsor, ON, N9A 6S1	Town of Tecumseh Clerk's Office 917 Lesperance Road Tecumseh, ON, N8N 1W9

Interested persons should provide written comments related to this proposed undertaking by **October 30, 2017 (Note: The 30-day review period has been extended from the original end date of October 24, 2017 to the new end date of October 30, 2017.)**. Comments should be directed to the following individuals.

John Henderson, P. Eng.
Water Resources Engineer
Essex Region Conservation Authority
360 Fairview Avenue West – Suite 311
Essex, Ontario, N8M 1Y6
Tel: (519) 776-5209
Fax: (519) 776-8688
jhenderson@erca.org

Jayson Innes, M.A.Sc., P. Eng.
Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, Ontario, N2L 0A4
Tel: (519) 585-7282
Fax: (519) 579-6733
jayson.innes@stantec.com

If concerns regarding this project cannot be resolved, a person or party may request that the Ministry of the Environment and Climate Change make an order for the project to comply with Part II of the Environmental Assessment Act which address individual environmental assessments. Requests for a Part II Order must be received by the Minister of the Ministry of the Environment and Climate Change at 77 Wellesley Street West, 11th Floor, Ferguson Block, Toronto, Ontario, M7A 2T5 no later than **October 30, 2017,** including a copy submitted to the project team members listed above. If no request is received, the Design Study will become the guiding document for stormwater management controls on Upper Little River.

Essex Region Conservation Authority
Notice of Study Update
Upper Little River Watershed Master Drainage and Stormwater Management Plan

Master Plan

The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh is completing a Master Drainage and Stormwater Management Plan for the Upper Little River Watershed (Master Plan). The intent of the Master Plan is to determine general stormwater management infrastructure requirements within the Upper Little River Watershed area to service existing and future development.

Master Plan Process and Approach

As described in the Municipal Class Environmental Assessment (Class EA) document (Municipal Engineers Association, 2000, as amended), there are four approaches that may be followed to complete a Master Plan process. The Master Plan was originally undertaken following Approach #2 with a Notice of Study Completion filed in October 2017. However, due to the overall duration of the project and changes to the Class EA requirements over that time, the Master Plan was not finalized after the 30-day public review period. The Master Plan will now be completed following Approach #1, which is a broader level of assessment. This change in approach results in the requirement for additional detailed investigations at the project-specific level in order to fulfill Class EA requirements for specific Schedule B and Schedule C projects, which will be listed within this Master Plan. No changes have been made to alternatives considered or general Master Plan recommendations.

Next Steps

The project team is currently completing revisions to the Master Plan to address the change in approach and will be issuing a revised Notice of Completion in the fall of 2019. The notice will provide details regarding the timing of the minimum 30-day public review period for the revised Master Plan and the opportunity for bringing project concerns to the project team members below.

Please note that the revised Master Plan Approach #1 will not be subject to Part II Order (PIIO) requests to the Minister of the Environment, Conservation and Parks. Future individual Schedule B and Schedule C projects identified within the Master Plan will be subject to further review and Class EA requirements, including PIIO requests.

For more information, please contact a member of the project team below.

James Bryant, P. Eng.
Water Resources Engineer
Essex Region Conservation Authority
360 Fairview Avenue West
Essex, Ontario, N8M 1Y8
Tel: (519) 776-5209 ext. 246
Fax: (519) 776-8688
jbryant@erca.org

Jayson Innes, M.A.Sc., P. Eng.
Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, Ontario, N2L 0A4
Tel: (519) 585-7282
Fax: (519) 579-6733
jayson.innes@stantec.com

This notice issued on August 31, 2019.

Contact Information	Date/Method of Communication	Comment/Concern	Response/Commitment to Carry Forward
Aamjiwnaang First Nation Chief Joanna Rogers 978 Tashmoo Avenue, Sarnia, ON N7T 7H5 519-336-8410 cplain@aamjiwnaang.ca	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012		
	Notice of PIC#2 via Canada Post – October 17, 2012 Letter Discussing the results from PIC #2 including display boards sent via Canada Post - December 18, 2012	Letter response dated April 15, 2013 noted that the information package would be forwarded to their Chief and Council for review and upon further direction from their council, we will be contacted to inform us of the next step.	No additional information was received
	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call October 26, 2017 Follow up Phone Call December 8, 2017		Follow up phone call – left message with Sharilyn Johnston to confirm receipt of project information and identify any concerns.
Caldwell First Nation Chief Louise Hillier P.O.Box 388 Leamington, ON N8H 3W3 cfnchief@live.com	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012		
	Notice of PIC#2 via Canada Post – October 17, 2012 Letter Discussing the results from PIC #2 including display boards sent via Canada Post - December 18, 2012	Letter Response dated November 27, 2012 requesting further consultation	A meeting was held with Caldwell First Nations on January 7, 2013 to discuss the project. During the meeting the project overview and history was presented. Outcomes of the meeting included a request for black willow and milkweed plantings within the study area and access to the black willow branches for harvesting. Caldwell First Nations also requested a copy of the Final Report for review.
	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call December 8, 2017		Follow up phone call – spoke with Mr. Delearly. Mr. Deleary indicated that they received the information and are dealing with political and organization issues with band council at the moment. Would review files and respond back shortly if there are any concerns.
Chippewas of Kettle and Stony Point First Nation Chief Tom Bressette 6247 Indian Lane Forest ON N0N 1J0 Thomas.bressette@kettlepoint.org	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call November 22, 2017 Follow up Phone Call December 8, 2017		Not noted in November 23, 2011 letter from Ministry of Aboriginal Affairs Notice of Completion sent along with a USB stick containing the full ESR. Follow-up phone call message left with Valerie George to confirm receipt of the project information and inquire if Chippewas of Kettle and Stoney Point First Nation had any concerns. Follow-up phone call message left with Valerie George to confirm receipt of the project information and inquire if Chippewas of Kettle and Stoney Point First Nation had any concerns.
Chippewa of the Thames First Nation Fallon Burch Consultation Coordinator Kelly Riley, Lands and Environment Rochelle Smith, (acting) Consultation Coordinator	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call November 22, 2017. Follow up Phone Call December 8, 2017.		Not noted in November 23, 2011 letter from Ministry of Aboriginal Affairs. Notice of Completion sent along with a USB stick containing the full ESR.

Contact Information	Date/Method of Communication	Comment/Concern	Response/Commitment to Carry Forward
			Follow up phone calls: Attempted to leave message with Kelly Riley (voicemail was full). Follow up phone call: left message with Richelle Smith – made reference to notice of completion and USB stick dated October 16, following up to discuss project and ensure COTTFN didn't have any concerns with the project.
Delaware Nation (Moravian of the Thames) Chief Greg Peters Justin Logan 14760 School House Line RR3 Thamesville ON N0P 2K0 gpeters@mnsi.net loganju@xplornet.ca	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012	Letter Response dated June 13, 2012 stating that the project was evaluated and it was recognized that this project will not require further consultation	
Munsee-Delaware Nation Chief Roger Thomas, Glen Forrest 279 Jubilee Road Muncey ON N0L 1Y0 Chief.thomas@munsee-delaware.org	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call Dec 8, 2017		Not noted in November 23, 2011 letter from Ministry of Aboriginal Affairs Follow up phone call – spoke with executive assistant Carol Antone. Noted that the Chief has a long list of projects to review, and requested that the letter be emailed. Emailed the letter on Dec. 8, 2017. carol@munsee.ca.
Oneida of the Thames First Nation Chief Randall Philips Holly Elijah 2212 Elm Ave Southwold, ON N0L 2G0 sheri.doxtator@oneida.on.ca	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012		
	Notice of PIC#2 via Canada Post – October 17, 2012 Letter Discussing the results from PIC #2 including display boards sent via Canada Post - December 18, 2012		
	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call October 26, 2107 Follow up Phone Call November 23, 2017 Follow up Phone Call December 8, 2017		Follow up phone call – left message with Public Works assistant. Follow up phone call – was referred to Janelle in the Political Office. Left voicemail message with Janelle to confirm receipt of project information and to identify any concerns with the project.
Bkejwanong Territory (Walpole Island) Chief Dan Miskokomon Jared Macbeth Dr. Dean Jacobs Janet.macbeth@wifn.org Wallaceburg, ON N8A 4K9	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012		
	Notice of PIC#2 via Canada Post – October 17, 2012 Letter Discussing the results from PIC #2 including display boards sent via Canada Post - December 18, 2012		
	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call November 23, 2017 Follow-up Phone Call December 8, 2017		Follow up phone call – left message with Janet Macbeth. Follow up phone call – left message with Janet Macbeth to confirm receipt of project information and to identify any concerns with the project.

APPENDIX C

General, Public, and Agency Correspondence

Ministry of the Environment
733 Exeter Road
London ON N6E 1L3
Tel.: 519 873-5000
Fax: 519 873-5020

Ministère de l'Environnement
733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Téléc.: 519 873-5020

Ontario

October 19th, 2011

Stantec Consulting Ltd.
140 Quellette Place
Suite 100
Windsor, Ontario
N8X 1L9

Attention: Mr. Phil Bartnik, Project Engineer, P. Eng.

Re: <u>ERCA Upper Little River Watershed Master Drainage Plan & SWM Plan</u>

Phil:

I am writing you today to acknowledge this ministry's receipt of the Notice of Commencement for the above noted project.

The preparation of Master Plans are an approach to planning that this ministry supports and is willing to provide assistance to. In that regard, in addition to keeping this office abreast of future notices and information regarding this study, if at all possible, this ministry office would appreciate being afforded an opportunity to review and comment on a Draft Watershed Master Drainage Plan & SWM Report, prior to and addition to circulation and commenting on the Final Report.

Yours truly,

Craig Newton
Regional Environmental Planner / EA
Ministry of the Environment
Southwestern Region
(519) 873-5014

Cc – Mr. D. McDougall, Supervisor, MOE Windsor Area Office
- Mr. S. Abernethy, Surface Water Group Leader, Water Resources, MOE SWR

Ministry of Aboriginal Affairs

160 Bloor St. East, 9th Floor
Toronto, ON M7A 2E6
Tel: (416) 326-4740
Fax: (416) 325-1066
www.aboriginalaffairs.gov.on.ca

Ministère des Affaires Autochtones

160, rue Bloor Est, 9e étage
Toronto ON M7A 2E6
Tél. : (416) 326-4740
Téléc. : (416) 325-1066
www.aboriginalaffairs.gov.on.ca

Ontario

RECEIVED

DEC 05 2011

STANTEC CONSULTING LTD.
Consulting Engineers

Reference: 526

NOV 23 2011

Phil Bartnik, P. Eng
Project Engineer
Stantec Consulting Ltd.
140 Ouellette Place Suite 100
Windsor, ON N8X 1L9

Re: Essex Region Conservation Authority Upper Little River Watershed Master Drainage Plan & Stormwater Management Plan

Dear Mr. Bartnik:

Thank you for your inquiry dated October 12, 2011 regarding the above-noted project.

As a member of the government review team, the Ministry of Aboriginal Affairs (MAA) identifies First Nation and Métis communities who may have the following interests in the area of your project:

- reserves;
- land claims or claims in litigation against Ontario;
- existing or asserted Aboriginal or treaty rights, such as harvesting rights; or
- an interest in your project's potential environmental impacts.

MAA is not the approval or regulatory authority for your project, and receives very limited information about projects in the early stages of their development. In circumstances where a Crown-approved project may negatively impact a claimed Aboriginal or treaty right, the Crown may have a duty to consult the Aboriginal community advancing the claim. The Crown often delegates procedural aspects of its duty to consult to proponents. Please note that the information in this letter should not be relied on as advice about whether the Crown owes a duty to consult in respect of your project, or what consultation may be appropriate. Should you have any questions about your consultation obligations, please contact the appropriate ministry.

You should be aware that many First Nations and/or Métis communities either have or assert rights to hunt and fish in their traditional territories. For First Nations, these territories typically include lands and waters outside of their reserves.

In some instances, project work may impact aboriginal archaeological resources. If any Aboriginal archaeological resources could be impacted by your project, you should contact your regulating or approving Ministry to inquire about whether any additional Aboriginal communities should be contacted. Aboriginal communities with an interest in archaeological resources may include communities who are not presently located in the vicinity of the proposed project.

With respect to your project, and based on the brief materials you have provided, we can advise that the project appears to be located in an area where First Nations may have existing or asserted rights or claims in MAA's land claims process or litigation, that could be impacted by your project. Contact information is below:

Bkejwanong Territory (Walpole Island) 117 Tahgahoning Road, R.R. #3 WALLACEBURG, Ontario N8A 4K9	Chief Joseph Gilbert (519) 627-1481 (Fax) 627-0440 Joseph.gilbert@wifn.org Nanette.keywayosh@wifn.org
Oneida Nation of the Thames 2212 Elm Avenue SOUTHWOLD, Ontario NOL 2GO	Chief Joel Abram (519) 652-3244 (Fax) 652-2930 Joel.abram@oneida.on.ca Laura.phillips@oneida.on.ca Holly.elijah@oneida.on.ca

For your information, MAA notes that the following Métis community may be interested in your project given the proximity of their community to the area of the proposed project or because of your project's potential environmental impacts:

Windsor-Essex Métis Council 4745 Huron Church Line Windsor, ON, N9H 1H5	Robert Leboeuf, President (519) 972-1063 TOLL FREE 1-888-243-5148 (Fax) 519-974-3739

Please copy any correspondence to Windsor-Essex Métis Council to the Métis Nation of Ontario. Contact information is below:

Métis Nation of Ontario Head Office 500 Old St. Patrick Street, Unit D Ottawa, Ontario, K1N 9G4	Métis Consultation Unit Fax: (613) 725-4225

The Government of Canada sometimes receives claims that Ontario does not receive, or with which Ontario does not become involved. For information about possible claims in the area, MAA recommends you contact the following federal contacts:

Ms. Janet Townson Claims Analyst, Ontario Team Specific Claims Branch Indian and Northern Affairs Canada 1310-10 Wellington St. Gatineau, QC K1A 0H4 Tel: (819) 953-4667 Fax: (819) 997-9873	Mr. Sean Darcy Manager Assessment and Historical Research Indian and Northern Affairs Canada 10 Wellington St. Gatineau, QC K1A 0H4 Tel: (819) 997-8155 Fax: (819) 997-1366

For federal information on litigation contact:

Mr. Marc-André Millaire
Litigation Team Leader for Ontario
Litigation Management and Resolutions Branch
Indian and Northern Affairs Canada
10 Wellington St.
Gatineau, QC K1A 0H4
Tel: (819) 994-1947
Fax: (819) 953-1139

Additional details about your project or changes to it that suggest impacts beyond what you have provided to date may necessitate further consideration of which Aboriginal communities may be affected by or interested in your undertaking. If you think that further consideration may be required, please bring your inquiry to whatever government body oversees the regulatory process for your project.

The information upon which the above comments are based is subject to change. First Nation or Métis communities can make claims at any time, and other developments can occur that could result in additional communities being affected by or interested in your undertaking.

Yours truly,

Heather Levecque

Heather Levecque
Manager, Consultation Unit
Aboriginal Relations and Ministry Partnerships Division

Delaware Nation Housing and Lands Department
Wiikhutiin waak Ahkiing

Moravian of the Thames
Delaware Nation Council

14760 School House Line, Thamesville, ON N0P 2K0
***Office located at 14979 School House Line, Moraviantown*

Tel: (519) 692-4290
Fax: (519) 692-3453

Wednesday, June 13, 2012

RECEIVED
JUN 19 2012
STANTEC CONSULTING LTD.
Consulting Engineers

Phil Bartnik, P.Eng.
Project Engineer
Stantec Consulting Ltd.
140 Ouellette Place Suite 100
Windsor, ON
N8X 1L9

Dear Mr. Bartnik,

I have reviewed the documentation received May 23, 2012 to the best of my ability and find the **Essex Region Conservation Authority Upper Little River Watershed Master Drainage Plan & Stormwater Management Plan** does not require any further consultation.

The information sent regarding the above mentioned project was evaluated and it was recognized that this project will not require any further discussion with the Delaware Nation, Moravian of the Thames First Nation.

Thanks for your time and consideration in this matter.

Sincerely,

Tina Jacobs
Lands and Resource Consultation Manager
Delaware Nation

Cc: Mr. Rick Peters - Director Operations, Chief Greg Peters

Regional Engineering
Engineering Services

Canadian National Railway
4 Welding Way
P.O. Box 1000
Concord, Ontario L4K 1B9
Tel.: 905-669-3184
Fax: 905-760-3406

4th, September, 2012

Phil.bartnik@stantec.com
Stantec Consulting Ltd.
140 Ouellette Place Suite 100
Windsor, ON
Canada N8X 1L9

Dear Sir or Madam:

Re: Essex Region Conservation Authority Upper Little River Watershed Master Drainage Plan & Stormwater Management Plan

Thank you for the letter, informing us of the above noted project. There appears to be CN property within the said boundaries and therefore CN Rail has concerns and comments regarding this project. Please keep CN on the project mailing list.

CN tracks, Chatham Subdivisions, are operating through the study area. It will require having involvement from CN, please feeling free to contact the undersigned.

Sincerely,

Derek Basso

Derek Basso
Utilities Coordinator
905-669-3184
Derek.Basso@cn.ca

Caldwell First Nation

Head Office: 22361 Austin Line, Bothwell, ON N0P 1C0
Branch Office: P.O. Box 388, Leamington, ON, N8H 3W3
Chief Louise Hillier: Box 388, Leamington, ON N8H 3W3
Phone: 519-322-1766 * **Fax:** 519-322-1533

November 27, 2012

Phil Bartnik, P.Eng.
Project Engineer

Re: Project – Essex Region Conservation Authority
Upper Little River Watershed Master Drainage Plan &
Stormwater Management Plan

SUBJECT: CONSULTATION WITH FIRST NATION

This correspondence is to inform you that you have not complied with government protocol in regards to "consultation with First Nations".

Consultation is not sending your correspondence that may or may not include your project plans or progress or reports.

Consultation is meaningful dialogue between two parties. This has not taken place at any point with Caldwell First Nation.

Caldwell First Nation's traditional land extends from the Detroit River to Long Point. If your project falls within this geographical area, you are required to engage in "consultation" with the Caldwell First Nation.

We do not support or encourage your project and you should cease any further development until "consultation" with Caldwell First Nation has taken place.

Copies of this correspondence will be forwarded to the appropriate government offices.

Meegwetch

Chief Louise Hillier
Caldwell First Nation

January 7, 2013

Ministry of Transportation
Windsor Border Initiatives Implementation Group
659 Exeter Road
London, Ontario
N6E 1L3

Attention: Mr. Rakesh Shreewastav

RE: Upper Little River Watershed Master Drainage Plan & Stormwater Management Plan Study

Dear Sir:

On October 22, 2012 we attended the Public Information Centre #2 held by McCormick Rankin on behalf of the Ontario Ministry of Transportation, the City of Windsor and the County of Essex. A further meeting was held on November 27, 2012 attended by representatives from The Ministry of Transportation, The City of Windsor, McCormick, Rankin Corporation and .

owns a fifty six (56) acre parcel of land on the south side of County Road #42, west of Lauzon Parkway, with a frontage of approximately 644' on County Road #42.

We strenuously object to several issues that are being proposed by the preferred plan as it would sterilize the use of our lands, based on the following:

(a) The preferred option depicts that Lauzon Parkway (a proposed Four (4) Lane Highway) would run directly through our property, bisecting the land. Since this road is shown as being a major thoroughfare, we assume the minimum width of 120' would be required for the road portion on County Road #42.

(b) The preferred plan shows the Little River Drain (which forms the western boundary of our property) will be expanded to a width of approximately 100m to the top of drain. This would necessitate utilizing a further portion of our frontage on County Road #42, leaving our company with a sliver of land fronting County Road #42.

(c) As well, there is consideration being given to the Lauzon Parkway Road to be relocated further west to abut the expanded Little River Drain. As the majority of the frontage would be used for the Lauzon Parkway Extension and the expanded Little River Drain, this does little to mitigate the damages to our company.

purchased this property for its strategic location across from the Windsor Airport. However, the preferred road and drainage locations presented at Public Information Centre #2 hinders our ability to develop the property and will greatly impact the utilization of our lands as it takes the majority of the frontage on County Road #42.

The City of Windsor supported a concept of mixed use commercial development in the 2006 report prepared by Stantec Consulting Ltd. However, we were advised by the City of Windsor to wait until the sewers became available before proceeding with any form of development. Sewers were recently installed along Lauzon Parkway and we are now in a position to consider development of our lands. Due to the proposed road location/green space requirements proposed at the Public Information Centre #2, the City of Windsor has now advised us that they will not consider any zoning changes to allow commercial development as originally intended. It is obvious that our property is now sterilized since no zoning can occur.

At the November 27, 2012 meeting, it was apparent to us that the Ministry of Transportation, and the City of Windsor intend on continuing with the preferred option that was depicted at the Planning Information Centre#2 on October 22, 2012. In fact, representatives from the Ministry of Transportation acknowledged the negative impact the proposed road location would have on our property.

We hereby ask that the location of the road be reconsidered. It is our recommendation to extend Lauzon Parkway further south from its existing location where it currently intersects with County Road #42 – through the Kennette Contracting property, which is east of our lands. Lauzon Parkway could then swing further west as it moves southerly. This scenario would still enable us to utilize some frontage along County Road #42.

In the alternative, the Government of Ontario/City of Windsor should proceed to negotiating for the purchase of the property immediately – not at some undetermined future date which would add to our carrying costs for the property. On November 27, 2012, it was stated by a Ministry of Transportation representative that there is no committed program to the next phase of this project after the current Environmental Assessment stage. It is completely ludicrous and unfair that the Government of Ontario or the City of Windsor would expect us to wait an undetermined amount of time before funding is made available for the construction of the Lauzon Parkway extension. This is "expropriation without compensation".

We await your immediate response.

c.c. Mr. Bob Felker, MTO Windsor BIIG
Mr. David Reis, MTO Windsor BIIG
Ms. Josette Eugeni, City of Windsor
Mr. Michael Cooke, City of Windsor
Ms. Anna Godo, City of Windsor
Ms. Jennifer Leitzinger, City of Windsor
Mr. Frank Scarfone, City of Windsor
Ms. Simona Simion, City of Windsor
Mr. Michael Chiu, McCormick, Rankin Corporation
Mr. Stan Taylor, Director of Source Water Protection, ERCA
Mr. Jayson Innes, Project Manager, Stantec Consulting Ltd.

January 30, 2013

Council Services
City of Windsor
350 City Hall Square West
Room #203
Windsor, Ontario
N9A 6S1

Re: City of Windsor Official Plan Amendment #91 (File Number OPA/3586)

Please be advised that I am unable to attend the Public Meeting for the City of Windsor Official Plan Amendment #91 scheduled for Monday, February 11, 2013 at 4:30 p.m. as I will be out of the country.

Our subject lands are municipallv known as

At the time of this written correspondence, a copy of the Proposed Official Plan Amendment and the planning report were not available for our review. I submit our concerns/ objections regarding the Proposed Official Plan Amendment #91 as follows:

- Inclusion of the tree line (see attached map) which is depicted as "Natural Heritage System" on Schedule D Land Use for the City of Windsor Sandwich South Secondary Plan. This **tree line** was planted by our family to act as a wind barrier between the farm parcels. None of these trees are indigenous to the area and it should not be included within the "Natural Heritage System" designation;

- The "Upper Little River – Stormwater Master Plan Class EA" also depicts wide (approximately 30 metre) areas designated "Natural Heritage System" along the north and west border of our property to accommodate their alternatives to stormwater management. A much wider "Natural Heritage System" designation for an "open" municipal drain with linear ponds will further impact future development potential for our lands. Setback requirements for residential uses will be greatly impacted on our property due to the "open" municipal drain and its' relocation as part of the "Upper Little River – Stormwater Master Plan Class EA" study.

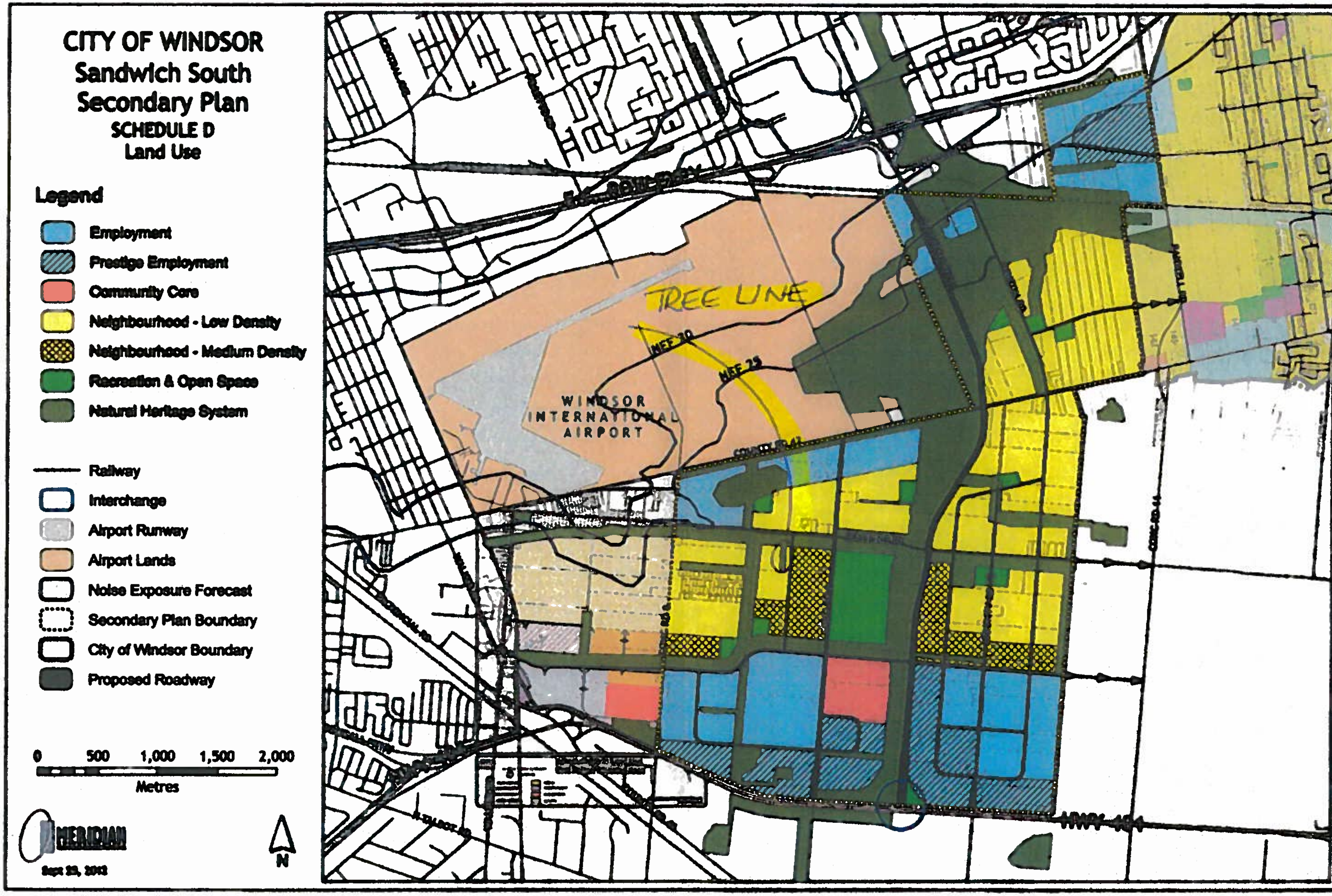
- The proposed designation of "Neighbourhood – Low Density" for our lands is not appropriate due to future development constraints (of an environmental and drainage nature). Give the constraints, future land assembly in this area seems likely. As such, given the adjacent properties designated "medium density" it seems appropriate that our property should be designated "Neighbourhood – Medium Density" to facilitate future land assembly and maintain future marketability for our lands by future developers.

- Finally, it appears that the natural drainage of the lands runs south to north, and as such, lands will have to be assembled for development to accommodate drainage as well as other development constraints. We are requesting that "land use" policies be included within the "City of Windsor – Sandwich South Secondary Plan" that encourages land assembly for our lands and the adjacent "medium density" area.

Further, please accept this letter as our written request to be notified of any adoption of the proposed official plan amendment #91 or of the refusal of a request to amend the official plan, so that we may be entitled to be added as a party to the hearing of an appeal of the Official Plan Amendment #91 before the Ontario Municipal Board.

Yours truly,

Attch: Map Schedule Depicting Land
Notice of Public Meeting – File# OPA/3586


CITY OF WINDSOR
Sandwich South
Secondary Plan
SCHEDULE D
Land Use
Legend
Employment
Prestige Employment
Community Core
Neighbourhood - Low Density
Neighbourhood - Medium Density
Recreation & Open Space
Natural Heritage System
Railway
Interchange
Airport Runway
Airport Lands
Noise Exposure Forecast
Secondary Plan Boundary
City of Windsor Boundary
Proposed Roadway
0
500
1,000
1,500
2,000
Metres
N
MERIDIAN
TREE LINE
NEF 30
NEF 25
WINDSOR INTERNATIONAL AIRPORT
HWY 401

CITY OF WINDSOR

NOTICE OF COMPLETE APPLICATION
NOTICE OF PUBLIC MEETING TO CONSIDER AN AMENDMENT TO THE CITY OF WINDSOR OFFICIAL PLAN

FILE NUMBER OPA/3586

TAKE NOTICE that a complete application for an amendment to the City of Windsor Official Plan has been received and that a public meeting will be held to consider the proposed amendment:

PLANNING & ECONOMIC DEVELOPMENT STANDING COMMITTEE
Monday, February 11, 2013 at 4:30 pm
Council Chambers, Third Floor, City Hall, 350 City Hall Square West, Windsor, Ontario

This is the statutory public meeting required by the Planning Act. The purpose of this meeting is to give the public an opportunity to comment, and for the PLANNING & ECONOMIC DEVELOPMENT STANDING COMMITTEE to make recommendation to Council, on the proposed amendment.

The meeting is open to any person. You will have an opportunity to speak on the proposed amendment. Written comments are also acceptable. Any personal information may become part of the public record.

Schedule A attached provides an explanation of the purpose and effect of the proposed official plan amendment and a description of the subject land, a key map showing the subject land, or an explanation why no description or key map is provided.

To receive a copy of the Planning Report or the recommendation of the PLANNING & ECONOMIC DEVELOPMENT STANDING COMMITTEE or to view additional information or material contact
Simona Simion at 519-255-6543 x6397 or ssimion@city.windsor.on.ca.

To confirm the date, time and location of this meeting, to speak on this matter and be listed as a delegation, or to receive a copy of the Council decision or the amending by-law call **Council Services at 519-255-6432.**

If a person or public body does not make oral submissions at a public meeting or make written submissions to the City of Windsor before the proposed official plan is adopted, the person or public body is not entitled to appeal the decision of the City of Windsor to the Ontario Municipal Board.

If a person or public body does not make oral submissions at a public meeting or make written submissions to the City of Windsor before the proposed official plan amendment is adopted, the person or public body may not be added as a party to the hearing of an appeal before the Ontario Municipal Board unless, in the opinion of the Board, there are reasonable grounds to do so.

If you wish to be notified of the adoption of the proposed official plan amendment, or of the refusal of a request to amend the official plan, you must make a written request to:

Council Services
City of Windsor
350 City Hall Square West, Room 203
Windsor, ON N9A 6S1

This application will be considered by City Council at a future date. All persons interested in attending the Council meeting should check the **Civic Corner** in the **Windsor Star**, the City of Windsor website at **http://www.citywindsor.ca/000060.asp** or call **311** for details about the Council Meeting date.

DATED at the City of Windsor January 18, 2013.

Steve Vlachodimos Deputy City Clerk
Valerie, Critchley, City Clerk
Windsor, Ontario

SCHEDULE 'A'

PART 1- An explanation of the proposed Official Plan Amendment change

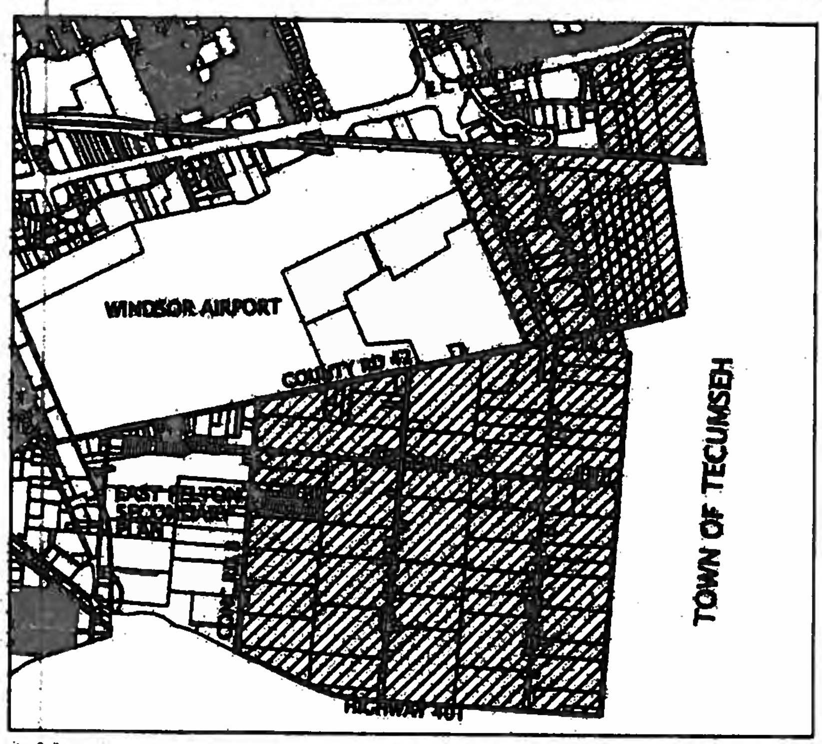
The purpose of this amendment is to:

- Amend Volume II: Secondary Plans and Special Policy Areas of the City of Windsor Official Plan by adding a new section to incorporate the goals, objectives, policies, development plan, implementation measures and associated schedules as the Sandwich South Secondary Plan
- Amend Schedule A: Planning Districts and Policy Areas, in the City of Windsor Official Plan Volume I to identify Sandwich South Secondary Plan Area
- Amend Schedule D: Land Use, in the City of Windsor Official Plan Volume I to re-designate lands from 'Future Urban Area' and 'Future Employment Area' as identified on Schedule D of this amendment

The Sandwich South Secondary Plan Study Area consists of a portion of the Transferred Lands that were added to the City of Windsor, which were formerly in the Town of Tecumseh, generally south and east of the Windsor International Airport. The Secondary Plan project has been undertaken in a parallel process with an Environmental Assessment (EA) Study of the Lauzon Parkway which commenced in 2011.

NOTE: If any additional information is required regarding this matter, please contact Michael Cooke, Manager of Planning Policy at 519-255-6543, ext. 6102 or Simona Simion, Research and Policy Support Planner at 519-255-6543, ext. 6397 or ssimion@city.windsor.on.ca.

PART 2- A key map showing the location of the lands affected by the Official Plan Amendment change



SCHEDULE 'A'

APPLICANT: CITY OF WINDSOR

SUBJECT LAND

DATE: JANUARY, 2013
OPA # [illegible]
FILE NO: OPA [illegible]

CITY OF WINDSOR

AAMJIWNAANG FIRST NATION
CHIPPEWAS OF SARNIA
Band Council

978 TASHMOO AVENUE
SARNIA, ONTARIO
N7T 7H5
Phone: (519) 336-8410
Fax: (519) 336-0382

April 15, 2013

File # 2013-0018

Stantec Consulting Ltd.
140 Ouelette Place
Suite 100
Windsor, Ontario
N8X 1L9

Attention: Phil Bartnik

Re: **Upper Little River Watershed Master Drainage Plan & Stormwater Management Plan Essex Region Conservation Authority**

Dear Mr. Bartnik:

Thank you for the letter and information package regarding this project dated December 18, 2012. Our staff has recorded this information in our log. Over the next few weeks it will be forwarded to our Chief and Council for their review. Upon further direction from our council, we will contact you to inform you of the next step.

Aamjiwnaang First Nation continues to assert and exercise our Aboriginal Rights and Title to all parts of our Reserve and Traditional Territory in regards to lands and resource issues.

Sincerely,

for /

Sharilyn Johnston
Environmental Coordinator
Aamjiwnaang First Nation

RECEIVED

APR 18 2013

STANTEC CONSULTING LTD.
Consulting Engineers

"Saving our Home and Native Land"

29 October 2013

Jayson Innes
Project Manager
Stantec Consulting Ltd.
49 Frederick Street
Kitchener, Ontario
N2H 6M7

Dear Mr. Innes:

Re: *Upper Little River Stormwater Master Plan Environmental Assessment* – City of Windsor

We act for owners of an 11.4 ha agricultural parcel in the City of Windsor bounded on the north by County Road No. 42, on the east by Little River, on the south by a wooded parcel and on the west by agricultural lands (refer attached).

has been following the Sandwich South Secondary Plan process which you may be aware has currently been put on hold by the City and, we are advised, unlikely to be resumed until completion of the *Lauzon Parkway EA*. As the *Upper Little River Stormwater Master Plan EA* may affect the development possibilities and potential of the subject lands arising out of the Sandwich South Secondary Plan, please consider this our request on behalf of our client to be added to your communications list for any and all upcoming public notices or public meetings with respect to the *EA*. At this point, we would appreciate your confirmation of what stage of the process you are in with respect to the *EA* as well as when approximately any future public meetings are anticipated and the expected completion date of the exercise.

Yours very truly,

RECEIVED
NOV - 4 2013
STANTEC CONSULTING LTD.

c.c.

attachment

September 11, 2019

VIA EMAIL

James Bryant
Water Resources Engineer
Essex Region Conservation Authority
360 Fairview Avenue West
Essex, ON N8M 1Y8

RE: Upper Little River Watershed Master Drainage and Stormwater Management Plan Essex Region Conservation Authority

Dear Mr. Bryant,

We have received notification concerning the above-mentioned project, issued August 31, 2019. The proposed project is located within the Mckee Treaty Area (1790) to which Chippewas of the Thames First Nation (COTTFN) is a signatory. It is also located within Big Bear Creek Additions to Reserve (ATR) land selection area, as well as COTTFN's Traditional Territory.

We presently do not have enough information to determine the impacts associated with your project. Please provide updates and studies as they become available to consultation@cottfn.com. As well, if there is an Archaeology Assessment conducted, we require notification and the opportunity to actively participate by sending First Nation field liaisons on behalf of this First Nation.

We look forward to continuing this open line of communication. To implement meaningful consultation, COTTFN has developed its own protocol — a document and a process that will guide positive working relationships. We would be happy to review COTTFN's Consultation Protocol with you. The protocol is available at www.cottfn.com/consultation.

Please do not hesitate to contact me if you need further clarification of this letter.

Sincerely,

Fallon Burch
Consultation Coordinator
Chippewas of the Thames First Nation
(519) 289-5555 Ext. 251
consultation@cottfn.com

Encl. INV-9-003-19

c: Jayson Innes, Project Manager, Stantec Consulting Ltd.

Chippewas of the Thames First Nation
Treaties, Lands & Environment Department

320 Chippewa Rd.
Muncey, Ontario N0L 1Y0

P: 519-289-5555
F: 519-289-2230

Consultation@cottfn.com
www.cottfn.com/consultation

Bill To: Essex Region Conservation Authority
Address: 360 Fairview Avenue West
Essex , ON N8M 1Y8

Phone: (519) 776-5209 Ext. 246
Fax: (519) 776-8688
Email: jbryant@erca.org

Invoice #: 9-003-19
Invoice Date: 09-12-2019

Invoice For: Upper Little River Watershed Master Drainage and Stormwater Management Plan

Item #	Description	Qty	Unit Price	Discount	Price
1	Filing Fee	1	$ 125.00	$ -	$ 125.00
2	1 - Consultation Coordinator	1	$ 85.00	-	42.50

Make all checks payable to: Chippewas of the Thames First Nation 320 Chippewa Rd. Muncey, ON N0L 1Y0 Attn: Wiindmaagewin	Invoice Subtotal	$ 167.50
	Administration Fee	15.00%
	Other	
	Deposit Received	
** Charges comply with the *Consultation Service Fees Schedule, Appendix D of the* Wiindmaagewin	TOTAL	$ 192.63

Comment #	Date	From		Comment	Response
1	2015-01-13	Windsor	AG	1. Under Section 8.1 (Next Steps), should the next step be to develop a functional design for the Upper Little River system prior to undertaking final design for specific development blocks? Do we have enough information to include parameters for the functional design in this report?	Text updated to refer to functional design. Additional information has been included in text including storage volumes and peak flow rates to facilitate functional design.
2	2015-01-13	Windsor	AG	2. Under the Lauzon Parkway Class EA, the consultant was having trouble figuring out how to drain the E-W Arterial Road east of Lauzon Parkway. One suggestion is to extend the E-W Arterial SWM facility. Can we include this in our report?	Yes. The corridor is proposed to extended east of the Lauzon Parkway along the E-W arterial.
3	2015-01-13	Windsor	AG	3. Should add some text similar to this excerpt from Chapter 7, East Pelton Planning Area, from the Windsor of Windsor Official Plan, Volume II. Stormwater Management, 7.6.26 To provide for a stormwater management system which minimizes the impact of urban development on the natural environment, is integrated as an amenity within the existing drain system and the open space system. It is capable of meeting applicable water quality and quantity requirements while minimizing any potential impacts on the Windsor International Airport related to waterfowl.	additional text has been added to section 2.0
4	2015-01-13	Windsor	AG	Don't the remaining phases of the EA process need to be completed prior to implementation?	text updated. The next steps assume the EA has been approved
5	2015-03-20	Windsor	AG	Archaeology Report - Pages 1.1 & 1.3, last sentence of 1st paragraph. prior to the expansion of water services within the study area It would be more correct to say that it was "prior to the expansion of storm sewer services within the study area", or municipal stormwater management system, but not related to water.	Text to be updated to "prior to the construction of the stormwater management system"
6	2015-03-20	Windsor	AG	Archaeology Report Page 3.15, I do not understand the following sentence from the last paragraph: The Little River springs from within the northern portion of the study area.	Text to be updated to "The Little River originates in the southern portion of the study area"
	Executive Summary				
7	2015-01-13	Windsor	various departments	Do not refer to Little River as a Creek.	All references to Little River as a creek have been removed
8	2015-01-13	Windsor	various departments	Delete 3 duplicate paragraphs on page ii. The following was repeated 2x in the exec summary p ii and iii (see email)	Duplicate text has been deleted
9	2015-01-13	Windsor	various departments	Should add to the Executive Summary under the main objectives paragraph, something to the effect that – the study anticipated development of the lands by multiple land owners and addresses/supports the ability of individual land owners to proceed.	Text updated
10	2015-05-27	ERCA	JH	ii -The highlighted section is a duplication of information in the previous paragraphs.	Refer to comment 8
11	2015-05-27	ERCA	JH	v - A dry pond alone will not provide "normal" quality protection ("combined with a treatment train approach" inserted)	Text updated
12	2015-05-27	ERCA	JH	vii - form changed to from	Text updated
13	2015-05-27	ERCA	JH	vii - "area" or "number"	Text changed to "number"
	1.0 Introduction and project Justification				
14	2015-05-27	ERCA	JH	page 1.1, Creek deleted	Text updated
	3.0 Project Approach				
15	2015-05-27	ERCA	JH	Page 3.1, mitigative changed to mitigation	Text updated
	3.2 Issues and Constraints				
16	2015-05-27	ERCA	JH	Page 3.2, Should protection of fish/habitat be included in this list?	protection of fish and fish habitat were added to the list
	3.3 Public Involvement				
17	2015-01-13	Windsor	various departments	Page 3.5, note that PIC#2 was held in conjunction with Lauzon Parkway Environmental Assessment and SS Secondary Plan PIC's, i.e. In addition, PIC #2 for the Lauzon Parkway Environmental Assessment and the third workshop for the Sandwich South Secondary Plan were held concurrently at the same location.	Text updated
18	2015-01-13	Windsor	various departments	Page 3.11, 2nd bullet point. Is text referring to Baseline Road in Windsor? If so, it is not Little Baseline Rd.	Text updated to refer to Baseline Road
19	2015-01-13	Windsor	various departments	Page 3.12. Clarify which study recommended the limits of proposed E-W Arterial Road. Confirm that the East Pelton Secondary Plan identified a corridor from Walker Road to 8th Concession Road.	Text updated to refer to the Windsor Annex Area Master Plan Study (2006) and East Pelton Secondary Plan (2009) for the extents of the east-west arterial
20	2015-05-27	ERCA	JH	Page 3.4. "that was" inserted in last paragraph	Text updated
21	2015-05-27	ERCA	JH	Page 3.5, "that" inserted in 4th paragraph from bottom	Text updated
	3.4.1 Provincial Policy Statement				
22	2015-05-27	ERCA	JH	page 3.6, The 2014 PPS (Section 3.1.3) also includes consideration for climate change that may increase the risk associated with natural hazards. Climate change is also noted in other section of the 2014 PPS. Similar to other items, climate change should be identified/considered in this document.	additional text has been added to section 3.4.1, and 7.7 regarding climate change.
	3.4.5 Summary of Policy Implications				
23	2015-05-27	ERCA	JH	page 3.9, "Master Plan Environmental Assessment Environmental Study Report" inserted and "Stormwater and Master Drainage Plan" deleted	Text updated
	3.5.2 Turkey Creek and Little River Subwatershed Study				
24	2015-05-27	ERCA	JH	page 3.10, "r" deleted from Little in heading	Text updated
25	2015-05-27	ERCA	JH	Page 3.11, Provincal changed to Provincial	Text updated
	4.1 Ecology				
26	2015-05-27	ERCA	JH	Page 4.1, General Comment: Appendices are referenced in this section but have not yet been provided. Do the Appendices contain additional plans/maps that identify where the identified flora, fauna, etc. were observed or have the potential to be within the study area. This is important information for the next component of the planning process (functional design) for the Upper Little River Study Area. Including plans/maps in the main body of the report would be helpful.	All of the plans were included in the main body of the report. The appendix information generally consists of tables (included in Appendix D).
27	2015-05-27	ERCA	JH	Page 4.1, from second paragraph (highway 3 to the south): The western boundary of the study area is not defined.	The description of the site has been removed from Section 4.1. It is discussed in Section 1
	4.1.3 Ecological field Studies and Investigations				
28	2015-05-27	ERCA	JH	Page 4.2, "the" deleted from 2nd paragraph from the bottom	Text updated

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	4.1.4.1 Aquatic Habitat Assessment				
29	2015-05-27	ERCA	JH	Page 4.6, "HADD" deleted and replaced with "impacts to fish and fish habitat": HADD is now old terminology from the previous version of the Fisheries Act. Update throughout the report as required.	Text updated
30	2015-05-27	ERCA	JH	Page 4.7, from first paragraph: Where are the proposed stream crossings and how were they selected?	The Waldron report dealt with a new sanitary sewer. Every drain the sewer crossed was studied. Specific details are in the Waldron report
	4.1.5.1 Designated Environmental Features				
31	2015-05-27	ERCA	JH	Page 4.7, 3rd paragraph from the bottom "and" inserted between "Parkway" and "north"	Text updated
32	2015-05-27	ERCA	DL	page 4.7, final paragraph: The study should utilize the most recent natural heritage information available through ERCA. The study area does contain Provincially Significant Wetlands within the Airport Woods, which is not recognized within this study. In addition, priority restoration opportunities as defined through the Essex Region Natural Heritage System Strategy (ERNHSS) should also be considered as informing an overall natural heritage system for the watershed. The natural heritage system should not contain infrastructure associated with stormwater management due to incompatibilities associated with contaminants within SWM facilities.	Text updated
33	2015-05-27	ERCA	JH	page 4.8, "one" replaced with "two" before "zone floodplain policy"	Text updated
	4.1.5.6.2 Vegetation Communities				
34	2015-05-27	ERCA	DL	page 4.9, with regards to the ELC system: The study has characterized the vegetation communities in accordance with the ELC First Approximation evaluation system, which was published in 1998. In 2008, the ELC evaluation system was revised and reorganized to yield a more accurate and extensive characterization of vegetation community types. This 2008 version of the ELC has been well promoted and extensively applied by those professionals who are certified as ELC evaluators within southern Ontario. This version of the ELC is the currently accepted standard that is to be utilized for vegetation community characterization until further revisions to the ELC are published. Any ecological evaluation which applies the ELC system is required to apply the 2008 version of the ELC system in order to be considered valid. One of the significant changes made within the 2008 ELC system was the reorganization of many of the vegetation types that, within the First Approximation, were listed under the "Cultural" ELC Community Class. This was done specifically to address the issue of private consultants misinterpreting or intentionally misapplying the "cultural" descriptor as meaning that a particular vegetation community was not considered significant or of value ecologically due to some anthropogenic origins and influences. Although this connotation was not the intent of the First Approximation publication, in order to eliminate any misinterpretation or misapplication of the ELC in this regard, the ELC system was subsequently reorganized eliminating the use of the moniker "cultural". Any references to ELC vegetation types containing the word "cultural" are therefore not in accordance with currently accepted ELC standards.	Text updated
	4.1.5.6.4 Wildlife and Wildlife Habitat				
35	2015-05-27	ERCA	JH	Page 4.15, 2nd paragraph from the bottom: Fix paragraph indent.	Text updated
	4.1.5.7 Aquatic Resources				
36	2015-01-13	Windsor	various departments	Page 4.20, Table 4. Is 7th Concession Drain classified, or is this considered the 7th Street Drain Diversion?	7th Concession Drain is shown as a Class F drain
37	2015-01-13	Windsor	various departments	Check how Figure 5 is referenced. Page 4.23, 2nd last paragraph – should it reference Figure 4?	This reference was removed
38	2015-01-13	Windsor	various departments	Where is Figure 5 referenced in the report?	reference was added in section 4.1.5.6.2
39	2015-05-27	ERCA	JH	page 4.19, Figure 4 only shows the drains that were surveyed and numbered sites with different symbols. The symbols and numbering are not defined. Additional information should be included in the Figure 4 legend.	drain descriptions are provided in Table 3
40	2015-05-27	ERCA	JH	Table 4 (Page 4.20), General Comment: Review DFO drain classification mapping.	Table 4 has been updated
41	2015-05-27	ERCA	JH	Table 4: The 6th Concession Drain is generally considered a Type E drain from the CN Railway property to the Little River.	agreed
42	2015-05-27	ERCA	JH	Table 4: Should this be Little River at Rivard Drain?	Text updated
43	2015-05-27	ERCA	JH	Table 4: Gouin Drain is typically wet.	DFO drain classification lists Gouin Drain as Type F
44	2015-05-27	ERCA	JH	Table 4: Little River is Type E to 6th Concession Drain.	Little River to 6th Concession has been changed to Type E
45	2015-05-27	ERCA	JH	Table 4: Could not find the location of Reach 14 on Figure 4.	Reach 14 which overlapped with reach 1 was removed from the table.
46	2015-05-27	ERCA	JH	Table 4: Reach 17 is the 7th Concession Drain not the 7th Street Drain. Does the 7th Street Drain Diversion cause the lower reach of the 7th Concession Drain to have permanent flow?	Reach 17 has been renamed. The Drain classifications are based on the DFO Drain Classification List
47	2015-05-27	ERCA	JH	Table 4: The 10th Concession Drain is upstream (south) of Baseline Road and flows easterly along Baseline Road to the Sullivan Creek Drain	Reach 21 was renamed to Little 10th Concession Drain
48	2015-05-27	ERCA	JH	Table 4: Little 10th Concession Drain is from Baseline Road to Little River.	Figure updated to stop at Baseline Road
49	2015-05-27	ERCA	JH	page 4.22, 2nd last paragraph: The drains where aquatic surveys were undertaken are shown with blue lines on Figure 3. It would be helpful to have the actual sampling locations included on this Figure.	Figure reference changed to 4.
50	2015-05-27	ERCA	JH	page 4.23, first paragraph: The Puce River and Pike Creek are not within the study area.	Text updated
51	2015-05-27	ERCA	JH	page 4.23 figure reference: Should this be figure 6?	This reference was removed
	4.1.5.7.3 Water Quality				
52	2015-05-27	ERCA	JH	page 4.24; indicative changed to indicating in first paragraph	Text updated
	4.1.6 Ecology Summary				
53	2015-05-27	ERCA	JH	page 4.27, This does not appear to include all drains with fish habitat (i.e.. 9th Concession Drain, 7th Concession Drain, etc.	Text updated
54	2015-05-27	ERCA	JH	page 4.27, The airport woodlots are PSW's	Airport woodlots to be included as PSWs

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55	2015-05-27	ERCA	JH	page 4.27, The regional storm in the Essex Region is Hurricane Hazel. The statement is correct, however, ERCA only regulates to the 1:100 year storm event. It would be more representative to state during the regulatory 1:100 year storm event.	Text updated
56	2015-05-27	ERCA	DL	page 4.27, Provincially rare (S1 to S3) species and species of Special Concern may indicate Significant Wildlife Habitat.	Text updated
	4.1.6.1 Summary of Environmental Constraints				
57	2015-05-27	ERCA	JH	Should base flow be included in this list?	Base flow has been added to the list
	4.2.8 Little River Flow				
58	2015-05-27	ERCA	JH	page 4.33, 3rd paragraph from the bottom: The identifier (i.e. SW4) for each monitoring site should be shown on Figure 12.	figure updated
	4.2.9 Potential Mitigation Measures				
59	2015-01-13	Windsor	various departments	Page 4.34, the group should review/comment on the recommended mitigation measures o Perforated storm laterals. DISADVANTAGES o Perforated Pond Outlets. DISADVANTAGES o Soak away Pits / Infiltration Trench. DISADVANTAGES o Longer Drawdown Times for SWM Facilities.	agreed. Additional review/comment from the group could be beneficial
60	2015-01-13	Windsor	various departments	Page 4.36. Check wording of "Base flow temperatures are higher the groundwater flows."	see comment 62
61	2015-05-27	ERCA	JH	page 4.36, Is this a concern for the airport? (referencing draw down times from SWM facilities)	Longer draw down times do not significantly modify the attractiveness of wet ponds to fowl when there is already a permanent water body
62	2015-05-27	ERCA	JH	page 4.36, "the" changed to "than" under disadvantages (first bullet)	Text updated
	4.3.1 Introduction (Hydrology)				
63	2015-05-27	ERCA	JH	page 4.38, How much field verification/survey work was undertaken to update the model?	Updates to the HEC-2 model are discussed in section 4.4
	4.3.4 Existing Drainage				
64	2015-05-27	ERCA	JH	page 4.40, text added to end of first paragraph: up to the Via Rail Canada Inc. property which is located approximately 350 metres north of Tecumseh Road East. From the Via Rail Canada Inc. property to Riverside Drive East, the Little River has been channelized with flood protection dykes on each side of the waterway that were designed to contain the 1:100 year flows.	Text updated
65	2015-01-13	Windsor	various departments	In the 1st paragraph of this section on Page 4.40, what does "Downstream of the study area (north of E.C. Row Expressway) Little River remains in a natural state." I believe that this is inaccurate.	This section has been reworded to "Downstream of the study area (north of the E.C. Row Expressway) Little River has been channelized with flood protection dykes on each side of the waterway."
66	2015-05-27	ERCA	JH	page 4.41, A plan should be included showing the major flow restrictions that have been considered in the analysis. Corresponding flows and water surface elevations would also be helpful.	Water levels shown in text (Tables 13 and 19) and on figure 14
67	2015-01-13	Windsor	various departments	Page 4.42. In Table 8, it references "North Townline Rd. (County Road 42)". If referring to the road, it should be called County Road 42; if referring to the drain, it should be called North Townline Rd. Drain.	Text updated
68	2015-05-27	ERCA	JH	page 4.43, Other Drains north of highway 401 include the Washbrooke Drain and Wellwood Drain. Please review the municipal drain mapping to ensure the accuracy of the text.	text updated
69	2015-05-27	ERCA	JH	page 4.43, Is the North Townline Road County Road 42? Please adjust throughout the report as required.	all references to North Townline Road have been changed to County Road 42
70	2015-05-27	ERCA	JH	page 4.43, 7th Concession Road is not Walker Road.	text updated
71	2015-05-27	ERCA	JH	page 4.43, Was this confirmed? (referring to final bullet)	Based on informal correspondence with the City of Windsor. To be confirmed
72	2015-01-13	Windsor	various departments	Page 4.43. If referring to the road, it should be called County Road 42; if referring to the drain, it should be called North Townline Rd. Drain.	text updated
73	2015-01-13	Windsor	various departments	Page 4.43. In last bullet, 7th Concession Road is not Walker Road (no 's') north of Legacy Park Drive. South of Legacy Park Drive, although Walker Road is technically also the 7th Concession, no one refers to it that way. Delete "Road" when referring to the 6th Concession Drain.	text updated
74	2015-05-27	ERCA	JH	page 4.44, It is my understanding that improvements were made to the Little River channel and floodplain (between EC Row and the Canadian Pacific Railway) to allow for a specified post development runoff from the Twin Oaks Subdivision without adversely impacting the Little River. Post development flows were to be controlled to a specified flow rate but not to pre-development flow rates before discharging to the Little River.	text updated to reference SWM controls within the Upper Little River Corridor
75	2015-05-27	ERCA	JH	page 4.44, Is this flow split referring to the 9th Concession Road Drain which is located between County Road 42 and Baseline Road? Under normal rain events, the 9th Concession Drain (from the south) outlets into the 6th Concession Drain which then flows to Little River. The 9th Concession Road Drain may drain to the 6th Concession Drain or to the North Townline Drain or to both. The municipal drain report profiles should be reviewed.	text updated to provide more information on the flow spit
76	2015-05-27	ERCA	JH	page 4.44, Hec-2 model?	Text updated to refer to HEC-2
77	2015-05-27	ERCA	JH	page 4.44, Were the model cross-sections updated to account for the channel improvements that were undertaken as part of the Twin Oaks development between EC Row and the Canadian Pacific Railway property in the early 1990's? In Section 4.4.3 it appears that the original model was updated to include this information.	Text updated to reference the Twin Oaks floodplain work
78	2015-01-13	Windsor	various departments	Page 4.44. Where is the junction of the 6th and 9th Conc Drains with a flow split?	The existing model was updated to include the extension of the 9th Concession Road drain to North Townline Drain
79	2015-01-13	Windsor	various departments	Page 4.45. Table 9 Where is the confluence of Little River and 9th Conc Drain?; Refer to the road as County Road 42 (not North Townline Road).	text updated
	4.3.6 Hydrologic Model Results				
80	2015-05-27	ERCA	JH	page 4.45,The 9th Concession Drain outlets into the 6th Concession Drain and the 6th Concession Drain outlets into Little River.	text updated

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81	2015-05-27	ERCA	JH	page 4.45, I think this should be County Road 42. Please confirm and revise as required throughout the report.	text updated
	4.3.7 Alternative Flow Estimates				
82	2015-05-27	ERCA	JH	page 4.45, ? (referring to Highway 9 in final paragraph)	Text updated to refer to the E.C. Row Expressway
83	2015-05-27	ERCA	JH	page 4.47, Is a plan showing the Key Point locations included in the Appendices? It would be helpful to include a plan in this section.	Key points have been removed from the text and referred to by road crossing
	4.3.8 Hydrology Summary				
84	2015-05-27	ERCA	JH	page 4.48, 6 hour Chicago? (first bullet)	text updated to refer to the 6-hour Chicago storm
	4.4.1 Hydraulics Introduction				
85	2015-01-13	Windsor	various departments	Refer to it as 7th Street Drain Diversion, not "drainage"	Text updated
86	2015-05-27	ERCA	JH	page 4.49, Lachanve Drain, not Lechance	Text updated
87	2015-05-27	ERCA	JH	page 4.49, 7th street Drain diversion, not drainage	Text updated
	4.4.2 Methodology				
88	2015-01-13	Windsor	various departments	Page 4.50, "entrance" should be singular for culvert entrances in last bullet of first group	Text updated
89	2015-05-27	ERCA	JH	page 4.50, This section requires additional clarification/discussion. (hydraulic model paragraph)	Text reworded
90	2015-01-13	Windsor	various departments	Page 4.51, Table 12. Road name is "Forest Glade", not Glen.	Text updated
	4.4.3 Hydraulic Model Results				
91	2015-05-27	ERCA	JH	page 4.50, add "for Existing Conditions" to the heading	Text updated
92	2015-05-27	ERCA	JH	page 4.50, HEC-2 not HEC-RAS	Text updated
93	2015-05-27	ERCA	JH	page 4.51, These numbers do not seem to correspond to the hard copies of the 1985 flood line maps or Hec-2 printouts. Are these suppose to be the actual 1985 elevations or are they your baseline PC-SWMM model results with the 1985 inputs? The added highlighted elevations are from the hard copies of the 1985 flood line maps and Hec-2 printouts. Please clarify.	The flood elevations have been updated. The numbers were based on a HEC-RAS model obtained from MRC that was based on the HEC-2 Model
	4.5.2 Background Review				
94	2015-05-27	ERCA	JH	page 4.53, In the Legend – "Little Creek Watershed Boundary" should be "Little River Watershed Boundary"	figure updated
95	2015-05-27	ERCA	JH	page 4.53, The Baseline Road Drain is noted from the 9th Concession Drain to the Little River Drain. It has been our understanding that this is the 6th Concession Drain. Please verify with the municipal drainage reports.	figure updated
	4.5.5.3 Erosion Setbacks				
96	2015-05-27	ERCA	JH	page 4.60, A plan showing the erosion setbacks for the watercourses should be included in this section.	A figure shows setbacks was added to the main body as Figure 14
	4.5.7 Restoration/Remediation Opportunities				
97	2015-01-13	Windsor	various departments	Page 4.61. refer to Sandwich South Employment Lands, not Windsor Annex Lands.	Text updated
	5.3.3 Summary of Assessment				
98	2015-05-27	ERCA	JH	page 5.10, second bullet, DFO not ERCA	Text updated
99	2015-05-27	ERCA	JH	page 5.10, Where is construction within a wetland proposed? This is typically something that would be difficult to obtain approvals for. (last bullet)	Text updated to remove the reference to construction in a wetland
	6.1 Recommended Stormwater Management Solution				
100	2015-01-13	Windsor	various departments	Check page numbering for Chapter 6. It starts on 6.12	page numbers updated
101	2015-05-27	ERCA	DL	page 6.12, ERCA does not support the concept of SWM facilities being promoted as 'natural' or providing habitat for wildlife. SWM facilities are infrastructure which treats potentially contaminated stormwater runoff. They are not simply aquatic systems, that if you plant trees and shrubs you end up with healthy functional habitat. In addition, there is a section of the SWM corridor proposed to be located between the forested areas on the Airport lands. These forested areas are also identified as Provincially Significant Wetlands. The proponent should demonstrate how the proposed SWM facilities will not have any negative impact to the hydrology which maintains the PSWs. Again, reiterating the above comment, SWM facilities are designed to control/manage stormwater from both a quantity and quality perspective – essentially treating contaminated water. This is not a feature which should be placed in close proximity or interact with	Text updated to not refer to SWM areas as natural habitat. The area on the airport lands has been made more general and moved away from the provincially significant woodlots.
102	2015-05-27	ERCA	DL	page 6.12, It does not appear that the proposed land use plan for the area proposes to place any of the significant natural heritage features, including CNHSs, into a natural heritage protection designation. It appears some blocks have been identified as 'open space', but this land use designation does not provide for adequate protection of significant natural heritage.	This study did not change land use information from other parties (perhaps input should be made to other planning studies like the South Sandwich Land use Planning Study)
103	2015-05-27	ERCA	JH	page 6.12, second bullet: area or number?	Text changed to "number"
	6.1.1 Design Criteria				
104	2015-05-27	ERCA	JH	page 6.13, Consideration of Low Impact Development should also be included/noted for development within the Upper Little River Area. This may be more related to the future functional design studies for each pond area, but it should at least be noted in this document.	Additional text has been added on low impact development measures in Section 6.1.1 and 7.7
105	2015-05-27	ERCA	JH	page 6.13, Please confirm the recommended 48 hour extended detention time. MOECC Table 3.2 is based on a 24 hour drawdown time. Is this related to drain base flow considerations? Does a longer detention time increase the potential for airport concerns?	The conceptual SWM ponds in the model use a simplified method to determine sizing. Orifices were assumed at the permanent pool and 0.3 m above the permanent pool. Drawdown times of 36 hours and 12 hours were assumed for the low and high orifice weir respectively to meet peak flow targets. The 36 (previously 28) hour time is not necessarily the extended detention time and this reference in the text has been removed.
106	2015-01-13	Windsor	various departments	for water quantity, what happens if IDF curves are updates?	If IDF curves are updated to account for climate change it is expected that storage requirements would increase, assuming the target flow in Upper Little River remains constant.

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107	2015-01-13	Windsor	various departments	pedestrian paths - primary paths should be above 100 year water level and paved (i.e. asphalt). Elsewhere in the document, it recommends gravel pathways. Suggest that this is o.k. for secondary paths.	text updated
108	2015-01-13	Windsor	various departments	p6.13 "construct ponds and establish vegetation prior to pond being brought on-line" Document should add text for option to construct temporary SWM facilities until such time that vegetation is established and permanent SWM is brought on-line.	Text updated
	6.1.2 Recommended Strategy				
109	2015-01-13	Windsor	various departments	After Figure 14-16, it refers to corridors of 120 to 200m. This should be shown on a drawing. Figures 16 should be revised to conform with this.	Corridor widths are shown on Drawing 3
110	2015-05-27	ERCA	JH	page 6.14, This section should also include a high level discussion about major and minor event routing from the individual development areas to the SWM facilities.	text updated
111	2015-05-27	ERCA	JH	page 6.14, Drawing 3 shows the proposed individual catchment areas. The overall drainage area for each proposed SWM corridor should be delineated on a plan.	the SWM corridor has been modified so that there is sufficient corridor within each catchment area. The figure was also updated to assign catchment numbers to portions of the SWM corridor.
112	2015-05-27	ERCA	JH	page 6.14, Conceptual SWM ponds are not shown on Drawing 3. A plan showing your conceptual locations of individual ponds and the related drainage areas should be included. This would assist with the future functional design stage of this project.	figures 17 to 19 to be updated
113	2015-05-27	ERCA	JH	page 6.14, Corridor dimensions should be shown on the plans.	corridor width has been shown on Drawing 3
114	2015-05-27	ERCA	JH	page 6.14, Can an estimate be included of the fish habitat that will be lost? How will the offsetting of fish habitat be distributed to the remaining drains that are proposed to be enhanced?	Approximately 1/3 of the existing municipal drains within the study area proposed to be abandoned, 1/3 are proposed to be left as is, and 1/3 are proposed to be enhanced/widened. Additional channel length is proposed along the proposed east-west arterial road but it is relatively minor compared to the length proposed to be abandoned. The distribution of the enhanced fish habitat to offset the loss of fish habitat has not been determined at this time and will be dependent on a detailed habitat assessment.
115	2015-05-27	ERCA	JH	page 6.14, Check for consistency throughout the document. (referring to offset vs compensate)	Text updated
116	2015-01-13	Windsor	various departments	p6.14 "The SWM corridor is approximately 200m wide for Upper Little River and 120m wide for all other tributaries" Text should be added that these corridors are reserved until such time that detailed design and report confirm size of facility; surplus lands will be released.	Text updated
117	2015-01-13	Windsor	various departments	p6.15 "...all other development (including trails) must be located outside of this boundary to prevent flood damage." Delete "including trails" – secondary trails are permitted within the 100year flood elevation.	Text updated
118	2015-05-27	ERCA	JH	page 6.15, The improvements that have been considered in the modeling need to be detailed in the report (i.e.. plans showing actual locations, cross-sections, etc.). These improvements plus the pond release rates are needed to ensure no adverse impacts to the Little River flow regime. Timing of the Little River modifications/improvements should be discussed. It is anticipated that these improvements may need to be completed before development proceeds in the study area.	Extensive channel improvements are no longer proposed. The existing channel is only proposed to be widened to create a riparian and flood plain area. Release rates have been added to the main body of the report.
119	2015-05-27	ERCA	JH	page 6.15, Based on MNRF guidelines, stormwater facilities should be located outside of floodplains. Technically, the proposed SWM ponds are being located off-line of the improved channels. The improved channels should contain the 1:100 year flows. The ponds are proposed within the proposed drainage corridor, however, is it correct to consider them in the floodplain?	Text updated
120	2015-01-13	Windsor	various departments	Table 17. North Townline Road should read as County Road 42. Second paragraph below refers to CN Rail Line. Are we recommending channel lowering outside of the study area (CN Rail - Via Tracks), or upstream of CPR?	The report no longer recommends channel lowering.
121	2015-05-27	ERCA	JH	page 6.16,The 1985 McLaren 1:100 year water level should also be include in this table. (table 18)	Text updated
122	2015-01-13	Windsor	various departments	Table 18 and paragraph below it. Road should read, Forest Glade.	Text updated
123	2015-05-27	ERCA	JH	page 6.16, A plan showing the flood prone areas under the proposed conditions should be included.	The reduced flows required to meet the existing municipal drain capacity have lowered the flows such that the 100-year flow is contained and there is no flooding outside the channel
124	2015-05-27	ERCA	JH	page 6.16, As per earlier comments, plans showing this area and the recommended improvements should be included.	The reduced flows required to meet the existing municipal drain capacity have lowered the flows such that the 100-year flow is contained and there is no flooding outside the channel. The Little River Channel Invert is proposed to remain unchanged from existing
125	2015-01-13	Windsor	various departments	Need Planning Level Cost Estimate in Chapter 6.	What sort of planning Level Cost Estimate are you looking for? Should this be part of functional design?
	6.1.2.1 Post Development Groundwater Recharge				
126	2015-05-27	ERCA	JH	page 6.17, The impervious % will be low, however, trails are proposed and infrastructure such as pump stations and related access laneways will be required. (referring to open space/natural heritage percentage)	The imperviousness of Open Space and Natural Heritage Features has been increased to 5%
127	2015-05-27	ERCA	JH	page 6.17, Does this create concerns for the Airport? (last paragraph of section)	The Airport generally expressed concern over areas of ponded water and wasn't as concerned with open channels as they do not represent good breeding habitat due to constant flows and short fetch lengths.
	6.2.1.1 Wetlands				
128	2015-01-13	Windsor	various departments	It is noted that "no provincially significant wetlands have been identified within the study area". What about the wetlands at Windsor Airport?	Text and figures updated to reflect to refer to the PSW on the Windsor Airport Lands

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129	2015-05-27	ERCA	DL	page 6.18, This needs to be corrected as PSW does exist on the Airport lands. The study will need to demonstrate that the proposal will not have any negative impact to the hydrological functioning of the existing wetland, or to the hydrologic regime that maintains the wetland.	Text updated to reflect to refer to the PSW on the Windsor Airport Lands. Current information shows the airport lands developing as a solar farm with minimal SWM controls and this area is no longer shown as a SWM area
130	2015-01-13	Windsor	various departments	Page 7.1, Section 7.0 1st paragraph. Should read "incidents", not indecent.	Text updated
	6.2.1.3 Wildlife Habitat				
131	2015-05-27	ERCA	DL	page 6.19, Pursuant to the findings, the consultants will need to seek MNRF input into the extent of regulated habitat under the ESA and any permitting requirements.	agreed. Text updated in section 6.2.1.3 and 8.1.2
132	2015-05-27	ERCA	DL	page 6.19, How has the study determined no negative impact? What is the mitigation? Vegetated SWM facilities are not habitat acceptable as mitigation/compensation for the loss of existing significant natural heritage features.	Potential impacts have been identified and mitigation measures have been outlines in Table 21 and Section 6.2.1
	6.2.1.4 Fish Habitat				
133	2015-05-27	ERCA	JH	page 6.19, DFO added	Text updated
134	2015-05-27	ERCA	JH	page 6.20, DFO should be asked to provide input into offsetting options, approval requirements, etc.? (compensation changed to offsetting)	Text updated
	6.2.1.6 Human Impacts				
135	2015-05-27	ERCA	DL	page 6.20, Are we only concerned with 'minimizing' negative impacts or are we required to have 'no negative impact'. There is a difference. Increasing public access to significant natural heritage features is a negative impact. Well defined trails with signage does not go far enough to mitigate this negative impact, but may lower the impact somewhat.	text now refers to mitigating impacts instead of minimizing
136	2015-05-27	ERCA	DL	page 6.20, Based on what? Experience has demonstrated otherwise. Conclusion not supported.	text has been updated to remove conclusion
	6.2.2 Mitigation of the Preferred Alternative				
137	2015-05-27	ERCA	JH	page 6.23, ERCA approvals are identified in the next paragraph. Based on the findings of the study, approvals will also be required from MNRF, DFO, MOECC, etc. Other applicable legislation should be identified similar to the ERCA paragraph.	Additional permit requirements are outlined in section 8.1.2
138	2015-05-27	ERCA	DL	page 6.23, The concept of the preferred alternative introduces potentially contaminated SWM facilities in contact with significant natural heritage features. These SWM facilities are proposed to be vegetated with native plants, and are being marketed as habitat within an overall greenway system. This concept itself is not fully supported.	appropriate buffers will be required between the natural heritage features and SWM facilities. The text has been revised to not refer to the SWM facilities as habitat.
	6.2.3 Recommendations				
139	2015-05-27	ERCA	JH	page 6.24, ERCA removed and MNR updated to MNRF in 3rd last bullet. Update MNR to MNRF throughout the report.	Text updated
140	2015-05-27	ERCA	JH	page 6.24, DFO added to second last bullet	Text updated
	7.2 Forested Wetlands				
141	2015-05-27	ERCA	JH	page 7.6, Future maintenance challenges with these types of facilities must be considered.	This section has been deleted
142	2015-05-27	ERCA	DL	page 7.6, Once again, the proposal is to create what resembles 'habitat' – i.e., a pit and mound swamp that is treed, and then have it function as a SWM facility. This is not supported.	This section has been deleted
	7.4 Stormwater Pumping				
143	2015-01-13	Windsor	various departments	In first paragraph, it states "Drawing 5 shows catchment areas where pumping is possible". I don't see how that is represented on the drawing. Drawing 5 only shows estimated depth of storm sewer below existing ground elevation	Drawing 5 has been removed and the text updated
144	2015-05-27	ERCA	JH	page 7.8, Drawing 5 shows potential storm sewer depths. It is unclear how pumping is shown on Drawing 5.	Drawing 5 has been removed and the text updated
145	2015-05-27	ERCA	JH	page 7.9, Backup power should be provided in addition to an emergency overflow.	Text updated
	7.6 Archaeology				
146	2015-01-13	Windsor	various departments	Archaeology is miss-spelled in the report. What was outcome of Stage 1 assessment?	Text updated and more details on the Stage 1 assessment were moved from the appendix to the main body
147	2015-01-13	Windsor	various departments	Portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological resources – where? It also states Stage 2 is required. Add text regarding the timing. Where is Stage 2 assessment recommended? There are no maps or areas referenced.	Additional text has been added to the report in Section 7.6. Figure 20 (was Arch 4) added to main report.
148	2015-05-27	ERCA	JH	page 7.10, Include additional documentations of the Stage 1findings and a plan showing the study areas and areas requiring a Stage 2 assessment.	Additional text has been added to the report in Section 7.6. Figure 20 (was Arch 4) added to main report.
	8.1.1 Final Design				
149	2015-01-13	Windsor	various departments	Last paragraph states "The preferred alternative is intended to be constructed in stages as needed for development to progress as shown on Drawing 3." Drawing 3 shows the assumed future land uses; it does not address how development would progress.	Text updated to report in sections 6 and 8
150	2015-01-13	Windsor	various departments	Should include description of minimum requirements for functional/detailed design for staged development.	Some additional text has been added. Perhaps more text is necessary. Discuss with ERCA/City/township.
151	2015-05-27	ERCA	JH	page 8.1, I think the next step would be a functional design study. (referring to the heading)	Text updated
152	2015-05-27	ERCA	JH	page 8.1, Under this scenario it is likely that interim SWM controls will be required since the ultimate facility will most likely be located at the downstream end of the development area. Information related to interim SWM facilities should be included.	additional text added on Interim SWM controls
	8.1.2 Permits and Approval Requirements				
153	2015-01-13	Windsor	various departments	Archaeological Resources – it doesn't specifically say to review the map & undertake a Stage 2.	Text updated
154	2015-05-27	ERCA	JH	page 8.2, "or will outlet into regulated areas within the Upper Little River study area" replaces from "the Regulatory…" to the end of the bullet.	Text updated

Comment #	Date	From		Comment	Response
155	2015-05-27	ERCA	JH	page 8.2, edits (red is deleted, blue is added): The proponent ERCA staff will be required to have an provide an initial screening of the final design drawings undertaken to determine whether the proposed works will result in serious harm to fish (death of fish, permanent alteration or destruction of habitat) and if authorization from DFO is required under the Federal Fisheries Act. Depending on the proposed works, the proposed work mitigation, measures and the restoration enhancement opportunities or if applicable, offsetting compensation measures may be required.	Text updated
156	2015-05-27	ERCA	JH	page 8.2, MOE changed to MOECC	Text updated
157	2015-05-27	ERCA	JH	page 8.2, MNR changed to MNRF	Text updated
158	2015-05-27	ERCA	JH	page 8.2, Work located within watercourses or which occupy public land may require approval under the Lakes and Rivers Improvement Act (LRIA) and/or the Public Lands Act. Based on ERCA's agreements with MNRF, ERCA is responsible for review and approval for issues related to Section 14 of the Public Lands Act. Initial screening for a LRIA permit will be provided by ERCA as part of their Memorandum of Understanding with MNR. The requirement for a LRIA Public Lands Act permit will be identified in consultation with MNRF staff	Text updated
159	2015-05-27	ERCA	DL	page 8.2, What about Endangered Species Act permitting requirements?	MNRF Text updated
160	2015-05-27	ERCA	JH	page 8.3,This should relate to development within the entire study area and not just the SWM features.	The Study Area for the Archaeological Assessment included the possible locations of SWM features and not the entire catchment area
161	2015-05-27	ERCA	JH	page 8.3, In Section 7.6 it is noted that a Stage 2 assessment is required for some portions of the study area. Is some form of additional archaeological assessment required for the entire site? Please clarify.	Areas with a moderate to high archaeological potential (shown on new figure) are recommended for a Stage 2 assessment
	8.2.1 Project Implementation Schedule				
162	2015-05-27	ERCA	JH	page 8.3, Functional design? (referring to final design)	Text updated
	9.0 References				
163	2015-05-27	ERCA	JH	page 9.1, http://www.birdsontario.org/atlas/index.jsp added to first reference	Text updated
164	2015-05-27	ERCA	JH	page 9.2, http://www.lio.ontario.ca/imf-ows/imf.jsp?site=aia_en added to LIO reference	Text updated
165	2015-05-27	ERCA	JH	page 9.2, www.mnr.gov.on.ca/MNR/nhic/nhic.cfm added to NHIC reference	Text updated
166	2015-05-27	ERCA	JH	page 9.3, http://www added to first reference	Text updated
	Other				
167		ERCA		Update drawings to show which areas are draining to which ponds. Not clear as presented	Refer to comment 111
168		ERCA		Include table of SWM parameters in report text	SWM parameter tables have been included in main report.
169		ERCA		provide more figure/maps/plans in main body	additional figures/maps/tables from the archeological/fluvial/hydraulic/etc. sections have been added to report
170		ERCA		discuss SWM controls for infill development	text added to 6.1.1
171	2015-10-07	Dillon		The Town's requirement would be that the permanent pool elevations of the stormwater management facilities be established no higher than the invert elevation of the proposed storm sewer outlets to these facilities (we have attached a figure from previous communications with Stantec in 2012 that reconfirm these proposed storm sewer outlet sizes/flows/elevations for your reference). As discussed, this is required to avoid having the storm sewers surcharged between rainfall events. The Town appreciates that this will result in the need for pump stations to discharge the allowable flows from these stormwater management facilities to the downstream receiving watercourses, and would like to have these allowable discharge rates confirmed for each location.	Pumping rates and volumes have been reviewed and updated based on comments received and are now included in the main report. The design now accommodates permanent pool elevations below grade.
172	2015-10-08	Dillon		The Town would like ensure that the active storage requirements for these stormwater facilities be re-evaluated to confirm that there would be no negative impacts to the existing and proposed developments in the respective subdrainage areas. This includes an evaluation of whether there could be risks of surface flooding from hydraulic grade line impacts for frequent storm events (1:5 year level of service) and for the 1:100 year major storm event. Active storage water levels for varying storm events should be confirmed and evaluated to ensure that they provide acceptable outlet conditions for the storm drainage systems	Pumping rates and volumes have been reviewed and updated based on comments received and are now included in the main report. The design now accommodates permanent pool elevations below grade.
173	2015-10-09	Dillon		The Town requests that the physical dimensions (plan and profile) of these stormwater management facilities be reconfirmed to a more functional level of detail (and in light of the above criteria). As you may be aware, the Town of Tecumseh has been developing a Secondary Plan for the Tecumseh Hamlet area, which is now beyond the 90 percent stage of completion. It is critical that any adjustments that may be required to the land areas required to accommodate these facilities be more firmly/conservatively established so as not to compromise the Secondary Plan process and its implementation in the future	Pumping rates and volumes have been reviewed and updated based on comments received and are now included in the main report. The design now accommodates permanent pool elevations below grade.
174	2105-06-18	ERCA	JH	Portions of the report refer to the entire study area while other portions that should relate to the entire area only seem to reference the SWM corridor. Please review	Text updated
175	2105-06-18	ERCA	JH	The context of regional storm vs. regulatory storm vs. 1:100 year storm is not clear in some sections of the report. We should have a discussion on this matter to ensure that the content of the final report is accurate.	Similar to Comment 55. Text updated
176	2105-06-18	ERCA	JH	It appears that a substantial amount of additional information will be available in the Appendices. When will the Appendices be available for review? In many locations where Appendices are referenced in the report, it would be helpful to have related figures included in the body of the report.	Appendix information has been provided. Additional figures and tables have been added to the main report. Please advise if more information is required.
177	2105-06-18	ERCA	JH	Have the MNR Technical Guides been considered in the modelling analysis	Yes. Additional references have been made in the text
178	2015-10-07	Dillon/ Tecumseh	FF	Permanent pool elevation of the stormwater management facilities could be lower than the surrounding ground elevations to accommodate an unsurcharged storm sewer outlet. This would require more grading and a larger pond footprint.	Pond blocks were increased in size to accommodate permanent pool elevations 6 m below the surrounding ground elevations.

Comment #	Date	From		Comment	Response
1	2017-02-16	Windsor	AG	The document should have a cost estimate. As previously noted, we would be satisfied with an estimate indicating an order of magnitude for the recommended type of system versus a conventional wet pond. Is it 50% more than a wet pond? Or a high-level estimate at planning-level precision for the overall work, to the nearest $1M or $5M or $10M, depending upon how large the number is. Put whatever caveats are required to note what is excluded. It could be included in Section 6 or 8.	agreed. Additional information has been added to section 6.3
2	2016-11-23	Windsor	AG	Section 4.2.9 Potential Mitigation Measures. We disagree with listed advantage, "limited maintenance of pipes required" for Perforated Storm Laterals and Perforated Pond Outlets. Due to the nature of the pipe (perforated), it tends to get clogged with roots from trees and phrag fairly quickly. For solid-wall PVC pipe, root-cutters can be used to remove any root-mass.	text updated
3	2016-11-23	Windsor	AG	Section 6.1.2 Recommended Stormwater Management Strategy. Under bullet points on page 6.4, where "Windsor South Sandwich Secondary Plan" is listed, add "(draft)", as this study was never finalized.	text updated
4	2016-11-23	Windsor	AG	Section 7.3 Stormwater Pumping. Revise word in the last paragraph and complete the thought in the last sentence. To determine the suitable suitability of the catchment areas for pumped or gravity outlets a conceptual storm sewer was developed. A sewer was assumed from a SWM facility location to the furthest upstream portion of its catchment area with a slope of 0.35%. Most of the catchments do not have sufficient cover based on these assumptions. The final grading on an individual property will determine the pumping requirements, but is it expected that the majority of the site will require pumping. Detailed calculations re regarding this are included in Appendix F.	text updated
5	2016-11-23	Windsor	AG	Section 8.2.1 Project Implementation Schedule. Correct the word in first sentence, Following completion of the ~~reaming~~ remaining phases of the EA	text updated
6	2016-11-23	Windsor	AG	Figure 3 – Legend shows City/Town Boundary – but it does not appear on the plan. There is a gray line which appears to follow in part the former municipal boundary before the land transfer (see Banwell Road near the EC Row Expressway)	The municipal boundary line was removed from Drawing 3. The line was difficult to see with the catchment boundary and study area limits
7	2016-11-23	Windsor	AG	Figures 17 to 19 – are still missing	figures now included
8	2016-11-23	Windsor	AG	Appendix A - I am conferring with the City's Manager of Records/Elections & Freedom of Information. There is personal contact information from sign-in sheets and comment sheets for PIC #1 and PIC#2. We may have to redact the personal information from the appendix.	Further feedback received from City. Personal information to be redacted
9	2016-11-23	Windsor	AG	From Comment response sheet dated 2016-10-11 - #5, 6 – text was not revised in the copy that we downloaded	Archaeology Report now updated. Note that this report differs from the version with the Ministry of Tourism, Culture, and Sport
10	2016-11-23	Windsor	AG	#59 – under Section 4.2.9, disagree with listed advantage, "limited maintenance of pipes required" for Perforated Storm Laterals and Perforated Pond Outlets. Due to the nature of the pipe (perforated), it tends to get clogged with roots from trees and phrag fairly quickly. For solid-wall PVC pipe, root-cutters can be used to remove any root-mass.	text updated
11	2016-11-23	Windsor	AG	#64 – text was not revised	text updated
12	2016-11-23	Windsor	AG	#125 - Still need planning level cost estimate.	agreed. Additional information has been added to section 6.3
13	2016-11-23	ERCA	MN	Consultation with First Nations will be a comment that can be anticipated by the MOECC. The ESR should detail how representative First Nations were provided the opportunity to consult and provide input towards this MCEA.	An additional section (3.4.2) was added to the report to cover first nations consultation.
14	2016-11-23	ERCA	MN	Pages 3.8, 3.4.2 City of Windsor Official Plan - The City has circulated draft OPA 86 and 87 which constitute the last two chapters of the Official Plan update. This section of the report should be updated to reflect this as the direction outlined in the text may not be the same as the general direction that is found in the most recent OPA updates (i.e., use of the policy language for Environmental Policy Areas (EPA) for example). The sentence that states "The City of Windsor and the ERCA undertook a Candidate Natural Heritage Site Biological Inventory to assess the most environmentally significant areas in the city" should be amended as the study (Update to the CNHS Inventory, December 2007 "…was not intended to be a complete biological inventory of all natural heritage features within the City limits." (page 5 of the City of Windsor Update to the CNHS Inventory, December 2007). This section may benefit from a final statement that indicates that the City of Windsor (and Town of Tecumseh) are in the process of updating their Official Plans to be consistent with the 2014 PPS and (in the case of Tecumseh the 2014 adopted County of Essex Official Plan).	Section 3.5.2 updated (City of Windsor Official Plan).
15	2016-11-23	ERCA	MN	Pages 3.9, Section 3.4.5. It would be beneficial to speak in these sections about whether the outputs/outcomes of the Class EA are intended to be considered 'integrated' with approvals of the *Planning Act* . How is the City and Town considering the integration of the outcomes of the Class EA with the updates to the Official Plan? Will the MCEA process be used as in Approach 4 of the MCEA process to lead towards integrated OPAs for these areas in a Secondary Plan?	Additional text has been added to Section 3.5.5 and 8
16	2016-11-23	ERCA	MN	Pages 3.12, 3.5.4 - The proposed mega-hospital location may be worthwhile to mention here as section 3.5.5. A secondary plan process has been recommended by the City to address some of the surrounding land use changes that will be resulting from the location of the proposed hospital. City staff should be consulted on whether to include reference to this development in this section.	agreed. A new section (3.6.5) has been added to the report to discuss the hospital

17	2016-11-23	ERCA	MN	Pages 4.1, 4.1.2 - The City of Windsor 1992 Candidate Natural Heritage Study should also have been consulted for this study. The Land Information Mapping should detail the specific mapping layers that were downloaded as part of the study and the date stamp for each data set. For example, the extent of the Airport Woodlands PSW has changed since it originally was first uploaded.	The City of Windsor Candidate Natural Heritage Site Biological Inventory Update (2008) and the Town of Tecumseh Natural Heritage Inventory (2011) were consulted and referenced in this report. References to these reports have been added to Section 4.1.2. Dates have been added to Existing Environmental Features layers on Figure 2.
18	2016-11-23	ERCA	MN	Pages - 4.2, 4.1.3 - 1st paragraph, last sentence: it is good to hear that the data was shared amongst partners involved in this project. I recommend that any natural heritage data that has been collected as part of this process be circulated in digital format to the Natural Heritage Information Centre and the Ministry of Natural Resources and Forestry Aylmer District office for incorporation into provincial databases. This recommendation is in keeping with other comments on other Class EA instruments (e.g., CO Class EA guidelines) and provincial Renewable Energy Approvals process guidelines changes. The intent of this recommendation is to recognize that any provincially significant natural heritage feature that have been confirmed in a provincially approved process is also considered to be a provincially significant natural feature in another provincially mandated process. For example, Environmental Assessments, Renewable Energy Approvals and the Planning Act all make reference to the same natural heritage significance metrics and approvals processes. Of particular importance would be point records of any tracked species and/or vegetation communities as determined by the NHIC/MNRF Aylmer Offices.	agreed
19	2016-11-23	ERCA	MN	Pages - 4.7, 4.1.5.1 Designated Environmental Features - 2nd paragraph: It should be clearly outlined here that the only wetland that has been confirmed to meet the criteria for a Provincially Significant Wetland in the study area is the Airport Swamps PSW. Other natural features may meet the criteria if they were to be evaluated by the OWES manual. For reference, the MNRF provides a technical memo that outlines the ELC vegetation types that would require further assessment to confirm whether the natural feature would require further assessment using the OWES manual to determine whether it is a PSW. The technical memo is available here: \\pdcerca\company\watershed management\Studies\EIAs\2013-02-14 Identifying wetlands and potential wetlands from ELC.docx and an update to this memo can be obtained by contacting MNRF Aylmer District staff directly. 3rd paragraph, the reference to the ERNHSS should be 2013 vs. 2008. Confirm whether the final GIS product was used to assist in determining designated environmental features in this section of the report.	text updated.
20	2016-11-23	ERCA	MN	Pages 4.8, 4.1.5.1. 1st paragraph: the last sentence should elaborate on what the planning policy approach would be for the Candidate Natural Heritage Sites. 2nd paragraph: the second sentence is incomplete: “A large woodlot ….” 3rd paragraph: it may be more appropriate to locate the discussion around priority restoration areas in a different section as the restoration areas have no designations associated with them or planning policy recommendations that require designation in either the City or Town of Tecumseh. Consider shifting this to another section. 4th paragraph: the floodplain control development control area is not technically a “Designated Environmental Feature” and it may not be most appropriate to locate this discussion of the natural hazards portion of the study area associated with designated environmental features.	Candidate Natural Heritage Sites has been added to section 4.1.5.1. The woodlot section has been updated in the second paragraph. Priority restoration areas and floodplain areas have been relocated to section 4.1.5.2 - Other Environmental Considerations.
21	2016-11-23	ERCA	MN	Pages 4.11, 4.1.5.6.3 - This section should provide a list of the species that were found, their Latin name, their provincial rarity ranking, and the provincial species at risk status (if applicable). A table should also include the species that were identified as element occurrences and that might be found in the study area should appropriate habitat be found to indicate how many species were not found (either due to sampling technique, timing, etc.) or by the fact that the habitat for these species is not present in any of the evaluations completed to date. The vascular plant species section should also report on the cumulative list of species that were identified in the 1992, 2008 and 2011 CNHS reports for both Windsor and Tecumseh. This should be the baseline.	Rare plant species data from the City of Windsor Candidate Natural Heritage Site Biological Inventory Update (2008) and the Town of Tecumseh Natural Heritage Inventory (2011) are now included in Section 4.1.5.7.2. All of the rare vascular plant species and species at risk plant species from these studies, background review (NHIC and wildlife atlases) and field investigations have been included in Appendix D. A habitat checklist is included in Appendix D.
22	2016-11-23	ERCA	MN	Pages 4.12, 4.1.5.6.4 - SWH If any rare species or rare vegetation communities were inventoried as part of the study these features should be considered as Significant Wildlife Habitat as per PPS policy 2.1.5 (d). In addition, the habitat of species confirmed as S1, S2, and S3 or SC would also require assessment for consideration as SWH. Direction on this process is available from the Significant Wildlife Habitat Technical Guide and associated Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E (available here)_\\pdcerca\company\watershed management\REFERENCES\LEGISLATION\PLANNING ACT\Natural Heritage\SWH\schedule-7e-jan-2015-access-vers-final-s.pdf	The Study Area has now been assessed in Section 4.1.5.7.4 and Appendix E for potential Candidate Significant Wildlife habitat according to the SWH Criteria Schedules for Ecoregion 7E.
23	2016-11-23	ERCA	MN	Pages 4.19, 4.16 - I will defer specific inventory comments to Dan Lebedyk but the highlighted text should be elaborated on. Does this mean that 22 plant species that are classified as rare were confirmed in the study area?	Appendix D provides a list of 42 provincially rare plant species identified during the background review and field investigations as potentially occurring in the study area. 22 of these species were confirmed in the Study Area during field investigations and Windsor (2008) and Tecumseh (2011) Biological Inventories.

24	2016-11-23	ERCA	MN	Pages 4.27, Section 4.2.8 - Little River Flow The methodology for appropriately determining the relative contributions of flows from a variety of catchment areas (including GW contributions, contributions from tile drains, etc.) should be detailed. P 4.29 and 4.32 - If the results of the assessment to determine the results of the baseflow assessments cannot be used to confirm the relative existing conditions for GW recharge – what is the alternative? Should there be additional studies completed to more completely and accurately determine this for the entire study area? Perhaps this is something that can be flagged for better delineation at a subsequent stage of the development process? Such as during a Functional Servicing Study?	flows in the channel between rainfall events was assumed to represent baseflow. The 2004 and 2005 baseflow monitoring events experienced precipitation relatively close to the measurement data so some of the flows could have been attributed to surface or tile flows. the 2011 event was likely more representative of typical summer baseflows. . Additional measurements could help to identify baseflow in the creek.
25	2016-11-23	ERCA	MN	Pages 5.2 - The use of the 'Upper Little River stormwater and master drainage plan' has not been used to this point in the document. Suggest using a consistent name of the product to ensure that there is clarity for the reader about what this document is intended to be.	'Upper Little River stormwater and master drainage plan' replaced with 'Upper Little River Master Plan Environmental Assessment Environmental Study Report'
26	2016-11-23	ERCA	MN	Page 5.5 - Total maintenance cost Open question: given the recent webinar on municipal SWM user fees and the associated discussion surrounding how to pay for ongoing maintenance and monitoring of SWM facilities it might be worthwhile confirming if the evaluation metrics included the maintenance costs and monitoring costs in this context.	The maintenance costs used in the evaluation matrix were based on relative annual costs for operation & maintenance activities for the alternative.
27	2016-11-23	ERCA	MN	Page 6.1.1 - 5th bullet: I am not aware if the Town has 'Design Guidelines'. This should be confirmed. Is this appropriate to include reference to the draft SWM guidelines document at least in an anticipatory manner?	The reference to Town of Tecumseh guidelines has been removed
28	2016-11-23	ERCA	MN	Page 6.4, 6.1.2 - Page 6.4: 3rd paragraph. The report states that the proposed conditions model was based on land use planning completed as part of the following studies – it would be appropriate to include date stamps as it is possible that all of the studies land use planning schedules have changed significantly since the condition model was established. This could have implications on the conditions model.	agreed
29	2016-11-23	ERCA	MN	general - What are the linkages between the outcomes of this Master Plan and the resultant Official Plan amendments that will be required to facilitate its implementation?	Additional text has been added to Section 8
30	2016-11-23	ERCA	DL	Page 24, See comment below on compliance with 2014 PPS.	See response below.
31	2016-11-23	ERCA	DL	Page 24, New 2014 PPS has similar policy now for Endangered and Threatened species. Change the above reference to endangered and threatened species to a similar statement as this, so as to be consistent with the 2014 PPS.	PPS has been revised in section 3.5.1 to include the following statement "Development and site alteration is not permitted in significant portions of the habitat of endangered or threatened species or fish habitat, except in accordance with provincial and federal requirements. "
32	2016-11-23	ERCA	DL	Page 36, Essex Region Natural Heritage System Strategy (ERNHSS) (2013). Was the 2013 ERNHSS used? Replace all occurrences of misnomer	The 2013 ERNHSS was referenced in this report. It has been listed in Section 4.1.2 in the list of background data collection sources.
33	2016-11-23	ERCA	DL	Section 4.1.5.6.3 pdf Page 40, Duplicate sentence to the one above. Delete.	duplicate text deleted
34	2016-11-23	ERCA	DL	Page 48, Rare	text updated
35	2016-11-23	ERCA	DL	Section 6.2 Page 110 of the PDF, The Proposed Land Use Plan is indicated as Drawing 4 and is dated 12.02.02. The plan does not clearly indicate the existing natural features underneath the proposed land use designations. Any designations which permit future development in or within 120 m of an existing natural feature will require the completion of an Environmental Impact Assessment (EIA) demonstrating no negative impact.	Agreed. The proposed land use plan was based on available planning information (refer to appendix F) and was not altered for Drawing 4. Additional text was added to Section 6.
36	2016-11-23	ERCA	DL	Page 111, How does this EA process inform the Planning Act approval process? This process should ensure that no negative impact is achieved consistent with the PPS, rather than "avoiding significant impacts" or "minimizing adverse impacts". There will be a requirement to demonstrate no negative impact for all land use changes proposed.	text updated to say "shows no negative impacts" and removes reference to avoiding/minimizing impacts
37	2016-11-23	ERCA	DL	Page 111, An ESA Permit from the MNRF may be required any where vegetation removal is proposed.	agreed. EAS added to section 8.1.2
38	2016-11-23	ERCA	DL	Section 6.2.1.3., Page 112, Permitting requirements may require that lands be restored to natural habitat in order to achieve overall benefit. This consideration is not appropriate at the functional design stage, but at the overall land use designation stage as the restoration lands will be required to be designated for protection and not be kept in residential, commercial or other permissive land use designations.	agreed. Additional text added to Section 6.2.1.3.
39	2016-11-23	ERCA	DL	Section 6.2.1.3, Page 112, This requires further quantification.	text updated in Section 6.2.1.3
40	2016-11-23	ERCA	DL	Section 6.2.1.3, Page 112, loss of diversity is a negative impact. There is a requirement to demonstrate no negative impact in order to realize land use designation approvals under the Planning Act.	additional text added to section 8
41	2016-11-23	ERCA	DL	Section 6.2.1.5., Page 113, These, as well as portions of natural habitat to be removed, have not been adequately quantified or depicted.	To be included in Natural Heritage System offset plan. Text added to section 8
42	2016-11-23	ERCA	DL	Page 113, What about the negative impacts expected from the introduction of human activity (residential, recreational, etc.) to this area which currently does not experience these types of anthropogenic disturbances? Education of trail users is only one aspect associated with increased human-wildlife interactions. Residential intensification as a negative impact on wildlife populations needs to be addressed.	text added to section 6.2.1.6
43	2016-11-23	ERCA	DL	Page 115, where are these proposed to occur? How much is proposed to 'compensate' for the loss of existing habitat? Further details should be provided in order to determine the appropriate land use designation configuration	To be included in Natural Heritage System offset plan. Text added to section 8
44	2016-11-23	ERCA	DL	Section 7.1, Page 119, Sumac? Sumac is an obligate upland species and does not tolerate flooding. I would recommend Black Willow, or Peach leaved willow here instead.	text updated
45	2016-11-23	ERCA	DL	Section 7.1, pdf Page 119, You don't want short grass either along wetland edges as this attracts geese.	text updated

46	2016-11-23	ERCA	DL	Page 120, Shrub? Scrub vegetation is what?	scrub vegetation is a plant community dominated by shrubs and including grasses. The text has been modified to refer to shrubs to avoid confusion.
47	2016-11-23	ERCA	DL	Section 7.2, Page 122, West Nile Virus is carried by Culex sp. of mosquitos which is a container breeder and not an open water breeder. SWM facilities and natural ponds and wetlands are not areas which would harbour WNV, with the exception of storm sewer pipes. This is further explained later in this section.	Text revised. Section 7.2 now refers to mosquitos in general and the sentence saying mosquitos around ponds could have west nile virus has been removed.
48	2016-11-23	ERCA	DL	Section 7.2 Page 123, Only IF necessary, which it should not be for a SWM facility.	Text revised. Introduction now reads "General guidelines to discourage mosquitoes include:" and the reference to larvacide was removed
49	2016-11-23	ERCA	DL	Page 135, Where is the complete Environmental Impact Assessment (EIA) demonstrating no negative impact, in accordance with PPS requirements for Planning Act approvals? (i.e., land use designations). EA to functional design to permitting to construction is not the complete process. An EIA is required for all Planning Act approvals (land use changes). This report is not a complete EIA.	This report is not a complete EIA. text added to section 8
50	2016-11-23	ERCA	JH	Page ii, This still needs to be completed?	agreed. this still needs to be completed. The report has been written as the final report, although some steps still need to be undertaken.
51	2016-11-23	ERCA	JH	page vii, Should this be with one pump for multiple "properties" or is it proposed to connect separate ponds and use one pump?	text updated to change "pump" to "properties"
52	2016-11-23	ERCA	JH	Page 1.2, See comment on Page ii?	see response to comment 50
53	2016-11-23	ERCA	JH	Page 3.4, Moved to Town of Tecumseh during project.	text updated
54	2016-11-23	ERCA	JH	Page 3.12, Should this be "provision"?	text updated to change "protection" to "provision"
55	2016-11-23	ERCA	JH	Page 4.1, I cannot find figure 1 in the previous or recent submissions.	Figure 1 was located on page 1.1 of the report. Moved to a separate page in the back pocket to be consistent with other figures.
56	2016-11-23	ERCA	JH	Page 4.2, Figure 4 – What is the difference between numbers in circles and numbers in diamonds? This should be included in the legend.	Diamonds indicate the fish survey locations conducted by Waldron in 2009. Circles identify the reaches surveyed by Waldron, Ecoplans, ERCA and Stantec, and do not identify specific survey locations along the reaches. This has been updated on Figure 3.
57	2016-11-23	ERCA	JH	Page 4.6, I cannot find records for ERCA sampling 35 drains in this area. What I did find was 7 sampling locations with approximately 35 records.	Text has been updated in section 4.1.4.1 to correspond to ERCA sampling records.
58	2016-11-23	ERCA	JH	Page 4.6, Sites are not identified on Figure 3.	reference to figure 3 was removed
59	2016-11-23	ERCA	JH	Page 4.6, The Waldron Report is referenced and should be included in the Appendix.	The Waldron Report was added to the references and not the appendix
60	2016-11-23	ERCA	JH	Page 4.6, This section talks about the airport lands and then the trunk sanitary sewer. I do not think the 10 potential crossings were on the airport lands. I think 2 separate surveys are being referenced. Please clarify.	Section 4.1.4.1 has been updated to accurately reflect the text in the 2009 Gerry Waldron report.
61	2016-11-23	ERCA	JH	Page 4.7, Is all of this information to be included in an Appendix? I could not find it in the information provided.	No aquatics information was included in the Appendix, however the Waldron Report has been referenced. The Gerry Waldron report and Stantec field notes can be added into the appendix if requested.
62	2016-11-23	ERCA	JH	Page 4.7, See comment on next page.	duplicate text (see next comment) was deleted
63	2016-11-23	ERCA	JH	Page 4.8, The first sentence is the same as the highlighted section on page 4.7. The second sentence is incomplete.	text deleted
64	2016-11-23	ERCA	JH	Page 4.8, This requires additional clarification. Based on the text, it could be misunderstood to be natural from EC Row to Lake St. Clair (which is not correct).	Last sentence now reads. "Naturalized reaches of Little River exist downstream of Baseline Road"
65	2016-11-23	ERCA	JH	Page 4.13, New DFO Classification maps are available and should be reviewed. Information related to the new maps is attached for your review. If the new maps are similar, the report should be updated. If significant changes have occurred, the report must clearly reference that the work was completed prior to the release of the new classifications.	The maps were similar and the report has been updated
66	2016-11-23	ERCA	JH	Page 4.14, Review new drain classification maps.	drain classification updated
67	2016-11-23	ERCA	JH	Page 4.14, Identification number 28 is not shown on Figure 4.	Ray Road drain is located between the 8th concession drain and Hayes Drain
68	2016-11-23	ERCA	JH	Page 4.15, Update to current DFO mapping.	2015 DFO mapping has not changed since 2011. References to 2015 DFO mapping have been updated in Section 4.1.5.8.2.
69	2016-11-23	ERCA	JH	Page 4.16, Update DFO mapping.	2015 DFO mapping has not changed since 2011. References to 2015 DFO mapping have been updated in Section 4.1.5.8.2.
70	2016-11-23	ERCA	JH	Page 4.16, It appears that reach locations are shown on Figure 4. Are the reach location numbers and fish sampling locations the same? Please clarify in the legend.	Sampling locations and reach locations have now been defined on Figure 4.
71	2016-11-23	ERCA	JH	Page 4.18, What does this mean? Why was information not requested?	This text was removed since it was removed since it did not add value to the assessment.
72	2016-11-23	ERCA	JH	Page 4.18, The watershed report card was updated in 2012. A copy of the 2012 report card is included with these comments. The data presented in this section should be updated.	text updated
73	2016-11-23	ERCA	JH	Page 4.21, Base flow should be added to this list.	Base low is mentioned in the previous bullet. It could be moved to a separate bullet
74	2016-11-23	ERCA	JH	Page 4.24, Where did this information come from? Much of the Essex Region is serviced by treated municipal water. Please refer to the e-mail (Groundwater) from the ERCA Source Water Department included with our comments that were uploaded to your ftp site.	text updated
75	2016-11-23	ERCA	JH	Page 4.32, Check this %. 352 is 1.94 times larger than 181? Is this % for a portion of the study area vs. the entire area. Please clarify.	text updated
76	2016-11-23	ERCA	JH	Page 4.30, Must also ensure that houses are disconnected so water is not re-circulated back to the house foundation drains.	text updated
77	2016-11-23	ERCA	JH	Page 4.34, A large portion of this study area is Brookston Clay which is normally taken as a being in hydrologic soil group D. Please provide clarification on the use of hydrologic soil group C.	The hydrologic soil group was based on Design Chart 1.08 from the MTO Drainage Manual (1997).
78	2016-11-23	ERCA	JH	Page 4.35, Little River is channelized with flood protection dykes north of the VIA Rail Canada Inc. railway property that is located approximately 350 m north of Tecumseh Road East. Not north of EC Row.	text updated
79	2016-11-23	ERCA	JH	Page 4.35, Figure 14 should include a note that the floodplain elevations are provided at existing flow restrictions or structures.	figure updated

80	2016-11-23	ERCA	JH	Page 4.39, Has this been confirmed?	Confirmed with City
81	2016-11-23	ERCA	JH	Page 4.58, LR-2 is not located within the Sandwich South Employments Lands.	text updated
82	2016-11-23	ERCA	JH	Page 5.10, It is anticipated that functional design studies will be undertaken for each subcatchment delineated by this study. The fisheries assessment/offsetting plan, however, will likely need to be undertaken for the entire study area since offsetting opportunities may not always be available in the same subcatchment.	text on fisheries offsetting has been added to Section 8
83	2016-11-23	ERCA	JH	Page 5.11, High level costs need to be included in the report.	agreed. Additional information has been added to section 6.3
84	2016-11-23	ERCA	JH	Page 6.2, Should "ponds" be "properties"?	text updated to change "pump" to "properties"
85	2016-11-23	ERCA	JH	Page 6.3, Figures 17 to 19 have not been provided in the current draft submission.	The figures have been included with this submission
86	2016-11-23	ERCA	JH	Page 6.3, On Drawing 3, can the varying corridor widths be differentiated with different blue shading so they stand out better.	figures updated
87	2016-11-23	ERCA	JH	Page 6.4, As previously noted, a fisheries assessment/offsetting plan will be required for the entire area since offsetting will not always be possible within the same subcatchment area. This will not be able to be addressed in the subcatchment functional design studies.	text on fisheries offsetting has been added to Section 8
88	2016-11-23	ERCA	JH	Page 6.4, Map is not in Appendix F. Drawing 4 shows the proposed land uses.	text updated. Proposed land use plans are now included in Appendix F.
89	2016-11-23	ERCA	JH	Page 6.5, See comments above regarding fisheries assessment/offsetting plan.	text on fisheries offsetting has been added to Section 8
90	2016-11-23	ERCA	JH	Page 6.5, Where is the information related to the proposed channel (i.e.. location, grades, cross-sections, etc.)	The proposed conceptual cross section is fairly uniform and is shown in Appendix F.
91	2016-11-23	ERCA	JH	Page 6.5, It appears that the proposed water levels are based on an improved Little River channel configuration. Accordingly, Little River channel improvement need to be undertaken first before development proceeds. This sequencing must be clearly documented in this report. Can any development proceed before the channel improvements are undertaken?	Water levels are based on an improved channel, but since flows from the SWM facilities are reduced from existing levels (to the 2-yr event) water levels will be less than existing in the existing channel. The improved channel will lower flood levels to within the channel banks
92	2016-11-23	ERCA	JH	Page 6.6, The radius circles are difficult to see on Drawing 3.	drawing updated
93	2016-11-23	ERCA	JH	Page 6.7, As previously noted in the report, facilities within the 2 km radius circle of the airport are to be dry facilities with a treatment train approach. Is a larger corridor width required for facilities within the 2 km radius circle?	Dry facilities are not expected to require a larger footprint. The footprint is largely based on quantity controls which are unchanged.
94	2016-11-23	ERCA	JH	Page 6.9, Many of the pond outflows appear to exceed the drain capacity during the post 1:100 year event.	The average proposed flow is less than existing. The conceptual SWM controls are approximate and it is expected that the pond design will be refined to more closely match the drain capacity as the design progresses.
95	2016-11-23	ERCA	JH	Page 7.8, Is this in Appendix F?	This information in included in the "Model Parameters" table - page 3 of the appendix (not including the title page).
96	2016-11-23	ERCA	JH	Page 7.12, I think this may have recently changed.	text changed to "generally not covered". Taken from the insurance bureau of Canada
97	2016-11-23	ERCA	JH	Page 7.13, An IDF update study was completed for the Essex Region. The results showed significant variability between different updating methods. Variation is so significant that it is not possible to select one updated curve with a reasonable level of confidence. The information, however, did generally show a projected increase. A copy of the report is attached. It should be referenced in this document.	text updated to reflect the "Comparison of Future IDF Curves for Southern Ontario" and an MTO memorandum on the Implementation of Climate Change for Highway Drainage.
98	2016-11-23	ERCA	JH	Page 7.15, Reference should be made to the upcoming MOECC guideline for LID's. MOECC bulletin attached.	text updated
99	2016-11-23	ERCA	JH	Appendix B – Correspondence includes letters received through project consultation. Some of these letters, such as correspondence from the Caldwell First Nation, were not in support of the study. How were these letters/concerns dealt with through the study process.	Generally the respondents were kept informed of the study progress. A meeting was held with the Caldwell First Nation as documented in Section 3.4.2.
100	2016-11-23	ERCA	JH	On page 1 of Appendix G, the Current PC-SWMM Model Proposed water elevations and flows in the first table do not match the Current PC-SWMM Model proposed water elevations and flows in the Proposed table at the bottom of the page. Please clarify.	The 2nd table was based on outdated information and has been updated.
101	2016-11-23	ERCA	JH	Drawing 4 is titled Proposed Land Use Plan. This could be taken to infer that the EA process will somehow result in changes to the land use designations in the study area. The EA process is not the Planning Act process. Changes in land use designations require approval under the Planning Act and any such approvals are required to be consistent with the 2014 PPS. The information contained within the EA report is deficient in several aspects in that it is not considered a complete EIA which has demonstrated no negative impact. At what part of the process will the EIA be completed for this area, in accordance with PPS policies? This will require additional biological work as most of the data being used in this report is many years old. Perhaps Drawing 4 should be renamed Potential Future Land Use Plan (or similar) with a qualifier that it is subject to additional studies under the Planning Act process. This next Planning Act process step must be clearly identified in Section 8 of the report.	Drawing 4 title updated to "Proposed Development Plan". Additional text added to Section 8
102	2016-11-23	ERCA	JH	It is anticipated that functional design studies may be undertaken for individual subcatchments within the overall study area vs. one functional design for the entire study area. It is noted in the report that fisheries offsetting may be required for the proposed loss of some open drains. It is further noted that fisheries offsetting may be required in some subcatchments for loss of habitat in other subcatchments. This needs to be known during the subcatchment functional design. It appears that the future drain assessment/DFO review should likely be completed for the entire area as a next step before functional designs proceed. If this is correct, this should be clearly identified in Section 8 of the report	text on fisheries offsetting has been added to Section 8
103	2016-12-13	Tecumseh	FF	A factor of 4X has been applied to the required area at the level/elevation of the permanent pool surface. We understand that this is intended to allow for 3/4 of the permanent pool surface area to be 'dry' (i.e.. island areas that may be planted surfaces at/above the permanent pool elevation), thereby serving to create discontinuous/isolated permanent pool wet surface areas that would allow for circulation of flows.	agreed

104	2016-12-13	Tecumseh	FF	We understand that this was the criteria previously used in re-sizing the ponds in the Tecumseh Hamlet, resulting in an increase from 120m to 150m in the SWM corridor widths (see attached prior emails and sketches). Is this still the case, and if so, is this reflected in the Master Plan document to capture this change?	agreed, this criteria was used to resize the Tecumseh SWM corridor. This is documented in the Environmental Study Report
105	2016-12-13	Tecumseh	FF	The area at the level/elevation of the permanent pool surface can have a significant influence on the footprint of the pond at the ground surface. Has there been any functional designs completed to confirm that this factor of 4X is sufficient to achieve the required permanent pool depths/volumes for quality treatment, to support/sustain habitat, and discourage waterfowl?	No functional designs have been completed. The permanent pool storage volume for water quality control is significantly less than the active storage volume for water quantity control, so the MOECC design criteria can be met with portions of the pond being dry
106	2016-12-13	Tecumseh	FF	We understand that the permanent pool depth is proposed to be 1.5m. Is this sufficient, as we understand that depths of up to 4m may be preferred for sustainability of habitat.	1.5 m is an average depth. Variation in depth would create a variety of aquatic habitat
107	2016-12-13	Tecumseh	FF	Also arising from our earlier comments, Stantec provided the SWM Pond design parameter tables via email dated *March 4, 2016 (attached),* which identified permanent pool elevations in that table that are 1.5 m to 2.1 m lower than the values that have now been included in the October 2016 Draft Master Plan (Appendix F).	agreed
108	2016-12-13	Tecumseh	FF	As previously agreed, the SWM solution for the Tecumseh Hamlet area will require that the permanent pool elevation (normal water level) be at/below the storm sewer inverts discharging to these ponds. Please reconfirm and update the Master Plan with the required normal water level elevations based on the proposed storm sewer outlet elevations identified for the Tecumseh Hamlet storm sewer system.	The water levels used in the model are based on gravity outlets for ease of modelling. The corridor has been made wide enough to accommodate lower permanent pools and pumping
109	2016-12-13	Tecumseh	FF	Active Storage Volumes and Pump Station Outlet Capacities. Each pond will require a pump station outlet to discharge to the existing downstream watercourse based on existing available drain capacity. The tables in the Master Plan appear to reference orifices/weirs and do not appear to account for pump stations as outlets from these facilities. Please confirm.	The corridors were made wide enough to accommodate a lower permanent pool and pumping in required. For ease of modelling and consistency all outlets were assumed to drain by gravity using weirs and orifices in the hydrologic model.
110	2016-12-13	Tecumseh	FF	Please confirm that the existing outlet drain capacities that have been outlined in the Master Plan and on which the allowable pump station outlet rates have been based, are acceptable to the City and ERCA and that no further studies would be required that might further reduce these pumping rates and further affect the required active storage volumes in these pond facilities.	The outlet drain capacities in the study are approximate and the final flows will be based on the downstream drain capacity.
111	2016-12-13	Tecumseh	FF	Is the increased 150m SWM corridor width sufficient to accommodate the required active storage volumes based on these allowable discharge rates.	yes
112	2016-12-13	Tecumseh	FF	Have climate change considerations been factored into the required active storage volumes and the resulting hydraulic grade line conditions in these facilities according to the Provincial Policy Statement and current understanding.	The report discusses climate change (Section 7.6) but all of the flows were based on existing precipitation data
113	2016-12-13	Tecumseh	FF	We also wish to point out that the "Ground Elevation of the Upstream Storm Sewer" provided in the Master Plan tables are more than 2.0 m higher than what our records indicate as the existing grades of the Tecumseh Hamlet lands (see attached comparison tables), which may affect the assumptions/results in the Master Plan.	The ground elevations were based on Ontario Base Mapping and the furthest upstream point of each catchment. Detailed survey information was not available for the entire study area. The corridor width was based on locations where survey was available
114	2016-12-13	Tecumseh	FF	We have confirmed that the land use % breakdown has now been updated to reflect the Tecumseh Hamlet Secondary Plan information, as outlined in our previous comments.	agreed
115	2016-12-21	Meeting	all	There is a need to have a better understanding of the fisheries offsetting that may be required as this area develops. Based on the conceptual land use plans, open waterways will be removed in certain subcatchment areas and potential habitat offsetting will be required in open waterways that are to remain in other subcatchment areas. Accordingly, offsetting will not always be available within the same subcatchment area. It should be identified that a next step following the completion of this report should be the development of a fisheries offsetting plan for the entire study area. The current study, however, should provide estimates of the habitat that will be lost (i.e. length of open drain, square footage of direct and indirect habitat, etc.), a list of the open drains proposed to be removed, a list of open drains to remain and the potential location of fisheries offsetting opportunities	A list of drains to be removed and retained has been added to Appendix F. Additional text on fisheries offsetting has been added to Section 8
116	2016-12-21	Meeting	all	Plans are included that identify proposed land uses within the study area. Completion of this EA study does not result in changes in land uses. Other *Planning Act* processes must be followed to change land use designations. The following items where discussed: • The report must clearly identify and qualify the information that was used in reference to proposed land uses.	The proposed land use plan was based on available planning information (refer to appendix F) and was not altered for the study
117	2016-12-21	Meeting	all	• The report must clearly identify that future Planning Act processes are required to change current land uses.	additional text on next steps has been added to Section 8
118	2016-12-21	Meeting	all	• The title of Drawing 4 should be modified so as to not imply that the proposed land uses are approved.	Drawing 4 title updated to "Proposed Development Plan".
119	2016-12-21	Meeting	all	• Based on the typical scope of an EA study, the current environmental investigations are not sufficient to support land use changes under a *Planning Act* process. It was recommended that 120 m offsets be shown around all natural features to indicate that additional environmental studies will be required within these areas to support future *Planning Act* approvals/processes.	Additional text on a 120 m offset was added to section 8. The environmental features are shown on a figure and the 120 m was not visible due to the scale of the drawing.
120	2016-12-21	Meeting	all	• This EA covers a very large area. The report should identify that future EA Addendums may be required to address the ultimate land uses that may be proposed in this area.	additional text added to section 8
121	2016-12-21	Meeting	all	Review of submitted City comments: • The City raised a question about the municipal boundary between the City of Windsor and the Town of Tecumseh shown on Figure 3. The City will provide Stantec with a plan showing the legal boundary.	additional information received to clarify. Drawing 3 has been updated.
122	2016-12-21	Meeting	all	• Order of magnitude costs for the different options that have been considered are to be included in the final report.	additional information on costs has been added to section 6.3

123	2016-12-21	Meeting	all	Review of submitted Tecumseh comments: • The Town raised a question regarding the proposed 1.5 m depth of the permanent pools and noted that pools up to 4 m may be preferred for habitat. o The proposed stormwater ponds are sewage treatment facilities. Typically, it is not recommended to encourage wildlife to use these facilities even though it is inevitable. It was agreed that the ponds should follow the design guidelines found in the MOECC Stormwater Management Planning and Design Manual (March 2003).	agreed
124	2016-12-21	Meeting	all	○ Stantec advised that the conceptual ponds have sufficient room to have a varying depth. This will be identified in the report.	additional text added to report in Section 6.1.2 on water level depth in the SWM ponds
125	2016-12-21	Meeting	all	• The Town noted a difference between the proposed pond normal water levels in the current report and in the previous report. This further raised the question about the size of the proposed SWM corridors. o Stantec advised that all ponds have been sized based on gravity outlets and that MOECC recommends a maximum depth for active storage. Stantec further advised that the same storage volume will be required for pumped ponds, however, the active storage will be at a lower elevation resulting in a larger top of the pond area. Stantec advised that this was considered when the SWM corridors were sized	agreed
126	2016-12-21	Meeting	all	○ Stantec is to include a cross-section that shows the worst case scenario pond configuration that resulted in the proposed 150 m SWM corridor width. This cross-section should also show how the gravity versus the pump option was considered in the pond/corridor sizing.	Cross sections are included in Appendix G for the pumped and gravity outlet configurations.
127	2016-12-21	Meeting	all	○ The report should include a discussion on how the pond sizes and SWM corridors were developed for this project.	Additional text added to Section 6.1.2
128	2016-12-21	Meeting	all	• The Town recommended that all comments received and the related responses should be included in the report Appendices. All were in agreement.	Comments and responses have been added to Appendix B
129	2016-12-21	Meeting	all	• The Town asked if any further studies would be required to confirm the available capacity in the downstream drains and the related pond outlet release rates that have been considered in this report. o Stantec confirmed that the downstream drain capacities have been based on information provided by the municipalities and standard Drainage Act procedures. This is considered a table top exercise since undertaking surveys of all drains to calculate actual drain capacities is beyond the scope of this EA. The assessment produced small allowable release rates for the proposed ponds. Modification to these release rates are not expected to have a significant impact on the storage volumes required. Finalization of the ultimate drain capacities and related pond release rates is required in future functional design studies.	agreed
130	2016-12-21	Meeting	all	• The Town asked how, or if, climate change has been considered and if increased intensity storms have been modelled. o Increased intensity storm have not been modelled.	The precipitation events were based on current IDF parameters
131	2016-12-21	Meeting	all	○ The report should include a discussion on the need to consider climate change in the future functional design studies.	additional text on climate change added to section 8
132	2016-12-21	Meeting	all	○ The report should identify how the current conceptual pond designs have the ability to be modified within the recommended SWM corridors to provide for additional storage that may be required under future climate change scenarios.	additional text added to section 6.1.2
133	2016-12-21	Meeting	all	○ The report should identify that, in addition to traditional stormwater ponds, future functional designs studies may need to consider LID alternatives. A list of potential LID alternatives should be included and it should be noted that all LID's may not be suitable for the existing physical constraints within the Essex Region.	agreed. Section 7.7 discusses LID in general and specific recommendations have been added to Section 8
134	2016-12-21	Meeting	all	• The Town requested that the final report be as detailed/specific as possible with regard to infrastructure needs and criteria. o Based on existing functional design studies that have been completed by the Town, all of the Town ponds will be required to be pumped. This criteria is to be included in the final report.	additional text added to Section 6.1.1. Functional studies were for areas west of Banwell. Not clear if criteria apply to pond south of Hwy 401?
135	2016-12-21	Meeting	all	○ The City does not have functional design studies for their portion of the study area, however, they have advised that all sewers are to be dry between storm events. The City also advised that they want pond normal water elevations to be at or below the sewer inverts versus sewer dewatering pumps. Accordingly, if functional design results in sewers that are lower than the inverts of the outlet drains, pumping will be required. The report should include this criteria.	additional text added to Section 6.1.1. Reference to a using a flap gate to keep the pipe dry was removed
136	2016-12-21	Meeting	all	Review of Submitted ERCA comments: • ERCA raised a question about when the proposed improvements to the Upper Little River are required to be completed. o Stantec advised that the improvements are required to improve existing flood elevations in the Little River. With the proposed pond restrictions, development should not worsen the existing conditions if the improvements are not completed immediately. These channel improvements are also planned to address some of the anticipated fisheries offsetting needs. Accordingly, the need to undertake the improvements may be driven by when certain sections of the area are developed. The schedule for undertaking the improvements to the Upper Little River channel requires further discussion with the City.	agreed
137	2016-12-21	Meeting	all	○ The cross-sections of the proposed channel improvements for the Upper Little River, the 6th Concession Drain, etc. that were used in the hydraulic model should be included in the final report. This will provide the minimum channel dimensions required for flow conveyance and storage. All fisheries offsetting requirements would be an expansion of the minimum hydraulic channel dimensions.	The cross section assumed for the hydraulic modelling is included in appendix G
138	2016-12-21	Meeting	all	Stantec requested a copy of the 1992 City of Windsor Candidate Natural Heritage Site Biological Inventory Report. A copy of this report is attached to this e-mail.	A copy of the 1992 study has been received and incorporated into the report

Comment #	Date	From		Nov 2016 Comment #	Comment	Response
1	2017-02-16	ERCA	JH	1	Section 6.3 does not provide cost estimates for all of the alternative development solutions that were considered. It appears that the provided comparison relates to ponds with pre 1:100 year release rates vs. release rates based on available drain capacity. Order of magnitude costs (or something similar) should be provided for all of the alternatives that were considered (i.e. do-nothing, water quality and erosion control only, communal stormwater facilities, on-line quantity control with local quality and erosion control, etc.).	Section 6.3 has been updated to include a preliminary opinion of probable cost for all alternatives
2	2017-02-16	ERCA	JH	8	All personal information has not been removed from Appendix C.	Appendix C has been updated to remove personal information
3	2017-02-16	ERCA	JH	61	If it is allowed by the original authors, we would suggest that all Stantec, Waldron and Ecoplan field investigations/reports should be included in an Appendix.	The Stantec and Waldron field investigation information has been included in Appendix E. The Ecoplans Report could not be located.
4	2017-02-16	ERCA	JH	90 & 137	A very basic cross-section is provided in Appendix H. It is our understanding that this is the minimum channel improvement that is required to produce the proposed future high water elevations and that any required fish habitat offsetting would be an expansion to this cross-section. While dimensions could be approximately scaled from the provided cross-section, a more detailed cross-section with channel dimensions should be included. A plan should also be included showing where this cross-section has been used in the modelling	More detailed figures have been added to the main body show cross sections and cross section locations.
5	2017-02-16	ERCA	JH	N/A	On Figure 6 there is only one site on the `Gouin Drain identified as being an isolated "Fish Habitat Location". This seems unusual. Other reaches are identified as "Fish Habitat Reaches". Is the Gouin Drain downstream of this location a "Fish Habitat Reach"?	Gouin Drain updated to "Fish Habitat Reach" on Figure 6
6	2017-02-16	ERCA	JH	N/A	On Figure 13 a large pond is shown near Hennin Street. This pond has been completely filled in.	figure updated
7	2017-02-16	ERCA	JH	N/A	Figure 14 provides existing and proposed floodplain elevations. Are the proposed elevations based on development with existing channel conditions or proposed channel improvements?	the proposed elevations assume proposed development and proposed channel improvements
8	2017-02-16	ERCA	JH	N/A	On Figure 17, numerous sub-catchment ponds appear to be shown within catchment boundaries. Catchments 2060 and 2095 appear to conceptually have 8 ponds. If this is correct, these catchment areas are not that large and 8 ponds seems unreasonable for a conceptual depiction. Please provide some clarification for this Figure.	The drawing was conceptual in nature and has been updated to more closely match the descriptions. The number of ponds shown is approximately half of that shown on the previous figure
9	2017-02-16	ERCA	JH	N/A	On Figure 18 there are 3 red lines in the bottom left corner of the sketch. It appears that these lines are likely from the original plan where this detail was taken from. If so, the 3 red lines should be removed	Figure 18 has been updated
10	2017-02-16	ERCA	JH	N/A	All personal information has not been removed from Appendix C. Please review Appendix G and make sure all personal information is removed.	Appendix C has been updated to remove personal information
11	2017-02-16	ERCA	JH		Section 3.3 - Add Mr. Phil Bartnik, Manager Engineering Services to the Tecumseh list.	Phil Bartnik has been added to the Tecumseh staff list
12	2017-02-16	ERCA	JH		Section 4.1.4.1 - All environmental field data should be included in an Appendix.	The Stantec and Waldron field investigation information has been included in Appendix E. The Ecoplans Report could not be located.
13	2017-02-16	ERCA	JH		Section 6.1.2. Refer to Appendix H	reference added for Appendix H
14	2017-02-16	ERCA	JH		Section 6.3 Order of Magnitude costs should be provided.	Section 6.3 has been updated to include a preliminary opinion of probable cost for all alternatives
15	2017-02-16	ERCA	JH		Section 7.6 - a comparison of Future IDF Curves for Southern Ontario. This Section should come before the previous NVCA Section. It should also identify that this study was commissioned by ERCA and TRCA.	Section 7.6 (climate Change) has been updated
16	2017-02-16	ERCA	DL		I have reviewed the revised document and find that the previous comments provided have been satisfactorily addressed.	agreed
17	2017-02-16	ERCA	DL		Of specific note is the recognition within the document that an Environmental Impact Assessment (EIA) will need to be completed – Development within 120 m of an existing natural feature will require an EIA demonstrating no negative impacts in support of future Planning Act approvals and process.	agreed
18	2017-02-16	ERCA	DL		Under section 6.2.1.6 Human Impacts, the revised report states the following: "The proposed development, through the implementation of additional trails and new development, has the potential to increase impacts to natural features from the introduction of human activity to an area that currently doesn't experience these anthropogenic disturbances. Potential mitigation measures include well-marked walking trails to discourage creation of informal trails, signage to educate trail users about the sensitivity of the natural features in the area, and trash receptacles place at intervals along the trails to discourage littering. Other mitigation measures may be required to show no negative impacts from residential intensification on wildlife populations." The above potential impact due to human population intensification of the area is not specifically addressed anywhere else in the report. This issue will need to be adequately addressed within any future EIAs for any land use designation changes in/around any existing natural features.	agreed

19	2017-02-16	ERCA	DL		Within section 4.1.2, the Essex Region Natural Heritage System Strategy (ERCA and County of Essex, 2013) is now referenced. Within the references section however, the citation is not included. This study should be properly included within the references section as follows: Essex Region Conservation Authority. 2013. Essex Region Natural Heritage System Strategy (An Update to the Essex Region Biodiversity Conservation Strategy). Essex, Ontario. 319 pages.	the reference has been added to Section 9.0
20	2017-02-16	ERCA	MN	15	Section from section 3.5.5 is pretty limited but may reflect the direction from the City and Town – that is, future applications will be required to change the zoning and official plan designations separate from the outcomes of this study. Section 8.1.1 details appropriately that future land use changes must meet all requirements of the Planning Act prior to implementation. Regarding the changes to section 8.1.2 I am not totally supportive of all of the statements made, but the process to outline the required studies for other processes (i.e., Planning Act, other Class EA, DFO process, etc.) should be identified through appropriate consultation with those other processes.	The text at the start if Section 8.1.2 was updated slightly to provide more overview on the processes. Prior to constructing the stormwater management features as well as the enhancement opportunities, a number of permits and approvals will need to be obtained through other process such as the Planning Act, Fisheries Act, and other Class EAs. The process to outline the required studies should be identified thought appropriate consultation with the following elements that may be part of the final implementation:
21	2017-02-16	ERCA	MN	18	comment addressed satisfactorily. I recommend that the data collected as part of this report be submitted to the NHIC as a condition of completion of the report. This would be in keeping with our contractual obligations between the ERCA and the NHIC (Dan Lebedyk is the signing authority).	Stantec did not observe any reportable species at risk or significant wildlife features during their investigations.
22	2017-02-16	ERCA	MN	21	ok. Per previous comment (18 – this data should be submitted to the NHIC to ensure the appropriate treatment at the Planning Act, other EA, and/or REA processes.	Stantec did not observe any reportable species at risk or significant wildlife features during their investigations.
23	2017-02-16	ERCA	MN	23	comment looks to be ok. Per previous comments regarding submission of 'raw' results to the NHIC as a condition of completion of the report – <u>especially</u> if SAR or SWH was documented. Fish records will typically have been submitted to the MNR as part of the License to Collect Fish for Scientific Purposes conditions.	Stantec did not observe any reportable species at risk or significant wildlife features during their investigations.
24	2017-02-16	ERCA	MN	29	text additions in section 8.1.1 is satisfactory. Page 4.13 –"Lake Sinclair" should be replaced with either Lake St. Clair or Lake Saint Clair.	text updated
25	2017-02-16	City	AG		Section 6.1.2. page 6.4. Include figures illustrating the cross-sections. Would be good to add sewer and pump station too; or add this to a figure for Section 7.3.	Storm sewers and pumps added to cross section figures and added to main body
26	2017-02-16	City	AG		Section 7.3. page 7.8. Include figure illustrating the cross-section with sewer and pump station	Storm sewers and pumps added to cross section figures and added to main body
27	2017-02-16	City	AG		Section 8.1.1, page 8.1. Suggest that a Guideline for the Development of SWM Facilities be one of the next steps. There should be consistency in the expectations of what conditions the facilities are maintained and associated maintenance budgets.	added to section 8.1.2
28	2017-02-16	City	AG		Section 8.1.1, page 8.1. Add text regarding minimum catchment area to be undertaken with functional design.	text on minimum catchment areas (20 ha) has been added to section 6.1.1 Design Criteria
29	2017-03-06	Town	FRF	15	Section 3.5.5 seems to suggest that this Master Plan is limited to Approach #1 (i.e.. not integrated). It indicates that further studies would be required to address Schedule B requirements for specific projects. Section 8 is also contradictory in this regard. It should be confirmed which Approach # this Master Plan satisfies? This Section also suggests that the Master Plan "should" consider various studies/objectives, but its not clear whether it has. The Town's Secondary Plan process for the Hamlet is relying on the Master Plan to satisfy the Class EA requirements for these SWM features, which isn't clear as being the case.	The Master Plan is Approach 2 including Phases 1 and 2 of the Municipal Class EA process with sufficient detail to satisfy a Schedule B Project. Additional studies are required, but they will not require an EA if they follow the Master Plan. Additional text added to Section 3.1 and 3.5.5.
30	2017-03-06	Town	FRF	24	The SWM facilities and their extended duration of releasing flows will change the flow characteristics throughout the drainage system. Was this assessed, particularly from a resiliency perspective (back-to-back storms).	The extended drawdown of flows from the pond will increase baseflows in Upper Little River. Back-to-back storms were not modelled.
31	2017-03-06	Town	FRF	27	Town does not have design guidelines, but there were design criteria agreed that should be identified, as these influenced the solutions (i.e.. NWL at/below sewer inverts, pumped outlets, etc.	agreed. This information is included in Section 6.1.1
32	2017-03-06	Town	FRF	82	Are the solutions not confirmed to be functional as part of this Master Plan process? Section 8 suggests that functional design is not possible, but this is what the Town's Hamlet Secondary Plan is relying on. Solutions in a Master Plan should be viewed as being functional. What is the extent/scope of these future studies that ERCA expects to be completed?	The EA satisfies the requirements of Master Plan Approach 2 (Schedule B). SWM alternatives were evaluated and a preferred solution selected. Sufficient design work was completed to select a preferred solution.
33	2017-03-06	Town	FRF	82	In Section 8, it is identified that fisheries compensation for the entire study area will be a future study. What is the expected timing for this? How does this affect Tecumseh's Hamlet area?	Specific timing information is unknown. This is considered future work.
34	2017-03-06	Town	FRF	94	Was this not corrected in the case of the Tecumseh Hamlet based on drainage reports, as confirmed below? Outlet drain capacities could be a significant constraint and should be identified to confirm that the solutions are functional.	All catchments were treated equally in the study and the target flow was calculated as the existing 2-year flow rate.
35	2017-03-06	Town	FRF	97	Was this factored into the modeling of the solutions, as further commented on below?	Climate Change was modelled assuming a 20% increase in flows as provided by the Town of Tecumseh

36	2017-03-06	Town	FRF	102	See my comments on Item No 82, above. This could have implications on the Tecumseh Hamlet.	Additional studies are needed to determine specific mitigation measures and how they are spread across the study area.
37	2017-03-06	Town	FRF	104	This documentation will facilitate future implementation/approvals requirements. Where is this documented?	Section 6.1.2
38	2017-03-06	Town	FRF	105	MOECC would be a min. criteria considering Town's desire for SW ponds to serve as amenities, natural habitat features/wetlands, and waterfowl deterrence. This should be identified to give the Town flexibility to require this of developers.	The 1.5 m is an average depth. MOECC criteria recommend depths ranging from a mean depth of 1 to 2 m up to a maximum of 3 m. Additional text added to Section 6.1.2 describing MOECC criteria.
39	2017-03-06	Town	FRF	109	The ESR should identify that functionally, these facilities will require pumping to meet the Town's criteria, which should be confirmed.	The pumping bullet in Section 6.1.1 says "Based on existing functional design studies completed by The Town, all Town ponds require pumps"
40	2017-03-06	Town	FRF	110	Town provided drainage reports for these drains. Will ESR confirm how drain capacities were established so that this can be verified in the future?	Drain capacities in the study were based on the 2-year 24 hour rainfall event as documented in Section 4.3.8 and 6.1.2
41	2017-03-06	Town	FRF	112	Climate change impacts should be assessed as part of this Master Plan since this may influence the solutions. This will be a design requirement, so it should be addressed at this time.	Climate Change was modelled assuming a 20% increase in flows as provided by the Town of Tecumseh and documented in Section 7.6
42	2017-03-06	Town	FRF	113	We based the Town's required storm sewer inverts on verified ground elevations. We will need to confirm HGL impacts based on water elevations, which should be OK based on lower NWL's.	agreed
43	2017-03-06	Town	FRF	115	Section 8 simply indicates the need in the future for an area-wide study to confirm compensation requirements. As a result, it is unclear what the impacts of this may be. When is this area-wide study expected? In its absence, would individual developers be required to do this on a piecemeal approach? It may be worthwhile indicating what the expectations for developers would be until this area-wide assessment is done.	A watershed scale study is required to determine appropriate mitigation measures and locations. This work is considered to be outside of the current project.
44	2017-03-06	Town	FRF	121	Don't see municipal boundary on Drawing No. 3?	The municipal boundary was removed from Drawing 3 since it is coincident with the catchment boundaries and was difficult to see on the drawing
45	2017-03-06	Town	FRF	123	Generally described normal water levels at 6m depth with 5:1 slopes. Ponds still being referred to as conceptual, not functional?	correct
46	2017-03-06	Town	FRF	126	Cross sections for both scenarios show NWL at 6m depth, which doesn't make sense unless outlet channels are 6m deep. Are there any channels this deep?	The 6 m depth was estimated based on available topographic information as the maximum depth of the permanent pool below the ground surface and was used to determine the corridor width as a worst case scenario. There are no channels that deep and ponds 6 m deep would need to be pumped.
47	2017-03-06	Town	FRF	127	Text generally ok, but still references design as conceptual only. Last paragraph confusing...	The EA satisfies the requirements of Master Plan Approach 2 (Schedule B). SWM alternatives were evaluated and a preferred solution selected. Sufficient design work was completed to select a preferred solution.
48	2017-03-06	Town	FRF	128	There has been a lot of email correspondence and attachments back and forth dating back to 2012 or so. None of this has been captured in the Appendices, other than minutes of our last meeting of Dec 20, 2016.	Additional correspondence has been added to the appendix
49	2017-03-06	Town	FRF	129	Are the allowable release rates relative to the drainage area upstream of the ponds (i.e.. the full capacity of the drains may not be what is allowed to be released from the ponds...)	Release rates are given on a total value for each catchment and a per hectare rate. The release rate from the ponds should be based on the pond drainage area.
50	2017-03-06	Town	FRF	130	Climate change impacts should be modeled, as this will be a requirement for design and should be assessed to confirm resiliency of solutions.	Climate Change was modelled assuming a 20% increase in flows as provided by the Town of Tecumseh and documented in Section 7.6
51	2017-03-06	Town	FRF	132	Modifications include steeper side slopes, which isn't appropriate. What is the climate change impact? Was this modelled?	Steeper slopes have been removed from the list of possible modifications. Climate change increases the storage volumes by approximately 20 to 30%
52	2017-03-06	Town	FRF	134	Town's criteria for pumping of ponds has been included. Town's functional studies were for the Hamlet area east & west of Banwell. Not sure how the pond south of 401 relates to this?	No specific requirement for pumping will be made for areas south of Highway 401
53	2017-03-06	Town	FRF	136	Town should have an understanding of the extent to which Hamlet development will rely on the Little River channel improvements. Can this be clarified?	The Hamlet can be developed without any downstream improvements
54	2017-03-06	Town	FRF		Does this document satisfy Schedule B EA requirements? If not, what is needed? The Town needs assurances because they are planning to move forward with Secondary Plans. If Schedule B requirements are not satisfied, they will not be able to commence Secondary Plans. What Approach number is satisfied under the EA process. It appears to be Approach 1, but the Town believes this study should at least satisfy Approach 2.	The EA satisfies the requirements of Master Plan Approach 2 (Schedule B). SWM alternatives were evaluated and a preferred solution selected. Sufficient design work was completed to select a preferred solution.

55	2017-03-06	Town	FRF		Climate Change – Additional generic information has been added regarding climate change. Dillon and the Town are concerned that the document does not provide enough information/analysis to demonstrate an appropriate duty of care regarding this matter. The Town suggests that a climate change analysis should be completed on one of the proposed subcatchment areas to determine if the proposed corridor is sufficient to provide for a potentially larger pond due to climate change. Completion of this analysis could then be used to further support for the proposed SWM corridor widths. This analysis could also set out a framework for future climate change assessments during subcatchment functional and detailed design processes. The Town wants it clearly identified that climate change must be addressed in future subcatchment functional and detailed designs.	Climate Change was modelled assuming a 20% increase in flows as provided by the Town of Tecumseh and documented in Section 7.6
56	2017-03-06	Town	FRF		Fisheries Habitat Offsetting – Appendix G contains a Table "Summary of Proposed Municipal Drain Modifications". This is an important piece of information which should be included in the main body of the report. This table identifies where habitat will be lost and where there is potential for enhancement opportunities. At this time, it is unclear if Tecumseh can address their enhancement needs in waterways situated within the Town limits or if development in Tecumseh will also require enhancements in City waterways. While this may not be known until the recommended fisheries offsetting study is completed, the report should identify these types of issues. Could fisheries offsetting needs impact the functionality of the recommended alternative? It should be confirmed that sufficient investigations have been undertaken through this EA process to ensure that fisheries offsetting needs can be satisfied through functional/detailed design. The report should include some typical fisheries offsetting techniques that could be considered in the future fisheries offsetting study. It would also be helpful if the report recommended a scoping strategy for the future fisheries offsetting study.	Discussion on offsetting potential being required in other areas is discussed in Section 8.1.1. Based on discussions through the EA the existing open channel municipal drain network was not intended to be retained and all development options were assumed to remove the drain network. Typical fishery offsetting techniques are included in Table 21. The fisheries offsetting report is considered future work.
57	2017-03-06	Town	FRF		Conceptual vs. Functional – The recommended alternative should provide functional scenarios that will be further detailed in the next step subcatchment functional/detailed designs. The word conceptual could be taken to mean that the functionality of the scenario has not been confirmed. We believe that this is mainly an issue with terminology, however, it must be clear in the report that the solution is functional. The use of these words in the report must be reviewed and modified as required.	The ponds are conceptual in nature. It is expected that drainage areas, pond locations, elevations, and outlet structures will be modified as the design progress. This study provides sufficient details to select a preferred solution including land requirements, allowable flows, and environmental impacts.
58	2017-03-06	Town	FRF		It is identified in the report that the ponds have been sized with a 1.5 m permanent pool and that the SWM corridors provide room for additional depth if required. This was added to address the Town's concern that they may want deeper ponds based on their desire to make these facilities amenities within their parkland features. The Town wants it stated in the report that they anticipate requiring deeper permanent pools for their ponds.	Additional text added to Section 6.1.2 indicating the Town's request. "The Town of Tecumseh anticipates that permanent pools deeper than 1.5 m will be required for their ponds."
59	2017-03-06	Town	FRF		The study area includes portions of Tecumseh on the south side of Highway 401. The report must clearly identify the criteria that is applicable to future development in this area.	Flow and storage volume requirements are provided in the report for the area south of Highway 401 that is developable in the Town of Tecumseh Official Plan.
60	2017-03-06	Town	FRF		It was previously identified that there appeared to be a datum issue between the storm sewer invert elevations provided by Tecumseh and the ground elevations that were used by Stantec for this study. Was this datum difference resolved and is there an impact on the anticipated HGL's in the upstream Tecumseh storm sewers?	The datum provided by Tecumseh were used to determine the 6 m elevation difference between the permanent pool and the top of pond. The HGL in the storm sewers is unchanged.
61	2017-03-06	City			"Looking at the PIC material, it appears that we have published a variety of names for this study: 1. Notice of Study Commencement – Upper Little River Watershed Master Drainage Plan & Stormwater Management Plan 2. PIC #1 & 2 notices – Upper Little River Watershed Master Drainage Plan & Stormwater Management Plan 3. PIC #1 & 2 display boards – Upper Little River Stormwater Master Plan Class Environmental Assessment 4. Draft report cover pages in July 2014, Sept. 2016, & Jan 2017 – Draft Upper Little River Master Plan Environmental Assessment I think that the name of the study should match either the notices or the display boards. At least it should include a term such as watershed, drainage, or stormwater."	agreed. The study will be referred to as the "Upper Little River Watershed Master Drainage and Stormwater Management Plan"

Comment #	Date	From		June 2017 Comment #	Comment	Response
1	2017-07-17	City	AG		I reviewed the document and my primary concern is that the SWM corridors be consistently shown in the document. Conceptual channel cross-section in Appendix H is not showing the recommended width.	Agreed. Cross sections have been moved to the main body of the Report and removed from the appendix
2	2017-07-17	City	AG		I understand that Drawing #3 will be replaced. Corridor widths should be shown as recommended (200m and 325m wide ?). Please confirm.	Corridor widths are either 200 m or 325m
3	2017-07-17	City	AG		I'm fine with new Drawing #4 provided there is sufficient information. It doesn't matter to me if it is on one drawing, or split up.	Agreed
4	2017-07-17	City	AG		Appendix B – I was concerned about including personal information on the comment sheets, but we are o.k. based on review of my notes from corresponding with the City's Manager, Records and Elections, Freedom of Information Coordinator. He advised that: "It appears that you covered yourselves with the following statement: Your completed Comment Sheet will be included in the Class EA report, which will be made public at the completion of this study. Please check the box below if you wish to have your comments included anonymously. Please withhold my name and contact information from publication in the Class EA report. I would consider this implied consent to full disclosure because you gave them the opportunity to opt out of making their information public."	Agreed
5	2017-07-18	Town	FF	35	Please note that Dwg No. 3 still shows the corridor widths at 150m, whereas I understood we have agreed to the need for 200m corridor widths?	Drawing 3 has been updated
6	2017-07-18	Town	FF	40	This should be OK, as it would be less than the typical 38mm of runoff over 24 hrs that is applied in the Drainage Act. We should also have confirmation of the runoff coefficients used and the allowable runoff rates for each drain.	Proposed flows rates are limited to the municipal drain capacity during the 100-year rainfall event (50 mm of runoff over 24 hours or approximately the 2-year 24-hour rainfall event. Allowable flow rates have been calculated on a catchment basis and are included in Table 11
7	2017-07-18	Town	FF	45	OK, but are we not revising to describe the solutions as "functional"?	Additional text has been added to the report describing the solution as functional
8	2017-07-18	Town	FF	47	This corresponds to "functional" design - ie. more than conceptual in nature.	Additional text has been added to the report describing the solution as functional
9	2017-07-18	Town	FF	54	It appears that Dwg No. 4 shows the pond corridor at the Desjardins Drain being centered on the existing drain, whereas the figures suggest the drain is off to one side. We should confirm the proper pond location, as this will affect the Secondary Plan and road layout.	The proposed channel alignment is not required to follow the existing municipal drain alignment
10	2017-07-18	Town	FF	57	I don't believe that complete flexibility in design drainage areas and pond location could/should be afforded to remain true to the Schedule B process, since these types of changes could be considered significant. It should be clarified that the pond solutions are "functional", with flexibility for only certain design details (refinement of pond elevations/shapes, outlet controls, etc). There should be limitations to changes in the fundamental aspects of the solutions to ensure compliance with the Schedule B EA approval inherent in this Master Plan.	Additional text has been added to the report describing the solution as functional. Significant changes would require a Schedule B EA.
11	2017-08-25	ERCA	JH		For this high level modelling, the watershed of the 6th Concession Drain should be modelled without the inclusion of stormwater management controls for existing development.	The modelling has been updated to remove all storage from the existing developed areas west of Concession Road 7
12	2017-08-25	ERCA	JH		You identified that the drain cross-sections used in the existing modeling scenarios relate to existing cross-sections and that future scenarios are modeled with improved cross-sections. You further identified that other than the Little River, the improved cross-sections are not required for development to occur on the tributary waterways from a capacity perspective. It was further discussed that some waterways will likely require improved cross-sections to address existing drain stability issues. In addition, some channel improvements may be required for fish offsetting. The modeled cross-section rationale must be clearly documented in the report. The requirements related to the Little River cross-section improvements for future flood elevations must also be documented.	an additional paragraph was added to section 6.1.2 to document the cross section rational
13	2017-08-25	ERCA	JH		In the next steps section of the report, the need for additional detailed floodplain analysis for the determination of flood proofing elevations must be included.	additional text added to section 8.1.2
14	2017-08-25	ERCA	JH		The parameters to be used for future stormwater pond designs must be clearly identified in the report (i.e. storm distribution and duration, time step, minimum c values and impervious levels for different land uses (c and % imp may be more depending on future proposals), etc.).	Precipitation is discussed in section 4.3.2.1, and included in the model input file, while impervious levels for different land uses are outlined in Appendix G
15	2017-08-25	ERCA	JH		The corridor widths shown in the legend on Drawing 4 have not been updated (You indicated that you thought this had been corrected since the Drawings were distributed for review).	corridor widths have been updated

From: Jeremy Wychreschuk <JWychreschuk@erca.org>
Sent: 2012-08-17 1:21 PM
To: Innes, Jayson
Cc: Brown, Steve; Godo, Anna; Winters, Patrick; bhillman@tecumseh.ca; Tim Byrne; John Henderson
Subject: RE: Upper Little River EA

Hi Jayson,

Thanks for sending us the information so far. I have reviewed the information, and further to Anna's comments below, have a number of additional comments (below). I have not received comments from others in my office (such as John Henderson and Tim Byrne), and I may receive additional comments (which I would forward when received). There really isn't very much information provided in the attached figures, and I expect that much of the information ERCA will be looking for will be in the report. When will this draft report be ready for our review?

- For the storm sewer figure with depth to invert categories, is it not more important to know the depth from the ground surface to the top of the pipe (to ensure no water freezes in the pipe)? How relevant is the depth to invert value? Also, for the <2 m, how much lower is it (just a bit, a lot lower, or does it vary greatly)? What size of storm sewer pipe will generally be required and will the size vary substantially?
- You mention that purple areas will require pumping and that green areas will not, but what about the in-between colours (yellow and orange)? Will these areas require any pumping at all?
- Your peak flows must meet pre-development flows, which I'm assuming is met with the values provided below. Is this correct?
- In addition to the water elevations at various design storms, what will be the affected areas (crude floodline mapping)? The most important design storm from the ERCA perspective is the 1:100 year design storm. Is the 100 year storm contained within the ROW?
- Arrows showing the primary direction of flow for each subcatchment would be helpful.
- I see no details for the airport SWM facilities. This will need to be provided, hopefully soon.
- I did not see any details about the inlet or outlet of the SWM ponds (provided in the report?). Cross sections and profiles are also required.
- No details about fish habitat changes/loss (and possible compensation areas if relevant) has been provided and are needed (discussed in the report?)
- I did not see any details about a trail or trails in the study area, though did see what appears to be a trail near the example pond. Can you confirm that a trail can be build along the entire SWM ROW?
- While I will reserve judgement about each individual pond once it has been designed, please keep in mind that we will need to have some kind of trial or access road to perform maintenance on the structure.

An important question that Anna asks below is what information are we expecting to present at the next PIC? In terms of timing with a Thursday, Sept. 27th PIC target, I assume you would need to finalize the poster boards by Friday, August 21st or earlier, which gives us about one month. When will we receive more information and the draft report?

Jeremy

From: Godo, Anna [mailto:agodo@city.windsor.on.ca]
Sent: August 14, 2012 6:12 PM
To: Innes, Jayson; Jeremy Wychreschuk; Winters, Patrick; bhillman@tecumseh.ca
Cc: Brown, Steve
Subject: RE: Upper Little River EA

Jayson:

My main questions are:

1. How do the proposed outlet channel inverts compare to the existing inverts?
2. What are the water surface elevations above the permanent pool elevation for various design storms?
3. What information will be presented at the PIC? When will we have draft boards?

FYI, I will be out of the office August 23rd-September 3rd and September 10th-14th.

Here are my comments.

Land use and road alignment assumptions are o.k.

Hydro parameters
- How do the (proposed) outlet channel inverts compare to the existing inverts? I assume that we are matching invert of Little River at the CPR. What about the rest of the system?
- Permanent pool elevation is generally 0.5m above outlet channel invert, except catchment areas 2090 (1.5m), 2100 (1.0m), 2110, 2115, 2125 & 2135 (1.5m), 2140 (1.0m), 2155 & 2185 (1.5m).
- Will 100 Year water surface elevation be included in the table?

Catchment Areas
For catchment areas 2025, 2027, 2040, 2072 – where do they drain to?

I assume that:
Areas 2005, 2007, 2010 drain (primarily) to the enclosed 7th Street Drain (on Walker Rd).
Areas 2000, 2002 drain via existing, primarily enclosed systems to the 6th Conc Drain (in area 2015)

Windsor Airport Lands – The drainage is split between the McGill and Rivard drains. How much work will have to be done to provide a sufficient outlet via the McGill? Is there any opportunity to outlet the stormwater management area via the Rivard to Little River?

What kind of alterations to the McGill drain proposed downstream of Lauzon Parkway, i.e. thru Hydro One lands and the developed Twin Oaks Industrial Subdivision? The municipal drain corridor currently owned by the City in Twin Oaks for the McGill drain is approx. 15m wide.

For catchment 2020, will the soccer field stormwater management facility remain as is?

Storm Sewer Depths
I have to think about whether 0.1% is a reasonable pipe slope assumption.

Airport Info
Will the report address the Windsor airport zones, i.e. 2km and 4km wildlife control zones? To what do the no tolerance and no confidence zones refer?

Pond Concept 3 – will need legend. Is that a trail or road next to the top of bank? It is hard to see the storm sewer pipe and outlet structure due to the colour used.

With regards,
Anna

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: August 10, 2012 5:10 PM
To: Jeremy Wychreschuk; Godo, Anna; Winters, Patrick; bhillman@tecumseh.ca
Cc: Brown, Steve
Subject: Upper Little River EA

Attached is information pertaining to the SWM plan.

The primary goal of the project is to determine the preferred SWM plan for the Upper Little River Watershed. We have determined a preferred SWM alternative (Alternative 6 - SWM corridors) and the next step is to better define these facilities so that they can be constructed in a consist manner that meets all of the governing criteria and planning vision for the area. As part of this work the channel corridor will be widened to create more riparian habitat.

The latest work involves establishing release rates, elevations, and storage volumes for the SWM facilities and providing sufficient information for the detailed design. The work so far is based on assumptions regarding land use and road alignments and will likely change as more information comes available. We have previously provided some general dimensions for the widened channel and SWM facilities (which I have not included with this email).

The following design criteria have been developed to meet the requirements for the site (peak flow control and erosion)
Level 2 Water Quality
48 hour drawdown of the Extended Detention Volume
2-year release rate – 5 L/s/ha
5-year release rate – 8 L/s/ha
100-year release rate – 16 L/s/ha
Permanent pool storage requirements – approximately 80 m^3/ha (dependent on land use)
Active storage requirements – approximately 500 m^3/ha (dependent on land use)

Tables include:

- SWM Characteristics - For each proposed catchment a required permanent pool and active storage volume has been calculated in order to provide the required SWM controls. These volumes have been used to size the SWM corridor/block areas and conceptual pond concept drawings. An estimated permanent pool elevation has also been calculated based on the channel and water elevations downstream of the SWM facilities.

Drawings include:

- An updated drawing showing the proposed catchment areas and SWM corridor locations (160311265_C-SD-prop. catchment areas.pdf)
- A drawing showing the estimated storm sewer depths (160311265_C-SD-storm sewer depths.pdf). Assuming a pipe slope of 0.1% from the estimated permanent pool elevation the storm sewer was extended to the catchment limits. This elevation was compared to the existing ground elevations. The catchments have been colour coded to show which catchments have plenty of cover (green) versus those that will likely require pumping (purple). There is some opportunity to alter these by lowering the existing downstream channel in some locations but this would require some coordination between areas and so far I have tried to isolate each area so it can develop on its own terms.
- A drawing showing the assigned SWM corridor locations for the proposed catchments as well as the location of the SWM corridors relative to the Airport (with reference to the Airport`s Wildlife Control Areas). The west portion of Baseline Road is very close to the Airport and this area will have stricter SWM guidelines than other areas of the watershed.
- A conceptual pond drawing (160311265_C-POND-FIG 3.pdf) for catchment 2165 (the Tecumseh lands south of the rail line). I am still working on a few more examples of these.

I talked to MMM/MRC about the project about a month ago and they seemed to be ok with concentrating the flow south of Highway 401 into one culvert crossing at 9th Concession Road. I have also talked to Dillon several times over the last month and I am going to send them information on about the ponds (release rates, elevations, and modelling) next week.

I am currently working on the report and more example pond drawings to provide guidance/examples for future pond designs.

Jayson Innes, M.A.Sc., P.Eng.
Senior Water Resources Engineer
Stantec
49 Frederick Street
Kitchener ON N2H 6M7
Ph: (519) 585-7282
Fx: (519) 579-8664
jayson.innes@stantec.com
stantec.com

From: Jeremy Wychreschuk <JWychreschuk@erca.org>
Sent: 2012-09-27 12:54 PM
To: Innes, Jayson
Cc: Godo, Anna; bhillman@tecumseh.ca
Subject: Upper Little River study - Additional comments

Hi Jayson,

I talked to Anna and Stan today, and have a few additional comments.

- For the trail system, instead of waiting for direction from the City on trail criteria, it is better for you to tell us what will work at certain areas. Perhaps a wider trail will be possible/required at certain areas, where other locations may have to be smaller or diverted to a sidewalk. Please note that it will be possible to align the trail into the nearby ROW if required.

- I've been informed that while the Little River floodline mapping shows a mostly contained 100 year flood contained within the channel, this was done when the channel was relatively clean and maintained. Now that it is less maintained, there are more frequent flooding problems, particularly just south of County Road 42 and our study boundary. Since I haven't seen your model parameters, I do not know how you are modeling this part of Little River. Are you assuming a clean channel? At minimum, we will have to state that we are assuming that the channel is clean and well maintained, and that it needs to remain that way. It would also be helpful to model the floodlines with high roughness values to see what the difference is with less maintenance. When you look our regulated lines in this area, it is far removed from the channel, and the reason for that is because significant flooding has been observed in this area in the past (regulated line is showing maximum observed). It would also be helpful to recommend some channel improvements along the main stem if required.

Jeremy

Jeremy Wychreschuk, M.A.Sc., P.Eng.
Director of Watershed Engineering

Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, ON N8M 1Y3
Phone: 519-776-5209 Ext. 305
Toll Free: 1-888-487-4760
Fax: 519-776-8688
Web: www.erca.org

From: Herlehy, Laura <lherlehy@dillon.ca>
Sent: 2012-10-26 10:47 AM
To: Innes, Jayson
Cc: Forest, Flavio; Chris Thibert; Michael Coombs; Roy Johnson; 126309
Subject: Re: FW: upper Little River
Attachments: Prop. Pond Outlets Notes.pdf

Good Morning Jayson,

We are in the process of finalizing the storm sewer design for the Tecumseh Hamlet and we have confirmed the cover issues that you have identified in your preliminary evaluation.

Attached is a figure that shows the the storm sewer outlets contributing to each SWM pond. The storm sewer outlet inverts have been set to maintain a minimum allowable cover at the upstream ends. These inverts are significantly lower then the permanent poll elevations provided. In your email below, you noted that their may be opportunity to lower the storm sewer inverts to be submerged at the outlets (approx. 1 m) and to use larger pipes to achieve flatter slopes. Implementing this solutions will not provide enough elevation to eliminate the cover issues.

For example, Pond 2215 (Gouin) has a permanent pool elevation of 180.50 and a pond outlet of 180.00. The storm sewer invert that would allow sufficient cover would be 178.00, 2.5 m below the pond outlet.

We are still looking at ways to optimize the storm sewer design to minimize cover impacts without using pump stations however due to the elevation differences it seems that the a pump station would be required at each pond outlet, so that the pond can be lowered. You mentioned that we need to ensure that the fish habitat is not impacted and that the 1:100 year event limits the opportunity to lower the elevation of the pond. We are also concerned the lowering the pond would require a larger pond footprint.

We would like to set up a call Tuesday morning to discuss the final approach we will take and get an understanding of the restrictions we may be faced with. We have several questions regarding the SWM pond and we may be able to optimize the system with further clarification.

I will sent a meeting notice shortly.

Thanks,
Laura

DILLON CONSULTING
Laura Herlehy
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216
F - 519.948.5054
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

On Tue, Oct 9, 2012 at 1:33 PM, Innes, Jayson <jayson.innes@stantec.com> wrote:

Previously the drawing was based on a storm sewer slope of 0.1%. The City of Windsor said that that was very shallow and they wanted to use a more conservative slope of 0.35% for the storm sewer (which the new drawing is based on).

The drawing is only a general guideline to show which areas have lots of fall and which ones don't. They were looking for a rough idea of what was possible across the watersheds for getting major and minor flows to the ponds. On a lot of the sites a pump could be avoided using very shallow pipe slopes with little cover, a storm sewer well below the permanent pool, and additional fill on a site, but this would result in increased capital costs for the storm sewer (due to large pipes) and maintenance costs. Ultimately the detail design will determine what slope/pipe size is appropriate for getting water to the pond.

As for the pumping. Any pumping would occur before outletting to the watercourse so that fish habitat is not impacted. There have been some examples where the permanent pool of the pond is lowered and the pond is pumped out following rainfall events. Sometimes the pump is located on the storm sewer inlet. Generally it is more economical if the pumps are located on the outlet rather than the inlet of a pond since the flow rates are less.

If you can get a storm sewer to drain out in the general neighbourhood of the permanent pool (they have talked of examples where the storm sewer invert is more than 1 m below the permanent pool) this would be the preferred scenario in my mind (to avoid ongoing pumping costs). If you can't make that work then a pump will be needed to provide positive drainage. The Tecumseh lands are at the upper end of the watershed, so it may be possible to lower the permanent pool by a bit and put in a small pump to draw down the extended detention volume between events. Some area get backed up by Little River during the 100-year event so far that they can't be lowered. These areas would need a larger pump on the inlet to get the water up into the pond. There was one ambitious design on Howard avenue. They had two different levels in the pond. The storm sewer outletted to a lower area, which was pumped up to the permanent pool in a different part of the pond. The lower area provided some quantity control in addition to being the sump for the pump.

Hopefully this provides some ideas

Jayson Innes, M.A.Sc., P.Eng.
Senior Water Resources Engineer
Stantec

49 Frederick Street
Kitchener ON N2H 6M7

Ph: (519) 585-7282
Fx: (519) 579-8664
jayson.innes@stantec.com

stantec.com

From: Herlehy, Laura [mailto:lherlehy@dillon.ca]
Sent: October-09-12 12:49 PM
To: Innes, Jayson
Cc: Forest, Flavio; Chris Thibert; Roy Johnson
Subject: Fwd: FW: upper Little River

Jayson,

Regarding this revised figure, can you let us know what changes have been made to the stormwater management ponds within the Tecumseh Hamlet area that resulted in the change in cover for the further storm sewers?

We were using the stormwater pond permanent pond levels included in the table that was provided previously (see attached). Have these values changed?

Also you mention that pumping is required to address these issues, can you describe how pumping or lift stations will be implemented in your plan? Will lift stations be required to discharge into the individual SWM ponds or will the lift stations be part of the proposed flow channels? Can you provide further clarification?

Thanks
Laura

Laura Herlehy
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3216

F - 519.948.5054
M - 519.818.3105
LHerlehy@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

---------- Forwarded message ----------
From: **Brian Hillman** <bhillman@tecumseh.ca>
Date: Tue, Oct 9, 2012 at 9:37 AM
Subject: FW: upper Little River
To: "Forest, Flavio" <FForest@dillon.ca>, "Herlehy, Laura (LHerlehy@dillon.ca)" <LHerlehy@dillon.ca>
Cc: Daniel Piescic <dpiescic@tecumseh.ca>

Flavio

I'm forwarding this to you in relation to the Tec Hamlet Servicing Work your team is undertaking.

Regards,

Brian.

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Friday, October 05, 2012 2:47 PM
To: Wychreschuk, Jeremy; Godo, Anna (agodo@city.windsor.on.ca); Brian Hillman
Subject: upper Little River

The PIC boards will be ready next week.

I updated the depth to storm sewer drawings based on the information from Anna (assuming a 0.35 % slope). As would be expected there are more areas that will need pumping (see attached PDF. About half of the areas are projected to have the storm sewer invert out of the ground at the upstream end of the site. The others have lower pipes and may be able to drain by gravity if the storm sewer is below the permanent pool elevation the storm sewer invert or other corner cutting. There are a few areas that look like they will be ok.

I talked to MRC about getting a digital copy of the new Lauzon Parkway alignment, and they said they were planning on moving it a bit again and they didn't want to send it to me right now. Based on his I am planning on using the old road/drain alignment from the previous PIC. So the road/SWM alignment may not match up completely between the two projects.

Jayson Innes, M.A.Sc., P.Eng.
Senior Water Resources Engineer
Stantec

49 Frederick Street
Kitchener ON N2H 6M7
Ph: (519) 585-7282
Fx: (519) 579-8664
jayson.innes@stantec.com

stantec.com

Brian Hillman
Director, Planning and Building Services
bhillman@tecumseh.ca
Town of Tecumseh - 917 Lesperance Rd. - Tecumseh, ON. - N8N 1W9
519-735-2184 x131 - 519-735-6712 -www.tecumseh.ca

This message is directed in confidence solely to the person(s) named above and may contain privileged, confidential or private information which is not to be disclosed. If you are not the addressee or an authorized representative thereof, please contact the undersigned and then destroy this message.

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From: Godo, Anna <agodo@city.windsor.on.ca>
Sent: 2013-01-22 1:39 PM
To: Innes, Jayson; Stan Taylor
Cc: Brian Hillman; Daniel Piescic
Subject: Upper Little River - TofC, Ponds, 100yr WSEL

Gentlemen:

This email contains my tardy reply on a few of issues/questions related to Upper Little River storm study.

1. Draft Table of Contents

Suggest adding:

Executive Summary

List of Exhibits/Figures

Appendices – Correspondence, Public consultation, reports

Comments:

Chapter 7 Management Plan – where is staging/phasing to be addressed?

2. Windsor's general guidelines for ponds

Several departments (Pollution Control, Parks, Operations, Development) were requested to provide comment.

General guidelines:

- PDCs to be set above 1:5yr HGL

- Facilities with steeper side slopes will require fencing

- generally slopes of 7H:1V desired for normal to maximum water level, limited areas of steeper grading 3H:1V

- freeboard area above 1:100 year level is required and should be mow-able (i.e. 4H:1V slopes)

- minimize the number of pumping stations required. I expect an order of magnitude in the range of 10 pumping stations to service the City's portion of the study area.

Due to issues at current developments

- storm sewer to be pumped out if invert is below pond normal water levels

- require hydraulic separation, flap gates

- bentonite clay plug on trenches where sewers outlet to the pond

Other items of concern:

- visibility of the permanent pool from ROW, park area

- vandalism, i.e. rip-rap

- maintenance access

Pollution Control's comments

- Provide mechanism to control pond depth to lower levels below normal if needed; in anticipation of large storms or draining of ponds for maintenance

- Size sewer from pond to pump station to provide adequate flow to pump(s) to minimize on/off cycling

- Size wet well to maintain minimum pump cycles

- construct ponds and establish vegetation prior to development proceeding

- design to account for pond maintenance such as weed harvesting and dredging.

- Provide for easement (above top of bank) around entire pond to allow for maintenance

- Shoreline should be natural where possible, hard shorelines such as landscape blocks, rip-rap, beach stone etc., will require higher maintenance and future replacement costs to maintain appearance

- provide more aquatic vegetation ; to keep phragmites out

- Aquatic plants and surrounding landscape should be selected so as to discourage Canada Geese and other large waterfowl from taking up residence

- Prior to assuming a new Pond Town/City should be provided with a Manual providing detailed maintenance required for long term and short term (while pond eco-system is establishing)

- All electrical service cabinets for aeration systems, fountains, etc should be located beyond the 1:100 freeboard level

Parks Dept's comments

The most important aspect of the ponds will be to insure that they are designed and constructed with the appropriate plant material and that the plant material is established prior to the ponds being brought on line. The specifications and tender should be very clear on the contractor's responsibility to insure that the plant material is established and thriving.

From an operational point of view the ponds that are unfenced will require life ring boxes to be installed. The boxes will have to be inspected on a regular basis by Parks which will necessitate a service path for a pick-up truck.

3. Other design guideline answers to Jayson's questions

What I would like to know in order to better answer when we need to pump and the size of the SWM ponds are:

- what is the minimum elevation of an inlet pipe relative to the permanent pool elevation that you would be willing to accept

  - storm sewers may be submerged below the permanent pool elevation, but must be hydraulically separated (i.e. bentonite plug and flap gate) and be dewatered between storms

- what are the minimum acceptable slopes above the 100-yr water level in the pond (for use when the pond is set lower than the surrounding area)

  - freeboard areas above 100 year water level must be of mowable slope, i.e. no steeper than 4H:1V, and no flatter than 2% (although the area may be landscaped with vegetation that does not require mowing)

4. Question about HGL in vicinity of WCF SWM facility/7th Street Drain Diversion

From the 7th Street Drain Diversion design, the 100 Yr WSElev is 189.00 at the soccer field SWM facility. Do you anticipate any significant change to this?

With regards,

Anna

Anna M. Godo, P.Eng.

Engineer III / Drainage Superintendent | Office of the City Engineer | 350 City Hall Square, Rm 302 | (519)255-6100 ext 6508 office | (519)817-7119 cell | agodo@city.windsor.on.ca

From: Daniel Piescic <dpiescic@tecumseh.ca>
Sent: 2013-04-04 10:19 AM
To: Innes, Jayson
Cc: Brian Hillman
Subject: FW: FW: Upper Little River - Comparison of Flood Elevations
Attachments: MTO Directive B-100.pdf

Jayson
Please see comments below from our engineers (Dillon) regarding Upper Little River - Comparison of Flood Elevations.
Please call me if you have any questions
Thank you
Dan

From: Forest, Flavio [mailto:fforest@dillon.ca]
Sent: March-26-13 2:20 PM
To: Daniel Piescic
Subject: Fwd: FW: Upper Little River - Comparison of Flood Elevations

Dan, the other day you asked for any comments on the Upper Little River study. The only thing that I questioned was the level of service to which they are basing the improvements on, and how realistic it might be to achieve the required depth/cross sections associated with containing a 1:100 year flow within the channel, including culvert/bridge crossings.
I passed the email along to our drainage folks and they provided the email below with their thoughts.
Please review and call me if you would like to discuss further.
I hope this gives you some ideas to consider.
Thanks

Flavio Forest
Partner
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3233
F - 519.948.5054
M - 519.791.2166
FForest@dillon.ca
www.dillon.ca

---------- Forwarded message ----------
From: **Oliver, Tim** <toliver@dillon.ca>
Date: Tue, Mar 26, 2013 at 1:28 PM
Subject: Re: FW: Upper Little River - Comparison of Flood Elevations
To: "Forest, Flavio" <fforest@dillon.ca>
Cc: Tom Marentette <TMarentette@dillon.ca>

Flavio,

Tom and I discussed this issue briefly late yesterday. Not sure why or for whom the study is being done for?

From my experience, I'm aware of no municipal drains that would convey the 100 year storm within the channel, including the large drainage systems through rural parts of the county like Little River Drain, Pike Creek Drain, etc.. However, the exception seems to be with municipal drains through urban areas like City of Windsor . I believe the Grand Marais Drain was previously requested by ERCA to upgrade to the 100 year capacity.

I'm aware that ERCA has floodplain mapping based on regional storms although they elect to use the lesser damaging 100 year storm flows for some of the very large municipal drain drain watersheds that existed as a natural watercourse or creek prior to its conversion to a municipal drain, and for the remaining natural watercourses like Belle River, Ruscom River, Cedar Creek, Turkey Creek, Canard River etc. instead of using the greater regional storm event (i.e Hurricane Hazel) which is impractical or too costly to protect against.

I know Tom M. has experienced having to size new wind farm culverts in Lakeshore such that there is a negligible impact on the 100 year flood level and change in hydraulic grade line with attention paid to flood plain mapping and previous hydrology studies. A requirement imposed by ERCA that lead to putting in culverts that exceed the 5 year design flows.

As for private access bridges and culverts on municipal drains, I'm not aware of any that are designed to convey the 100 year design flows, they are mostly conveying the 5 year storm capacity at best with head water above the culvert, more of them are meeting the 2 year design storm only.

Designing to a higher design flow within the channel would require deepening the drain or raising the drain banks significantly, not practical especially in the rural areas. The 100 year storm flows through the drain channel would not be possible or practical for most of the upper portion of the Little River Drain. All roads and the bridges over the drain would need be raised significantly and improving the channel hydraulics I suspect would cause more harm than good to the lower reaches if less water is able to spill its banks and spread out at the upper reaches of the drain. Reviewing the modeling results of the 100 year flood levels provided by Stantec seems to indicate that it allows for this spreading of water since the levels are not much above the existing surrounding ground levels.

However, MTO's directive (B-100 attached) on design flood criteria for road bridges and culverts with greater than 6 m span width that cross a freeway/**urban** arterial type road does require a minimum 10 year storm peak flow confined to the channel (bank to bank) and 100 year peak storm flows through the bridge structure which Little River Drain likely fits this category where it passes through urban area. For rural areas, MTO 's directive indicates a lesser storm of 2-5 year frequency within channel (bank to Bank) and 25-50 year design storm flows through road bridge structures.

Typically private access culverts and bridges can only be designed to match capacity of the channel (2-5 year storm peak flows) as larger structures do not fit the drain without significant deepening of the drain channels which is impractical when drain slopes are so minimal within Essex County due to flat and low lying topography wide spread throughout the county.

Just my thoughts,

Tim

On Mon, Mar 25, 2013 at 1:58 PM, Forest, Flavio <fforest@dillon.ca> wrote:
Guys, we were asked to comment by Tecumseh on Stantec's Upper Little River Watershed modeling for the 1:100 year event.

Stantec is being told to design the Little River so that the 1:100 year event is contained within the channel cross section. Is it typical for this level of service to be required for a primary watercourse such as the Little River (including the culvert crossings)? I would suspect that there would be a floodplain adjacent to the channel that would accommodate overland flows for a major storm event rather than having the channel and culverts being required to convey 1:100 year flows.
What is your experience so that I can respond to Tecumseh?
Thanks

Flavio Forest
Partner
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3233
F - 519.948.5054
M - 519.791.2166
FForest@dillon.ca
www.dillon.ca

---------- Forwarded message ----------
From: **Daniel Piescic** <dpiescic@tecumseh.ca>
Date: Mon, Mar 25, 2013 at 8:51 AM
Subject: FW: Upper Little River - Comparison of Flood Elevations
To: "Forest, Flavio (FForest@dillon.ca)" <FForest@dillon.ca>, Laura Moy <lmoy@tecumseh.ca>

Flavio/Laura
Any comments on this?
Thanks
Dan

From: Brian Hillman
Sent: March-22-13 3:24 PM
To: Daniel Piescic
Cc: Robert Filipov; Rick Wellwood; Chad Jeffery
Subject: FW: Upper Little River - Comparison of Flood Elevations

Dan.

See info below and the attached for your review and comment as necessary. If you provide any comments to Jayson, please copy me so I can include them in the file.

Thanks,
Brian.

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Friday, March 15, 2013 10:38 AM
To: Godo, Anna (agodo@city.windsor.on.ca); Taylor, Stan
Cc: Brian Hillman
Subject: Upper Little River - Comparison of Flood Elevations

So here are some preliminary results from the flood plain modelling (see attached PDF). I have compared the ERCA floodplain mapping with the more recent modelling for the Twin Oaks business park and the current modelling. Generally they are within 0.5 m. The current PC-SWMM model assumed a Manning's n of 0.045 for the channel and 0.10 for the floodplain. The older HEC-RAS model assumed a Manning's n of 0.03 for the channel and 0.20 for the floodplain.

Generally the current modelling has higher water levels in the upper reaches (due to higher flows) and lower levels in the lower reaches (due to the larger channel cross section through the twin oaks area) when compared to the ERCA flood plain mapping. There is a lot of head loss through the Country Road 42 and Baseline Road crossings, and increasing their dimensions would help to lower water levels.

I have also included results for the proposed conditions modelling. The proposed model shows lower water levels than existing at all locations due to the lower flows and wider channel.

Existing ground elevations at the crossings are included and most of the locations show flooding outside the banks during the 100-year storm under proposed conditions, although some of them are fairly minor (0.1 m). The areas at the downstream end (Forest Glen and the E.C. Row) look to be flooding park land (there is no development shown in the low areas in the air photos so these areas likely flood often and have not been developed). Upstream of the railway the highest flooding occurs at Lauzon Road and Country Road 42. The surrounding land is relatively low compared to the channel invert at these locations (2.2 and 2.4 m respectively where at most of the other crossings the channel is around 3 m below the surrounding land).

The general direction I've been given is to keep the 100-year flood line inside the channel. Possibly ways to make this happen are to:

- Lower the channel
- Fill in the floodplain
- Widen the proposed channel and road crossings
- Some combination of the above
- Other??

Jayson Innes, M.A.Sc., P.Eng.
Senior Water Resources Engineer
Stantec
49 Frederick Street
Kitchener ON N2H 6M7
Ph: (519) 585-7282
Fx: (519) 579-8664
jayson.innes@stantec.com
stantec.com

Brian Hillman
Director, Planning and Building Services

Daniel Piescic
Director, Public Works and Environmental Services
dpiescic@tecumseh.ca

Town of Tecumseh - - Tecumseh, ON. - N8N 1W9
519-735-2184 ext 140 - 519-735-6712 -www.tecumseh.ca

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Tim Oliver
Dillon Consulting Limited
202 King Street West Suite 300
Chatham, Ontario, N7M 1E5
T - 519.354.7802 ext. 3317
F - 519.354.2050
M - 519.359.5600
TOliver@dillon.ca
www.dillon.ca

Daniel Piescic
Director, Public Works and Environmental Services
dpiescic@tecumseh.ca
Town of Tecumseh - - Tecumseh, ON. - N8N 1W9
519-735-2184 ext 140 - 519-735-6712 -www.tecumseh.ca

From: Daniel Piescic <dpiescic@tecumseh.ca>
Sent: 2013-07-30 3:22 PM
To: Brian Hillman; Godo, Anna; Innes, Jayson
Cc: TByrne@erca.org; Stan Taylor (STaylor@erca.org); Phil Bartnik
Subject: RE: Upper Little R. Report -2013-06-14-Sections_1_to_4.docx

Everyone:

Engineering Services has done a cursory review of the Draft Report for the Upper Little River Master Plan: Comments are as follows:

Project Title

- Project title should be: "Upper Little River *Stormwater Management* Master Plan"??

Title Page / Table of Contents

- The date of the draft report should be identified on the title page for reference
- Pages ii, iii, iv – the header needs to be formatted as the rest of the report
- Section 3.3 Public Involvement – This section needs to be expanded and should include sub-sections for:
  - Notices/Advertisements
  - Public Information Centres
  - Council Presentations
  - Correspondence/meetings with First Nations, etc.
- Section 4.0 Existing Conditions – need to include a sub-sections for:
  - Archaeological Assessment (Stage 1 at a minimum should be completed)
  - Social and Economic Environment
- Additional Sections need to be added to the Report that discuss:
  - Summary of Alternatives, including the factors of how each alternative was evaluated, and figures
  - Preferred Alternative, including figures, preliminary cost estimate, property issues, issues with existing field tile drainage, site access for maintenance, environmental impact, mitigating measures, etc.

List of Tables / Figures

- The List of Figures does not match what is attached at the end of the report.
- The Figures should all be located at the end of the Report and include a title page for the section (including the list of the figures).
- Figures should have a standard "figure template".
- Figures that are included in the body of the Report should be re-labelled as "Plates" and a List of Plates is to be added to the table of contents.
- Need Figures depicting the various alternatives, and preferred solution
- Figure 14 – Legend to be revised to: "Little Creek River Watershed Boundary"
- May want to add a "Land Use Plan" Figure

List of Appendices

- This section needs to be completed, as the body of the Report makes reference to individual Appendices.

Body of Report

- Section 3.1
  - 2nd paragraph to be revised to: "…by the Municipal Engineers Association (October 2000, as amended in 2007 & 2011)…"
- Section 3.3
  - Section to be expanded as discussed above
  - 4th last paragraph on Page 3.5 to read: "…The Open House portion of the May October meeting consisted…"
- All Tables, Appendices, and Plates when referred to in the text of the report (including the titles) are to be BOLD. This was not consistent throughout the report.

- Locations in the report where reference is made to “Attachments” and “Drawings”. This needs to be reviewed and revised.
- Locations in the report where the text makes reference to a Table, however the Table referred to is in a previous section and does not contain that specific information (eg. on Page 4.34 references Table 2 & Page 4.35 references Table 1). This needs to be reviewed and revised
- Section 4.1.5.6.3 (Page 4.13)
    - First and second bullet paragraphs have provincially rankings of S3? and S2?. The “?” needs to be removed from the context of the report.

Dan

From: Brian Hillman
Sent: July-25-13 2:45 PM
To: Daniel Piescic
Subject: FW: Upper Little R. Report -2013-06-14-Sections_1_to_4.docx

See below and ERCA’s comments attached…

From: Stan Taylor [mailto:STaylor@erca.org]
Sent: Thursday, July 25, 2013 10:20 AM
To: Godo, Anna; Brian Hillman
Cc: Tim Byrne
Subject: FW: Upper Little R. Report -2013-06-14-Sections_1_to_4.docx

Anna, Brian

Further to my email below, Tim Byrne has asked that I send you copies of my comments (attached) .. I had a couple of very minor comments on the Figures also (file is too large to email)

As you likely know, Tim is the ERCA lead on this now (as of April – I am back into Source Water Protection with a full work program there again) .. he asked me to advise you to please send him any comments you may have on the partial draft Report ASAP (and copy me please)

Please note that Stantec’s posting of this material on their FTP site will apparently expire in the next couple of days … we recommend that you download the files from the FTP site ASAP if you haven’t done so already (I will send you the coordinates for that via separate email)

Thanks
Stan

From: Stan Taylor
Sent: July 24, 2013 3:50 PM
To: Tim Byrne
Cc: John Henderson
Subject: Upper Little R. Report -2013-06-14-Sections_1_to_4.docx

Tim

My comments are as shown on the attached .. a couple of them are questions for you, or things that I think may need your input ..

I assume you will pass them along to Jayson, with any clarifications you may need to make to my comments

I have comments on a couple of the maps too .. I will send those to you separately (large file)

Did anyone else have any comments (e.g. Windsor, Tecumseh, or yourself)? .. I haven’t seen any

I look forward to seeing the complete draft Report, with the recommendations etc.

Stan

Brian Hillman
Director, Planning and Building Services

Daniel Piescic
Director, Public Works and Environmental Services
dpiescic@tecumseh.ca
Town of Tecumseh - - Tecumseh, ON. - N8N 1W9
519-735-2184 ext 140 - 519-735-6712 -www.tecumseh.ca

From: Godo, Anna <agodo@city.windsor.on.ca>
Sent: 2015-03-20 3:06 PM
To: Innes, Jayson; 'Tim Byrne'; Brian Hillman
Cc: Daniel Piescic
Subject: RE: Upper Little River SWM Study - Status

Jayson,

I have a few minor comments.

Pages 1.1 & 1.3, last sentence of 1st paragraph. prior to the expansion of water services within the study area
It would be more correct to say that it was "prior to the expansion of storm sewer services within the study area", or municipal stormwater management system, but not related to water.

Page 3.15, I do not understand the following sentence from the last paragraph: The Little River springs from within the northern portion of the study area.

Anna

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Thursday, January 22, 2015 2:57 PM
To: Godo, Anna; 'Tim Byrne'; Brian Hillman
Cc: Daniel Piescic
Subject: RE: Upper Little River SWM Study - Status

Thank you for your comments. We will work on addressing them.

I have attached a copy of the Stage 1 Archaeological Assessment for this project. It was referenced in the Draft Environmental Study Report and it needs to be submitted to the Ministry of Tourism, Culture, and Sport as part of the archeology work. Please let me know if you have any comments before it is finalized and submitted.

Thanks

From: Godo, Anna [mailto:agodo@city.windsor.on.ca]
Sent: January-13-15 4:42 PM
To: 'Tim Byrne'; Brian Hillman; Innes, Jayson
Cc: Daniel Piescic
Subject: RE: Upper Little River SWM Study - Status

With respect to the draft report, I have 3 items which we have not previously discussed.

1. Under Section 8.1 (Next Steps), should the next step be to develop a functional design for the Upper Little River system prior to undertaking final design for specific development blocks? Do we have enough information to include parameters for the functional design in this report?
2. Under the Lauzon Parkway Class EA, the consultant was having trouble figuring out how to drain the E-W Arterial Road east of Lauzon Parkway. One suggestion is to extend the E-W Arterial SWM facility. Can we include this in our report?
3. Should add some text similar to this excerpt from Chapter 7, East Pelton Planning Area, from the City of Windsor Official Plan, Volume II.

> Stormwater Management, 7.6.26 To provide for a stormwater management system which minimizes the impact of urban development on the natural environment, is integrated as an amenity within the existing drain system and the open space system. It is capable of meeting applicable water quality and quantity requirements while minimizing any potential impacts on the Windsor International Airport related to waterfowl.

Various departments from the City met to review the draft document. Particular attention was paid to Chapters 6, 7 & 8 (Description of Preferred Alternative, Design Considerations, Project Implementation).

Executive Summary

- Do not refer to Little River as a Creek.
- Delete 3 duplicate paragraphs on page ii. The following was repeated 2x in the exec summary p ii and iii

> Stantec is the lead consultant (project management and water resources), in cooperation with Parrish Geomorphic Ltd (fluvial geomorphology), to complete a Class EA Study to determine a preferred approach to providing stormwater management control measures for the upper Little River watershed.
>
> The Project Team, consisting of representatives from the City of Windsor, the Town of Tecumseh, the Essex Region Conservation Authority (ERCA), the Ministry of Natural Resources (MNR), and the Consultant Team, has examined a number of alternatives for stormwater management control based on a combination of previous documentation and current information. In addition, two Public Information Centres (PIC) (May 29, 2012 and October 22, 2012) have been held to receive input on the alternative options investigated and to present the preferred option.
>
> A preferred option was developed as a result of an evaluation of alternatives and public/agency input, and is considered representative of the most appropriate option to achieve the required controls, while maximizing opportunities to conserve existing natural conditions. Details of the Study process, from conceptual development of alternatives through to selection and preliminary design of the preferred alternative, are summarized in the following ESR, which is to be considered for approval by the Municipalities.

Should add to the Executive Summary under the main objectives paragraph, something to the effect that – the study anticipated development of the lands by multiple land owners and addresses/supports the ability of individual land owners to proceed.

3.3 Public Involvement

- Page 3.5, note that PIC#2 was held in conjunction with Lauzon Parkway Environmental Assessment and SS Secondary Plan PIC's, i.e. In addition, PIC #2 for the Lauzon Parkway Environmental Assessment and the third workshop for the Sandwich South Secondary Plan were held concurrently at the same location.
- Page 3.11, 2nd bullet point. Is text referring to Baseline Road in Windsor? If so, it is not Little Baseline Rd.
- Page 3.12. Clarify which study recommended the limits of proposed E-W Arterial Road. Confirm that the East Pelton Secondary Plan identified a corridor from Walker Road to 8th Concession Road.

4.1.5.7 Aquatic Resources

- Page 4.20, Table 4. Is 7th Concession Drain classified, or is this considered the 7th Street Drain Diversion?
- Check how Figure 5 is referenced. Page 4.23, 2nd last paragraph – should it reference Figure 4?
- Where is Figure 5 referenced in the report?

4.2.9 Potential Mitigation Measures

- Page 4.34, the group should review/comment on the recommended mitigation measures
  - o Perforated storm laterals. DISADVANTAGES
  - o Perforated Pond Outlets. DISADVANTAGES
  - o Soakaway Pits / Infiltration Trench. DISADVANTAGES
  - o Longer Drawdown Times for SWM Facilities.
- Page 4.36. Check wording of "Baseflow temperatures are higher the groundwater flows."

4.3.4 Existing Drainage

- In the 1st paragraph of this section on Page 4.40, what does "Downstream of the study area (north of E.C. Row Expressway) Little River remains in a natural state." I believe that this is inaccurate.
- Page 4.42. In Table 8, it references "North Townline Rd. (County Road 42)". If referring to the road, it should be called County Road 42; if referring to the drain, it should be called North Townline Rd. Drain.
- Page 4.43. If referring to the road, it should be called County Road 42; if referring to the drain, it should be called North Townline Rd. Drain.
- Page 4.43. In last bullet, 7th Concession Road is not Walker Road (no 's') north of Legacy Park Drive. South of Legacy Park Drive, although Walker Road is technically also the 7th Concession, no one refers to it that way. Delete "Road" when referring to the 6th Concession Drain.
- Page 4.44. Where is the junction of the 6th and 9th Conc Drains with a flow split?
- Page 4.45. Table 9 Where is the confluence of Little River and 9th Conc Drain?; Refer to the road as County Road 42 (not North Townline Road).

4.4.1 Hydraulics Introduction

- Refer to it as 7th Street Drain Diversion, not "drainage"

4.4.2 Methodology

- Page 4.50, "entrance" should be singular for culvert entrances in last bullet of first group.
- Page 4.51, Table 12. Road name is "Forest Glade", not Glen.
- Page 4.61. refer to Sandwich South Employment Lands, not Windsor Annex Lands.

Check page numbering for Chapter 6. It starts on 6.12

6.1.1 Design Criteria

- for water quantity, what happens if IDF curves are updates?
- pedestrian paths - primary paths should be above 100 year water level and paved (i.e. asphalt). Elsewhere in the document, it recommends gravel pathways. Suggest that this is o.k. for secondary paths.

p6.13 "construct ponds and establish vegetation prior to pond being brought on-line"
Document should add text for option to construct temporary SWM facilities until such time that vegetation is established and permanent SWM is brought on-line.

6.1.2 Recommended Strategy

After Figure 14-16, it refers to corridors of 120 to 200m. This should be shown on a drawing. Figures 16 should be revised to conform with this.
p6.14 "The SWM corridor is approximately 200m wide for Upper Little River and 120m wide for all other tributaries"
Text should be added that these corridors are reserved until such time that detailed design and report confirm size of facility; surplus lands will be released.

p6.15 "...all other development (including trails) must be located outside of this boundary to prevent flood damage." Delete "including trails" – secondary trails are permitted within the 100year flood elevation.

Table 17. North Townline Road should read as County Road 42.
Second paragraph below refers to CN Rail Line. Are we recommending channel lowering outside of the study area (CN Rail - Via Tracks), or upstream of CPR?

Table 18 and paragraph below it. Road should read, Forest Glade.

Need Planning Level Cost Estimate in Chapter 6.

6.2.1.1 Wetlands

It is noted that "no provincially significant wetlands have been identified within the study area". What about the wetlands at Windsor Airport?

Page 7.1, **Section 7.0** 1st paragraph. Should read "incidents", not indecent.

7.4 Stormwater Pumping

In first paragraph, it states "Drawing 5 shows catchment areas where pumping is possible". I don't see how that is represented on the drawing. Drawing 5 only shows estimated depth of storm sewer below existing ground elevation.

7.6 Archaeology

Archaeology is miss-spelled in the report. What was outcome of Stage 1 assessment? Portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological resources – where? It also states Stage 2 is required. Add text regarding the timing. Where is Stage 2 assessment recommended? There are no maps or areas referenced.

8.1.1 Final Design

Last paragraph states "The preferred alternative is intended to be constructed in stages as needed for development to progress as shown on Drawing 3." Drawing 3 shows the assumed future land uses; it does not address how development would progress.

Should include description of minimum requirements for functional/detailed design for staged development.

8.1.2 Permits and Approval Requirements
Archaeological Resources – it doesn't specifically say to review the map & undertake a Stage 2.

8.2.1 Project Implementation Schedule

> Following Council endorsement of this ESR, the report will be available for a 30-day public review period. If there are no concerns raised during the 30-day review period the project will have environmental clearance for final design and construction subject to receipt of all approvals and exemptions.

Don't the remaining phases of the EA process need to be completed prior to implementation?

Anna

From: Tim Byrne [mailto:TByrne@erca.org]
Sent: Wednesday, November 05, 2014 4:43 PM
To: Brian Hillman; jayson.innes@stantec.com
Cc: Godo, Anna; Daniel Piescic
Subject: RE: Upper Little River SWM Study - Status

Brian- We have been provided a draft document that we have begun to review. We need to speak to Dan on some of the issues and there are some clarifications with the City requiring attention. We will be completing a review and providing some comments within a week. Sorry for the lack of attention of late to this file, there have been other brush fires requiring extinguishing.

From: Brian Hillman [mailto:bhillman@tecumseh.ca]
Sent: Wednesday, November 5, 2014 2:27 PM
To: Innes, Jayson (jayson.innes@stantec.com)
Cc: Godo, Anna (agodo@city.windsor.on.ca); Tim Byrne; Daniel Piescic
Subject: Upper Little River SWM Study - Status

Jayson:

We have not seen any activity on this file in some time. Can you advise of its status and projected timelines/outstanding actions for completion?

Perhaps a conference call with all affected parties can be convened if deemed necessary.

Thanks,

Brian.

Brian Hillman
Director, Planning and Building Services
bhillman@tecumseh.ca
Town of Tecumseh - 917 Lesperance Rd. - Tecumseh, ON. - N8N 1W9
Phone: 519-735-2184 ,131 Fax: 519-735-6712 - www.tecumseh.ca

From: John Henderson <JHenderson@erca.org>
Sent: 2015-06-18 12:39 PM
To: Innes, Jayson
Cc: Tim Byrne; Godo, Anna; Brian Hillman
Subject: Upper Little River Draft Report
Attachments: Draft Report 2014-07-22 - ERCA Comments .docx

Good afternoon Jayson,

We have reviewed the Draft report for the Upper Little River Study and comments have been provided in Track Changes mode within the attached document. In addition, the following general comments/questions are provided:

1. Portions of the report refer to the entire study area while other portions that should relate to the entire area only seem to reference the SWM corridor. Please review.

2. The context of regional storm vs. regulatory storm vs. 1:100 year storm is not clear in some sections of the report. We should have a discussion on this matter to ensure that the content of the final report is accurate.

3. It appears that a substantial amount of additional information will be available in the Appendices. When will the Appendices be available for review? In many locations where Appendices are referenced in the report, it would be helpful to have related figures included in the body of the report.

4. Have the MNR Technical Guides been considered in the modelling analysis.

We anticipate that a conference call will be beneficial to discuss finalizing the report once you have had a chance to review our comments. We will contact you next week to schedule a conference call.

Regards,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From:	Forest, Flavio <fforest@dillon.ca>
Sent:	2015-10-07 6:34 PM
To:	John Henderson
Cc:	Daniel Piescic; Brian Hillman; Phil Bartnik; Innes, Jayson; Paul Donahue
Subject:	Re: Upper Little River Study
Attachments:	Tecumseh Hamlet Storm Outlets.pdf

John, further to my meeting with the Town of Tecumseh this morning, I would like to confirm the following comments on the Town's behalf as it relates to this study:

- The Town's requirement would be that the permanent pool elevations of the stormwater management facilities be established no higher than the invert elevation of the proposed storm sewer outlets to these facilities (we have attached a figure from previous communications with Stantec in 2012 that reconfirm these proposed storm sewer outlet sizes/flows/elevations for your reference). As discussed, this is required to avoid having the storm sewers surcharged between rainfall events. The Town appreciates that this will result in the need for pump stations to discharge the allowable flows from these stormwater management facilities to the downstream receiving watercourses, and would like to have these allowable discharge rates confirmed for each location.
- The Town would like ensure that the active storage requirements for these stormwater facilities be re-evaluated to confirm that there would be no negative impacts to the existing and proposed developments in the respective subdrainage areas. This includes an evaluation of whether there could be risks of surface flooding from hydraulic gradeline impacts for frequent storm events (1:5 year level of service) and for the 1:100 year major storm event. Active storage water levels for varying storm events should be confirmed and evaluated to ensure that they provide acceptable outlet conditions for the storm drainage systems.
- The Town requests that the physical dimensions (plan and profile) of these stormwater management facilities be reconfirmed to a more functional level of detail (and in light of the above criteria). As you may be aware, the Town of Tecumseh has been developing a Secondary Plan for the Tecumseh Hamlet area, which is now beyond the 90 percent stage of completion. It is critical that any adjustments that may be required to the land areas required to accommodate these facilities be more firmly/conservatively established so as not to compromise the Secondary Plan process and its implementation in the future.

We would be pleased to meet with you to review these comments in further detail.
Regards,

Flavio R. Forest, P.Eng.,
Partner
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3233
F - 519.948.5054
M - 519.791.2166
FForest@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

On Tue, Oct 6, 2015 at 5:21 PM, Innes, Jayson <jayson.innes@stantec.com> wrote:

The permanent pool (PP) or normal water elevations reported in the model/table were based on flows draining by gravity to Little River. The ponds were set slightly above elevations in the Little River or nearby municipal drains.

The city prefers to keep the inlet pipe above the PP elevation. If it is below the PP, then pipe needs to have a flap gate and be dewatered between events. A gravity overflow is required in case of pump failure.

Where the storm sewers are well below the gravity PP elevation the idea is that the PP elevation would be lowered to accommodate the sewer and the flows pumped to a gravity outlet. We had looked at lowering the outlets somewhat, but there is often significant backwater from Upper Little River. The exact PP elevation difference between a gravity drained pond and a pump drainage pond depends on the detailed grading design which is not known at most locations and varies depending on the site. To try and manage this the conceptual pond block sizes were increased to accommodate additional grading.

From: Forest, Flavio [mailto:fforest@dillon.ca]
Sent: October-05-15 9:50 AM
To: John Henderson
Cc: Daniel Piescic; Innes, Jayson; Brian Hillman
Subject: Re: Upper Little River Study

Good morning John, we have received information from Stantec and are in the process of summarizing our thoughts. We have a meeting scheduled with the Town on Wednesday morning, and hope to be in a position to provide you with our comments shortly afterwards.

In general, the questions we raised with Jayson Innes and the resulting discussions we held back in 2012/2013 continue to be of concern, and they relate primarily to the elevation of the Tecumseh Hamlet storm sewer outlets to the proposed pond facilities and how this affects the operation/maintenance of the Town's storm sewer systems. It appears that the storm sewer outlets would be well below the pond's proposed permanent pool elevations (normal water levels), resulting in continuously submerged storm sewer systems. Also, the storm sewer outlets would be lower than the proposed bottom of the ponds, which would either suggest the need to lower the ponds (resulting in an increased pond footprint), or the need for lift station to pump the storm sewer flows up into the proposed ponds.

We understood that Jayson Innes had requested direction from the City on typical design standards for ponds in our region, but it does not appear that the proposed pond solutions reflect any changes that would address these concerns.

Please contact me if you would like to discuss this in further detail.

Regards,

Flavio

Flavio R. Forest, P.Eng.,
Partner
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3233
F - 519.948.5054
M - 519.791.2166
FForest@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

On Fri, Oct 2, 2015 at 5:14 PM, John Henderson <JHenderson@erca.org> wrote:

Hi Dan,

I am following up on your review of the Upper Little River Study. A developer in Windsor is very anxious to start moving forward with functional design in a portion the study area. It has the potential to get political. Has Dillon completed their review and have comments been sent to Stantec?

Please let me know when you have a minute.

Thank you,

John Henderson, P. Eng.

Essex Region Conservation Authority (ERCA)

360 Fairview Avenue West, Suite 311

Essex, Ontario N8M 1Y6

519-776-5209 ext. 246

Fax: 519-776-8688

Please consider the environment before printing this email

From: Daniel Piescic [mailto:dpiescic@tecumseh.ca]
Sent: August-18-15 4:24 PM
To: John Henderson
Cc: Innes, Jayson; Forest, Flavio (FForest@dillon.ca); Brian Hillman
Subject: RE: Upper Little River Study

John

I have reviewed but have also forwarded the document to Dillon to ascertain whether it is consistent with the Towns proposed Functional Service Plan for the Tecumseh hamlet secondary Plan as it relates to Storm Water management.

As I understand it ….Stantac has to provide some information to Dillon in order to complete the review. I also understand that Jayson has been on vacation and Dillon must wait until Jayson is back in order for him to liaise with Dillon and provide the needed information so that Dillon can complete their review.

Thank you

Dan

From: John Henderson [mailto:JHenderson@erca.org]
Sent: August-18-15 12:47 PM
To: Daniel Piescic
Cc: Innes, Jayson
Subject: Upper Little River Study

Hi Dan,

Further to our conference call a few weeks ago, I am following up to see if you have had a chance to review the draft report and provide comments to Stantec.

Please let me know.

Thanks,

John Henderson, P. Eng.

Essex Region Conservation Authority (ERCA)

360 Fairview Avenue West, Suite 311

Essex, Ontario N8M 1Y6

519-776-5209 ext. 246

Fax: 519-776-8688

Daniel Piescic P.Eng.
Director, Public Works and Environmental Services
dpiescic@tecumseh.ca
Town of Tecumseh - - Tecumseh, ON. - N8N 1W9
Phone: 519-735-2184 , 140 Fax: 519-735-6712 - www.tecumseh.ca

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From: John Henderson <JHenderson@erca.org>
Sent: 2016-01-27 12:34 PM
To: Daniel Piescic; Phil Bartnik; Brian Hillman; Innes, Jayson; Tim Byrne; Forest, Flavio
Subject: Upper Little River Meeting Summary - January, 27 2015

Importance: High

Good afternoon Everyone.

Thank you for participating in the conference call this morning to discuss Tecumseh's comments/concerns regarding the draft Upper Little River Study information that Stantec has been provided for review. The following highlights the main topics that were discussed:

- Tecumseh previously provided storm sewer invert information for future sewers that will discharge into the proposed ponds.

- Tecumseh wants their storm sewers to be dry after rainfall events.

- Tecumseh wants confirmation that the proposed pond storage elevations will not adversely impact the hydraulics of the existing upstream storm sewers.

- Stantec advised that the proposed storm sewer inverts and the existing related invert elevations of Little River are approximately equal. The ponds will therefore have to be pumped.

- Tecumseh prefers to pump the ponds with smaller pump stations to draw the normal water level below the sewer inverts versus having substantially larger pump stations to pump the storm sewers into the ponds.

- Stantec's current assessment has assumed that 70% to 80% of the pre-development 1:100 year flows can be released from the ponds into the downstream municipal drains.
  - Most municipal drains are designed to a 1:2 or 1:5 year storm for pre-development conditions.
  - The currently assumed pond release rates may adversely impact downstream lands.
  - The proposed pond outlet rates must consider the existing available capacity in the downstream municipal drains in accordance with the existing drainage by-laws. This would avoid having to undertake drainage improvements in portions of the municipal drains that are located within the City of Windsor. If this is not possible, due to pond area requirements, airport issues, etc., downstream municipal drain improvements may need to be considered.
  - Stantec will review the drainage report information they have and advise if they have sufficient information to estimate the existing available downstream drain capacities.
  - Tecumseh will review their files to determine if they have any additional information that will assist in estimating downstream drain capacities and forward any available information to Stantec (with a copy to ERCA).
  - Once the available downstream drain capacities are determined, Stantec will re-run their pond modeling with the revised release rates and determine the pond storage requirements.

  - With the revised pond storage requirements and the future Tecumseh storm sewer inverts, Stantec will develop preliminary pond sizing requirements to confirm the anticipated land area needed for each pond. Currently, a 120 metre wide corridor has been proposed for the stormwater facilities. If this proposed corridor width cannot accommodate the pond area requirements, the municipal drains and other proposed services, alternatives will have to be considered.
  - Airport constraints must be considered in the proposed pond configurations.

- Stantec advised that, provided that they have sufficient information to estimate the capacities of the downstream drains, it will take approximately a week to re-run the modeling and disseminate the results for further review/discussion.

- Tecumseh requires that all proposed stormwater facilities are located completely within the limits of the Town of Tecumseh.

- It was discussed that the study appendices are required in order for all partners to complete their review of the draft information. Stantec advised that it will take approximately a week to complete the draft appendices for distribution.

- There is significant development pressure in portions of the Upper Little River Study area. It is desired by all partners that this process proceeds as quickly as possible to finalize this study.

We trust that this summary captures the main topics that were discussed. If you have any questions or would like to provide clarification on this information, please do so by January 29, 2016.

Best regards,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: John Henderson <JHenderson@erca.org>
Sent: 2016-02-03 4:19 PM
To: Godo, Anna; Innes, Jayson
Cc: Tim Byrne
Subject: Upper Little River Meeting Summary - February 3, 2016

Importance: High

Good afternoon Anna and Jayson,

Thank you for participating in the conference call today to discuss Windsor's comments/concerns regarding the draft Upper Little River Study information that Stantec has provided for review. The following highlights the main topics that were discussed:

- Stantec's current assessment has assumed that 70% to 80% of the pre-development 1:100 year flows can be released from the ponds into the existing municipal drains.
    - Most municipal drains are designed to a 1:2 or 1:5 year storm for pre-development conditions.
    - The currently assumed pond release rates may adversely impact downstream lands without improvements to the existing watercourses.
    - It is likely that development will proceed prior to potential improvements to the existing municipal drains. The proposed pond outlet rates must consider the existing available capacity in the downstream municipal drains in accordance with the existing drainage by-laws. If this is not possible due to pond area requirements, airport issues, etc., alternative may need to be considered.
    - Stantec will review the drainage report information they have and advise if they have sufficient information to estimate the existing available downstream drain capacities.
    - Once the available downstream drain capacities are determined, Stantec will re-run their pond modeling with the revised release rates and determine the pond storage requirements.
    - With the revised pond storage requirements, Stantec will develop preliminary pond sizing requirements to confirm the anticipated land area needed for each pond. Currently, a 120 metre wide corridor has been proposed for the stormwater facilities. If this proposed corridor width cannot accommodate the pond area requirements, the municipal drains and other proposed services, alternatives will have to be considered.
    - Airport constraints must be considered in the proposed pond configurations.
    - Pond sizing will also be estimated with the downstream channels being improved to convey 70 % to 80 % of the pre-development 1:100 year flows. Under this scenario, the design parameters for the improved channels are required. This approach gives the City the option of undertaking channel improvements in order to reduce pumping times and/or pond sizes as larger portions of the area become developed.

- It was discussed that the study appendices are required in order for all partners to complete their review of the draft information. Stantec advised that it will take approximately a week to complete the draft appendices for distribution.

- Stantec is going to review the proposed Airport Solar Farm layout/area and adjust the modelling accordingly.

- There is significant development pressure in portions of the Upper Little River Study area. It is desired by all partners that this process proceeds as quickly as possible to finalize this study.

We trust that this summary captures the main topics that were discussed. If you have any questions or would like to provide clarification on this information, please do so by February 5, 2016.

Best regards,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: John Henderson <JHenderson@erca.org>
Sent: 2016-08-16 9:37 AM
To: Innes, Jayson
Cc: Godo, Anna; Daniel Piescic; Phil Bartnik; Richard Wyma; Tim Byrne
Subject: Upper Little River Study - Future Drain Capacity

Importance: High

Good morning Jayson,

In response to your question, we have contacted both Town of Tecumseh and the City of Windsor. Both partners have advised that they do not plan on improving the capacity of the existing drains other than routine maintenance to restore the drains to their original capacity as per the current drainage engineer's reports.

The existing drain capacity estimates that you have used in your modeling must be clearly presented in the final report. Some drains, such as the 6th Concession Drain (Windsor), will ultimately be re-located and the relocation must be size appropriately. Also, it is proposed that a new drain will be constructed along the future east-west arterial road (Windsor) which has been identified as a stormwater management corridor. At this time, we do not know what capacity you have used for this future channel in the modelling. It is unlikely that this channel will be designed to convey the pre 1:100 year flows. The ultimate capacity of this channel will most likely depend on the existing capacity of the unimproved Little River Drain at their confluence. Please advise on how this future east-west drainage channel has been addressed.

In addition to the above, we would also like to see a schedule for the completion of this project. There continues to be significant development pressure in this area and completion of this study is required to allow functional design studies to begin within each of the proposed catchment areas.

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Daniel Piescic [mailto:dpiescic@tecumseh.ca]
Sent: Monday, August 15, 2016 1:33 PM
To: John Henderson; Godo, Anna; Phil Bartnik
Cc: Tim Byrne; Forest, Flavio (FForest@dillon.ca)
Subject: RE: Upper Little River Study - Status

Hi John

The Town will not be improving the downstream drains to allow for larger release rates than originally designed other than to carry out repairs or maintenance to the drains to restore the drain's flow capacity to its original capacity as per the drainage engineers report.

Thank you
Dan

From: John Henderson [mailto:JHenderson@erca.org]
Sent: August-15-16 8:27 AM
To: Godo, Anna; Phil Bartnik; Daniel Piescic
Cc: Tim Byrne
Subject: RE: Upper Little River Study - Status
Importance: High

Good morning Everyone,

To date we have not received a response to our August 5, 2016 e-mail. Please respond so we can provide the appropriate information to Stantec to allow them to finalize the Draft report.

If you have any questions, please do not hesitate to contact me.

Thank you,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: John Henderson
Sent: Friday, August 5, 2016 4:45 PM
To: Godo, Anna; 'Phil Bartnik'; 'Daniel Piescic'
Cc: Tim Byrne
Subject: FW: Upper Little River Study - Status

Good afternoon Everyone,

As you are aware, Stantec has revised the proposed pond release rates to consider the existing carrying capacity of the receiving drains. As a result, pond sizes have increased, and when the area is fully developed, the post development flow to the Little River during major events will be less than existing conditions (assuming water can overland route to the Little River now).

Stantec's is asking if this is the ultimate condition for this area or will the downstream drains eventually be improved to allow for larger release rates. It is my understanding that some drains may be improved in the future (i.e. 6th Concession Drain – Windsor) but that this is likely not the case for most drains. Increasing future drain capacities to increase pond release rates would lead to smaller storage requirements, however, it also raises the following items:

- Upgrades to the downstream watercourses to convey larger flows will likely be very costly.
- It is anticipated that the ponds will have pumped outlets. Future increases to the pond release rates may require pump upgrades. If this is the intended path forward, the ultimate pond release rates should be considered in the subsequent functional design for each proposed pump station in the individual catchment areas.
- With development planned in this area for many years, the ponds will be fully established when all downstream improvements are completed.
- Based on the local flat topography and related limitations on overland routing, the existing watercourses likely do not convey the 1:100 year flows now.
- etc.

Has increasing the capacity of the existing receiving watercourses been considered for this area as development proceeds?

My initial thoughts are that, other than for one or two of the major receiving watercourses, it is unlikely that the watercourses would be improved to convey significantly more flow than their current theoretical design capacity. In addition, the reduction in flow rates to the Little River may benefit the downstream floodprone lands that are protected by the Little River Flood Control dykes by reducing downstream high water elevations.

Please let me know what the municipal intentions are with regard to the ultimate carrying capacities of the existing open drains that will provide outlet for the proposed ponds.

Thank you,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Thursday, August 4, 2016 5:01 PM
To: John Henderson

Cc: Tim Byrne; Richard Wyma
Subject: RE: Upper Little River Study - Status

I was adding the work we did this spring for Tecumseh where we looked at lowering the outflows from the SWM ponds to the capacity of the existing municipal drains, which was generally below existing conditions, so that any area can develop independently. I am unsure whether this is an ultimate condition or whether the flows will be allowed to increase up to existing once there are downstream improvements. With the lower municipal drain flows the 100yr flow is about 1/2 of existing and water levels are always within the channel. I was sure how to word this in the report.

Thanks

From: John Henderson [mailto:JHenderson@erca.org]
Sent: 2016-07-12 11:04 AM
To: Innes, Jayson
Cc: Tim Byrne; Richard Wyma
Subject: Upper Little River Study - Status
Importance: High

Good morning Jayson,

I am following up with you to get a status report on this project. We are again getting pressure from local politicians and developers who are anxious to get developments moving within the study area. As per Dillon's June 3, 2016 e-mail, it appears that Tecumseh concerns have been addressed, however, with larger ponds they have re-raised the concern about waterfowl and the airport. This may be more of a detailed design issue, however, we need to be confident that it can be adequately address during detailed design. Have you considered the impact of larger ponds in relation to airport concerns?

In addition, we still have not received the draft appendices for review/comment. When will they be available?

I have reviewed our files and the most current version of the Draft report that we have was included in your attached November 23, 2015 e-mail. Is this still the current version of the Draft report? If not, please provide your most recent draft report that will correspond to the appendices.

At this point in time, we need to set a schedule for the completion of this project.

Please contact me if you have any questions regarding the above.

Best regards,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

Daniel Piescic P.Eng.
Director Public Works & Environmental Services
dpiescic@tecumseh.ca
Town of Tecumseh - - Tecumseh, ON. - N8N 1W9
Phone: 519-735-2184 , 140 Fax: 519-735-6712 - www.tecumseh.ca

From: John Henderson <JHenderson@erca.org>
Sent: 2016-11-23 4:26 PM
To: Innes, Jayson
Cc: Godo, Anna; Daniel Piescic; Phil Bartnik; Brian Hillman; Richard Wyma; Tim Byrne; Forest, Flavio
Subject: Upper Little River Study Draft Oct 2016 - Review Comments
Attachments: Capture.JPG

Importance: High

Hi Jayson,

As per our phone conversation this morning, the City and ERCA have reviewed your October 2016 Draft report and related information for the Upper Little River Study. Comments are expected soon from the Town of Tecumseh.

All City/ERCA comments and supporting information have been uploaded to your ftp site (See attached for list of 13 uploaded files).

In addition to ERCA's uploaded comments, we also provide the following:

1. Appendix B – Correspondence includes letters received through project consultation. Some of these letters, such as correspondence from the Caldwell First Nation, were not in support of the study. How were these letters/concerns dealt with through the study process.

2. On page 1 of Appendix G, the Current PC-SWMM Model Proposed water elevations and flows in the first table do not match the Current PC-SWMM Model proposed water elevations and flows in the Proposed table at the bottom of the page. Please clarify.

3. Drawing 4 is titled Proposed Land Use Plan. This could be taken to infer that the EA process will somehow result in changes to the land use designations in the study area. The EA process is not the Planning Act process. Changes in land use designations require approval under the Planning Act and any such approvals are required to be consistent with the 2014 PPS. The information contained within the EA report is deficient in several aspects in that it is not considered a complete EIA which has demonstrated no negative impact. At what part of the process will the EIA be completed for this area, in accordance with PPS policies? This will require additional biological work as most of the data being used in this report is many years old. Perhaps Drawing 4 should be renamed Potential Future Land Use Plan (or similar) with a qualifier that it is subject to additional studies under the Planning Act process. This next Planning Act process step must be clearly identified in Section 8 of the report.

4. It is anticipated that functional design studies may be undertaken for individual subcatchments within the overall study area vs. one functional design for the entire study area. It is noted in the report that fisheries offsetting may be required for the proposed loss of some open drains. It is further noted that fisheries offsetting may be required in some subcatchments for loss of habitat in other subcatchments. This needs to be known during the subcatchment functional design. It appears that the future drain assessment/DFO review should likely be completed for the entire area as a next step before functional designs proceed. If this is correct, this should be clearly identified in Section 8 of the report.

As discussed, the City is hoping to present the final report to their Standing Committee in mid December. This would require the final report to be available by December 1, 2016. You advised that this was very aggressive, however, you would review the submitted comments (once they are all received) and then provide a schedule for completion.

If you have any questions, please do not hesitate to contact our office.

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From:	Forest, Flavio <fforest@dillon.ca>
Sent:	2016-12-13 6:33 PM
To:	John Henderson
Cc:	Daniel Piescic; Phil Bartnik; Brian Hillman; Winterton, Mark; Godo, Anna; Richard Wyma; Tim Byrne; Innes, Jayson; Laura Herlehy
Subject:	Re: Upper Little River Study Draft Oct 2016 - Review Comments
Attachments:	Dillon Consulting Limited Mail - Re_ Upper Little River Update June 2016.pdf; ULR-info-2016-03-03 (2).pdf; Stantec SWM Little River Draft ESR Background.pdf

Hello John, on the Town's behalf, we have completed a review of the draft Upper Little River SWM EA report and appendices, including in relation to the comments we provided previously. We have attached copies of our previous correspondence and responses, which we would expect to be reflected in the final EA report:

- Email communications from January 27, 2016 to June 3, 2016 between the Town, ERCA and Stantec
- Related attachments that showed updated catchment areas, pond cross sections, pond footprints and pond design parameters.
- Proposed storm sewer inverts provided to Stantec, by Dillon, on Oct. 26, 2012.
- Project correspondence from Stantec, dated March 4, 2016 including parameters for SWM pond design, and parameter tables.
- Hydrology parameter tables from Appendix F of the October 2016 Little River SWM ESR Draft Report.

Our comments are as follows:

1. A factor of 4X has been applied to the required area at the level/elevation of the permanent pool surface. We understand that this is intended to allow for 3/4 of the permanent pool surface area to be 'dry' (ie. island areas that may be planted surfaces at/above the permanent pool elevation), thereby serving to create discontinuous/isolated permanent pool wet surface areas that would allow for circulation of flows.
   - We understand that this was the criteria previously used in re-sizing the ponds in the Tecumseh Hamlet, resulting in an increase from 120m to 150m in the SWM corridor widths (see attached prior emails and sketches).
     - Is this still the case, and if so, is this reflected in the Master Plan document to capture this change?
   - The area at the level/elevation of the permanent pool surface can have a significant influence on the footprint of the pond at the ground surface.
     - Has there been any functional designs completed to confirm that this factor of 4X is sufficient to achieve the required permanent pool depths/volumes for quality treatment, to support/sustain habitat, and discourage waterfowl?
   - We understand that the permanent pool depth is proposed to be 1.5m.
     - Is this sufficient, as we understand that depths of up to 4m may be preferred for sustainability of habitat.
2. Also arising from our earlier comments, Stantec provided the SWM Pond design parameter tables via email dated *March 4, 2016 (attached),* which identified permanent pool elevations in that table that are 1.5 m to 2.1 m lower than the values that have now been included in the October 2016 Draft Master Plan (Appendix F).
   - As previously agreed, the SWM solution for the Tecumseh Hamlet area will require that the permanent pool elevation (normal water level) be at/below the storm sewer inverts discharging to these ponds.
     - Please reconfirm and update the Master Plan with the required normal water level elevations based on the proposed storm sewer outlet elevations identified for the Tecumseh Hamlet storm sewer system.
3. Active Storage Volumes and Pump Station Outlet Capacities
   - Each pond will require a pump station outlet to discharge to the existing downstream watercourse based on existing available drain capacity.
     - The tables in the Master Plan appear to reference orifices/weirs and do not appear to account for pump stations as outlets from these facilities. Please confirm.

- Please confirm that the existing outlet drain capacities that have been outlined in the Master Plan and on which the allowable pump station outlet rates have been based, are acceptable to the City and ERCA and that no further studies would be required that might further reduce these pumping rates and further affect the required active storage volumes in these pond facilities.
- Is the increased 150m SWM corridor width sufficient to accommodate the required active storage volumes based on these allowable discharge rates.
- Have climate change considerations been factored into the required active storage volumes and the resulting hydraulic gradeline conditions in these facilities according to the Provincial Policy Statement and current understanding.
- Have the hydraulic gradline conditions of these facilities been assessed in terms of their impact on the performance of the storm sewer systems related to surface flooding, etc.

4. We also wish to point out that the "Ground Elevation of the Upstream Storm Sewer" provided in the Master Plan tables are more than 2.0 m higher than what our records indicate as the existing grades of the Tecumseh Hamlet lands (see attached comparison tables), which may affect the assumptions/results in the Master Plan.
5. We have confirmed that the land use % breakdown has now been updated to reflect the Tecumseh Hamlet Secondary Plan information, as outlined in our previous comments.

As we indicated previously, the work that the Town has been undertaking in advancing the Secondary Plan for the Tecumseh Hamlet lands have allowed for more detailed information on the storm drainage requirements, but at the same time also require greater clarity on the impact of the proposed SWM facilities on the developable lands and road network that are being established by the Town.
Please review our comments and let us know if you would like to meet in order to discuss this in further detail.
Regards,

Flavio Forest
Partner
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3233
F - 519.948.5054
M - 519.791.2166
FForest@dillon.ca
www.dillon.ca
Please consider the environment before printing this email

On Mon, Dec 12, 2016 at 11:29 AM, John Henderson <JHenderson@erca.org> wrote:

Good morning Flavio,

I know you and the Town were in an OMB hearing for the past two weeks and you are likely coming back to a substantial workload. It would be greatly appreciated if your review of the draft October 2016 Upper Little River Study report could take top priority.

If you have any questions, please do not hesitate to contact me.

John Henderson, P. Eng.

Essex Region Conservation Authority (ERCA)

360 Fairview Avenue West, Suite 311

Essex, Ontario N8M 1Y6

519-776-5209 ext. 246

Fax: 519-776-8688

Please consider the environment before printing this email

From: John Henderson
Sent: Tuesday, December 6, 2016 9:28 AM
To: 'Forest, Flavio' <fforest@dillon.ca>
Cc: 'Daniel Piescic' <dpiescic@tecumseh.ca>; 'Phil Bartnik' <pbartnik@tecumseh.ca>; 'Brian Hillman' <bhillman@tecumseh.ca>; Winterton, Mark <mwinterton@citywindsor.ca>; 'Godo, Anna' <agodo@citywindsor.ca>; Richard Wyma <RWyma@ERCA.org>; Tim Byrne <TByrne@ERCA.org>; Innes, Jayson <jayson.innes@stantec.com>
Subject: RE: Upper Little River Study Draft Oct 2016 - Review Comments
Importance: High

Hi Flavio,

Just following up to see how your review of the updated draft information is progressing. The Town's comments are required to allow Stantec to finalize the study. I met with Mark Winterton last Friday regarding some other matters and he requested an update on the status of the study. As previously noted, the City is anxious to finalize this document so it can be presented to their Standing Committee for approval. There are currently developer within the Windsor portion of the study area that want to move into functional design as well as the mega hospital project.

If there is anything we can do to assist you with your review, please let us know.

Best regards,

John Henderson, P. Eng.

Essex Region Conservation Authority (ERCA)

360 Fairview Avenue West, Suite 311

Essex, Ontario N8M 1Y6

519-776-5209 ext. 246

Fax: 519-776-8688

Please consider the environment before printing this email

From: John Henderson
Sent: Wednesday, November 23, 2016 4:36 PM
To: 'Forest, Flavio' <fforest@dillon.ca>
Cc: Daniel Piescic <dpiescic@tecumseh.ca>; Phil Bartnik <pbartnik@tecumseh.ca>; Brian Hillman <bhillman@tecumseh.ca>
Subject: FW: Upper Little River Study Draft Oct 2016 - Review Comments
Importance: High

Hi Flavio,

As discussed, please provide an ftp site and I will provide the updated draft documents for your review.

John Henderson, P. Eng.

Essex Region Conservation Authority (ERCA)

360 Fairview Avenue West, Suite 311

Essex, Ontario N8M 1Y6

519-776-5209 ext. 246

Fax: 519-776-8688

Please consider the environment before printing this email

From: John Henderson
Sent: Wednesday, November 23, 2016 4:26 PM
To: Innes, Jayson <jayson.innes@stantec.com>
Cc: 'Godo, Anna' <agodo@citywindsor.ca>; Daniel Piescic <dpiescic@tecumseh.ca>; Phil Bartnik <pbartnik@tecumseh.ca>; Brian Hillman <bhillman@tecumseh.ca>; Richard Wyma <RWyma@ERCA.org>; Tim Byrne <TByrne@ERCA.org>; 'Forest, Flavio' <fforest@dillon.ca>
Subject: Upper Little River Study Draft Oct 2016 - Review Comments
Importance: High

Hi Jayson,

As per our phone conversation this morning, the City and ERCA have reviewed your October 2016 Draft report and related information for the Upper Little River Study. Comments are expected soon from the Town of Tecumseh.

All City/ERCA comments and supporting information have been uploaded to your ftp site (See attached for list of 13 uploaded files).

In addition to ERCA's uploaded comments, we also provide the following:

1. Appendix B – Correspondence includes letters received through project consultation. Some of these letters, such as correspondence from the Caldwell First Nation, were not in support of the study. How were these letters/concerns dealt with through the study process.

2. On page 1 of Appendix G, the Current PC-SWMM Model Proposed water elevations and flows in the first table do not match the Current PC-SWMM Model proposed water elevations and flows in the Proposed table at the bottom of the page. Please clarify.

3. Drawing 4 is titled Proposed Land Use Plan. This could be taken to infer that the EA process will somehow result in changes to the land use designations in the study area. The EA process is not the Planning Act process. Changes in land use designations require approval under the Planning Act and any such approvals are required to be consistent with the 2014 PPS. The information contained within the EA report is deficient in several aspects in that it is not considered a complete EIA which has demonstrated no negative impact. At what part of the process will the EIA be completed for this area, in accordance with PPS policies? This will require additional biological work as most of the data being used in this report is many years old. Perhaps Drawing 4 should be renamed Potential Future Land Use Plan (or similar) with a qualifier that it is subject to additional studies under the Planning Act process. This next Planning Act process step must be clearly identified in Section 8 of the report.

4. It is anticipated that functional design studies may be undertaken for individual subcatchments within the overall study area vs. one functional design for the entire study area. It is noted in the report that fisheries offsetting may be required for the proposed loss of some open drains. It is further noted that fisheries offsetting may be required in some subcatchments for loss of habitat in other subcatchments. This needs to be known during the subcatchment functional design. It appears that the future drain assessment/DFO review should likely be completed for the entire area as a next step before functional designs proceed. If this is correct, this should be clearly identified in Section 8 of the report.

As discussed, the City is hoping to present the final report to their Standing Committee in mid December. This would require the final report to be available by December 1, 2016. You advised that this was very aggressive, however, you would review the submitted comments (once they are all received) and then provide a schedule for completion.

If you have any questions, please do not hesitate to contact our office.

Essex Region Conservation Authority
sustaining the place for life

John Henderson, P. Eng.

Essex Region Conservation Authority (ERCA)

360 Fairview Avenue West, Suite 311

Essex, Ontario N8M 1Y6

519-776-5209 ext. 246

Fax: 519-776-8688

From: John Henderson <JHenderson@erca.org>
Sent: 2016-12-21 9:23 AM
To: Brian Hillman; Hicks, Wes; Forest, Flavio; Innes, Jayson; Dan Lebedyk; Mike Nelson
Cc: Tim Byrne; Daniel Piescic; Phil Bartnik; Godo, Anna
Subject: Upper Little River Study Conference Call - December 20, 2016
Attachments: 1992 - CNHS Report_OptimizeScannedPDF.PDF

Good morning Everyone,

Thank you for participating on the conference call yesterday.

Attendees:

Brian Hillman - Town of Tecumseh
Wes Hicks, P. Eng. - City of Windsor
Flavio Forest, P. Eng. - Dillon Consulting Ltd.
Jayson Innes, P. Eng. - Stantec Consulting Ltd.
Dan Lebedyk - ERCA
Michael Nelson - ERCA
John Henderson, P. Eng. - ERCA

The following is provided as a brief summary of the main items discussed:

1. There is a need to have a better understanding of the fisheries offsetting that may be required as this area develops. Based on the conceptual land use plans, open waterways will be removed in certain subcatchment areas and potential habitat offsetting will be required in open waterways that are to remain in other subcatchment areas. Accordingly, offsetting will not always be available within the same subcatchment area. It should be identified that a next step following the completion of this report should be the development of a fisheries offsetting plan for the entire study area. The current study, however, should provide estimates of the habitat that will be lost (i.e. length of open drain, square footage of direct and indirect habitat, etc.), a list of the open drains proposed to be removed, a list of open drains to remain and the potential location of fisheries offsetting opportunities.

2. Plans are included that identify proposed land uses within the study area. Completion of this EA study does not result in changes in land uses. Other *Planning Act* processes must be followed to change land use designations. The following items where discussed:
   - The report must clearly identify and qualify the information that was used in reference to proposed land uses.
   - The report must clearly identify that future *Planning Act* processes are required to change current land uses.
   - The title of Drawing 4 should be modified so as to not imply that the proposed land uses are approved.
   - Based on the typical scope of an EA study, the current environmental investigations are not sufficient to support land use changes under a *Planning Act* process. It was recommended that 120 m offsets be shown around all natural features to indicate that additional environmental studies will be required within these areas to support future *Planning Act* approvals/processes.
   - This EA covers a very large area. The report should identify that future EA Addendums may be required to address the ultimate land uses that may be proposed in this area.

3. Review of submitted City comments:
   - The City raised a question about the municipal boundary between the City of Windsor and the Town of Tecumseh shown on Figure 3. The City will provide Stantec with a plan showing the legal boundary.
   - Order of magnitude costs for the different options that have been considered are to be included in the final report.

4. Review of submitted Tecumseh comments:
   - The Town raised a question regarding the proposed 1.5 m depth of the permanent pools and noted that pools up to 4 m may be preferred for habitat.
     - The proposed stormwater ponds are sewage treatment facilities. Typically, it is not recommended to encourage wildlife to use these facilities even though it is inevitable. It was agreed that the ponds should follow the design guidelines found in the MOECC Stormwater Management Planning and Design Manual (March 2003).
     - Stantec advised that the conceptual ponds have sufficient room to have a varying depth. This will be identified in the report.
   - The Town noted a difference between the proposed pond normal water levels in the current report and in the previous report. This further raised the question about the size of the proposed SWM corridors.
     - Stantec advised that all ponds have been sized based on gravity outlets and that MOECC recommends a maximum depth for active storage. Stantec further advised that the same storage volume will be required for pumped ponds, however, the active storage will be at a lower elevation resulting in a larger top of the pond area. Stantec advised that this was considered when the SWM corridors were sized.
     - Stantec is to include a cross-section that shows the worst case scenario pond configuration that resulted in the proposed 150 m SWM corridor width. This cross-section should also show how the gravity versus the pump option was considered in the pond/corridor sizing.
     - The report should include a discussion on how the pond sizes and SWM corridors were developed for this project.
   - The Town recommended that all comments received and the related responses should be included in the report Appendices. All were in agreement.
   - The Town asked if any further studies would be required to confirm the available capacity in the downstream drains and the related pond outlet release rates that have been considered in this report.
     - Stantec confirmed that the downstream drain capacities have been based on information provided by the municipalities and standard *Drainage Act* procedures. This is considered a table top exercise since undertaking surveys of all drains to calculate actual drain capacities is beyond the scope of this EA. The assessment produced small allowable release rates for the proposed ponds. Modification to these release rates are not expected to have a significant impact on the storage volumes required. Finalization of the ultimate drain capacities and related pond release rates is required in future functional design studies.

- The Town asked how, or if, climate change has been considered and if increased intensity storms have been modelled.
    - Increased intensity storm have not been modelled.
    - The report should include a discussion on the need to consider climate change in the future functional design studies.
    - The report should identify how the current conceptual pond designs have the ability to be modified within the recommended SWM corridors to provide for additional storage that may be required under future climate change scenarios.
    - The report should identify that, in addition to traditional stormwater ponds, future functional designs studies may need to consider LID alternatives. A list of potential LID alternatives should be included and it should be noted that all LID's may not be suitable for the existing physical constraints within the Essex Region.
- The Town requested that the final report be as detailed/specific as possible with regard to infrastructure needs and criteria.
    - Based on existing functional design studies that have been completed by the Town, all of the Town ponds will be required to be pumped. This criteria is to be included in the final report.
    - The City does not have functional design studies for their portion of the study area, however, they have advised that all sewers are to be dry between storm events. The City also advised that they want pond normal water elevations to be at or below the sewer inverts versus sewer dewatering pumps. Accordingly, if functional design results in sewers that are lower than the inverts of the outlet drains, pumping will be required. The report should include this criteria.

5. Review of Submitted ERCA comments:
    - ERCA raised a question about when the proposed improvements to the Upper Little River are required to be completed.
        - Stantec advised that the improvements are required to improve existing flood elevations in the Little River. With the proposed pond restrictions, development should not worsen the existing conditions if the improvements are not completed immediately. These channel improvements are also planned to address some of the anticipated fisheries offsetting needs. Accordingly, the need to undertake the improvements may be driven by when certain sections of the area are developed. The schedule for undertaking the improvements to the Upper Little River channel requires further discussion with the City.
        - The cross-sections of the proposed channel improvements for the Upper Little River, the 6^{th} Concession Drain, etc. that were used in the hydraulic model should be included in the final report. This will provide the minimum channel dimensions required for flow conveyance and storage. All fisheries offsetting requirements would be an expansion of the minimum hydraulic channel dimensions.
    - Stantec requested a copy of the 1992 City of Windsor Candidate Natural Heritage Site Biological Inventory Report. A copy of this report is attached to this e-mail.

The above provides a summary of the comments that were discussed during the conference call. Other comments were submitted that were not discussed. It was agreed that, prior to preparing the final report, Stantec will prepare a table that includes all of the comments provided and their proposed responses/method of addressing the comments for all to review. Once all parties have agreed with Stantec's proposed responses/method of addressing the comments, Stantec will prepare the final report.

It is desired by all parties to have the final report completed by the end of January 2017.

Please advise me of any on omissions or clarifications immediately.

Thank you,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Dan Lebedyk <DLebedyk@erca.org>
Sent: 2017-01-30 11:30 AM
To: John Henderson; Tim Byrne; Mike Nelson
Cc: Richard Wyma
Subject: RE: Upper Little River Study - REVIEW REQUESTED

1. I have reviewed the revised document and find that the previous comments provided have been satisfactorily addressed.

2. Of specific note is the recognition within the document that an Environmental Impact Assessment (EIA) will need to be completed – Development within 120 m of an existing natural feature will require an EIA demonstrating no negative impacts in support of future Planning Act approvals and process.

3. Under section 6.2.1.6 Human Impacts, the revised report states the following:

"The proposed development, through the implementation of additional trails and new development, has the potential to increase impacts to natural features from the introduction of human activity to an area that currently doesn't experience these anthropogenic disturbances. Potential mitigation measures include well-marked walking trails to discourage creation of informal trails, signage to educate trail users about the sensitivity of the natural features in the area, and trash receptacles place at intervals along the trails to discourage littering. Other mitigation measures may be required to show no negative impacts from residential intensification on wildlife populations."

The above potential impact due to human population intensification of the area is not specifically addressed anywhere else in the report. This issue will need to be adequately addressed within any future EIAs for any land use designation changes in/around any existing natural features.

4. Within section 4.1.2, the Essex Region Natural Heritage System Strategy (ERCA and County of Essex, 2013) is now referenced. Within the references section however, the citation is not included. This study should be properly included within the references section as follows:

Essex Region Conservation Authority. 2013. Essex Region Natural Heritage System Strategy - (An Update to the Essex Region Biodiversity Conservation Strategy). Essex, Ontario. 319 pages.

Please do not hesitate to contact me if you should have any questions or require any additional information.

Thank you.

Sincerely,

DAN LEBEDYK
Biologist/Ecologist
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 • Essex, Ontario • N8M 1Y6
P. 519-776-5209 x 409 • F. 519-776-8688
dlebedyk@erca.org www.essexregionconservation.ca

From: John Henderson
Sent: Friday, January 27, 2017 5:16 PM
To: Tim Byrne <TByrne@erca.org>; Dan Lebedyk <DLebedyk@erca.org>; Mike Nelson <MNelson@erca.org>
Cc: Richard Wyma <RWyma@erca.org>
Subject: Upper Little River Study - REVIEW REQUESTED
Importance: High

The updated report and related information can be found at the following location:

\\pdcerca\company\watershed management\Studies\ENVIRONMENTAL ASSESSMENTS\PROVINCIAL\Class EA\Municipal Class EA (MEA)\Windsor\Upper Little River SWM Study\Draft Report January 27, 2017

Please review in relation to your previously submitted comments ASAP. The City needs the final report completed early in the week of January 30, 2017 in order to get it on the agenda for the February Standing Committee Meeting.

Thank you,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Friday, January 27, 2017 4:42 PM
To: John Henderson <JHenderson@erca.org>
Cc: Tim Byrne <TByrne@erca.org>; Mike Nelson <MNelson@erca.org>; Richard Wyma <RWyma@erca.org>; Godo, Anna <agodo@citywindsor.ca>; Winterton, Mark <mwinterton@citywindsor.ca>; pbartnik@tecumseh.ca; bhillman@tecumseh.ca; dpiescic@tecumseh.ca
Subject: RE: Upper Little River Study - Status

I have put a copy of the revised report on the following FTP site. The list of recent comments is located in the comment directory and will explain the changes that have been made.

Please let me know if you have any additional comments.

Thanks

Login Information

Browser link: https://tmpsftp.stantec.com
FTP Client Hostname: tmpsftp.stantec.com **Port:** 22 (can be used within an FTP client to view and transfer files and folders; e.g., FileZilla)
Login name: s0210142755
Password: 7230313
Disk Quota: 2GB
Expiry Date: 2/10/2017

From: John Henderson [mailto:JHenderson@erca.org]
Sent: 2017-01-19 10:00 AM
To: Innes, Jayson <jayson.innes@stantec.com>
Cc: Tim Byrne <TByrne@erca.org>; Mike Nelson <MNelson@erca.org>; Richard Wyma <RWyma@erca.org>; Godo, Anna <agodo@citywindsor.ca>; Winterton, Mark <mwinterton@citywindsor.ca>
Subject: RE: Upper Little River Study - Status

Good morning Jayson,

Please push your environmental group. We need to get this completed ASAP.

Essex Region Conservation Authority
sustaining the place for life

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From:	John Henderson <JHenderson@erca.org>
Sent:	2017-02-16 4:05 PM
To:	Innes, Jayson
Cc:	Winterton, Mark; Godo, Anna; Daniel Piescic; Brian Hillman; Phil Bartnik; Richard Wyma; Tim Byrne; Dan Lebedyk; Mike Nelson
Subject:	Upper Little River Study - Comments on January 27, 2017 Submission
Attachments:	Draft Report 2017-01-27 J Henderson Comments.docx; RE: Upper Little River Study - REVIEW REQUESTED; RE: Upper Little River Study - REVIEW REQUESTED; Draft Report 2017-01-27 - AMG Comments.pdf
Importance:	High

Good afternoon Jayson,

ERCA and the City have reviewed your January 27, 2017 Draft report and related information. The Town of Tecumseh anticipates having their review completed by mid next week. Attached are comments from ERCA and the City. The following are additional comments are from ERCA related to the response matrix, drawings, figures and appendices:

1. The following comments relate to your responses provided in the response matrix. The comment numbers relate to the original comment numbers.

    - Comment 1 – Section 6.3 does not provide cost estimates for all of the alternative development solutions that were considered. It appears that the provided comparison relates to ponds with pre 1:100 year release rates vs. release rates based on available drain capacity. Order of magnitude costs (or something similar) should be provided for all of the alternatives that were considered (i.e. do-nothing, water quality and erosion control only, communal stormwater facilities, on-line quantity control with local quality and erosion control, etc.).
    - Comment 8 – All personal information has not been removed from Appendix B.
    - Comment 61 – If it is allowed by the original authors, we would suggest that all Stantec, Waldron and Ecoplan field investigations/reports should be included in an Appendix.
    - Comments 90 and 137 – A very basic cross-section is provided in Appendix G. It is our understanding that this is the minimum channel improvement that is required to produce the proposed future high water elevations and that any required fish habitat offsetting would be an expansion to this cross-section. While dimensions could be approximately scaled from the provided cross-section, a more detailed cross-section with channel dimensions should be included. A plan should also be included showing where this cross-section has been used in the modelling.

2. On Figure 6 there is only one site on the `Gouin Drain identified as being an isolated "Fish Habitat Location". This seems unusual. Other reaches are identified as "Fish Habitat Reaches". Is the Gouin Drain downstream of this location a "Fish Habitat Reach"?

3. On Figure 13 a large pond is shown near Hennin Street. This pond has been completely filled in.

4. Figure 14 provides existing and proposed floodplain elevations. Are the proposed elevations based on development with existing channel conditions or proposed channel improvements?

5. On Figure 17, numerous sub-catchment ponds appear to be shown within catchment boundaries. Catchments 2060 and 2095 appear to conceptually have 8 ponds. If this is correct, these catchment areas are not that large and 8 ponds seems unreasonable for a conceptual depiction. Please provide some clarification for this Figure.

6. On Figure 18 there are 3 red lines in the bottom left corner of the sketch. It appears that these lines are likely from the original plan where this detail was taken from. If so, the 3 red lines should be removed.

7. All personal information has not been removed from Appendix B. Personal information exists for Ms. Sheila Roberts, letters from 882885 Ontario Limited contain signatures and the letter from Monteith Brown Planning Consultants contains personal information. Please review Appendix B and make sure all personal information is removed.

If you have any questions, please contact me.

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Mike Nelson <MNelson@erca.org>
Sent: 2017-02-16 3:13 PM
To: John Henderson
Subject: RE: Upper Little River Study - REVIEW REQUESTED

Hi John,

I have compared the updated report, appendices, drawings and figures to the comments I put forward and the associated responses in the 8002-2017 matrix and offer the following:

Comment #:

13 – comment addressed satisfactorily.
14 – comment addressed satisfactorily.
15 – Section from section 3.5.5 is pretty limited but may reflect the direction from the City and Town – that is, future applications will be required to change the zoning and official plan designations separate from the outcomes of this study. Section 8.1.1 details appropriately that future land use changes must meet all requirements of the Planning Act prior to implementation. Regarding the changes to section 8.1.2 I am not totally supportive of all of the statements made, but the process to outline the required studies for other processes (i.e., Planning Act, other Class EA, DFO process, etc.) should be identified through appropriate consultation with those other processes.
16 – comment addressed satisfactorily.
17 – comment addressed satisfactorily.
18 – comment addressed satisfactorily. I recommend that the data collected as part of this report be submitted to the NHIC as a condition of completion of the report. This would be in keeping with our contractual obligations between the ERCA and the NHIC (Dan Lebedyk is the signing authority).
19 – comment addressed satisfactorily.
20 – ok
21 – ok. Per previous comment (18 – this data should be submitted to the NHIC to ensure the appropriate treatment at the Planning Act, other EA, and/or REA processes.
22 – ok.
23 – comment looks to be ok. Per previous comments regarding submission of 'raw' results to the NHIC as a condition of completion of the report – <u>especially</u> if SAR or SWH was documented. Fish records will typically have been submitted to the MNR as part of the License to Collect Fish for Scientific Purposes conditions.
24 – ok.
25 – ok.
26 – ok.
27 – ok
28 – ok
29 – text additions in section 8.1.1 is satisfactory.

Page 4.13 –"Lake Sinclair" should be replaced with either Lake St. Clair or Lake Saint Clair.

115 – ok
116 – ok.
117 – ok

118 – ok
119 – ok
120 – ok
128 – ok.
136 – ok
137 – ok
138 – ok

Thanks,
Mike

From: John Henderson
Sent: Friday, January 27, 2017 5:16 PM
To: Tim Byrne <TByrne@erca.org>; Dan Lebedyk <DLebedyk@erca.org>; Mike Nelson <MNelson@erca.org>
Cc: Richard Wyma <RWyma@erca.org>
Subject: Upper Little River Study - REVIEW REQUESTED
Importance: High

The updated report and related information can be found at the following location:

\\pdcerca\company\watershed management\Studies\ENVIRONMENTAL ASSESSMENTS\PROVINCIAL\Class EA\Municipal Class EA (MEA)\Windsor\Upper Little River SWM Study\Draft Report January 27, 2017

Please review in relation to your previously submitted comments ASAP. The City needs the final report completed early in the week of January 30, 2017 in order to get it on the agenda for the February Standing Committee Meeting.

Thank you,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Friday, January 27, 2017 4:42 PM
To: John Henderson <JHenderson@erca.org>
Cc: Tim Byrne <TByrne@erca.org>; Mike Nelson <MNelson@erca.org>; Richard Wyma <RWyma@erca.org>; Godo, Anna <agodo@citywindsor.ca>; Winterton, Mark <mwinterton@citywindsor.ca>; pbartnik@tecumseh.ca; bhillman@tecumseh.ca; dpiescic@tecumseh.ca
Subject: RE: Upper Little River Study - Status

I have put a copy of the revised report on the following FTP site. The list of recent comments is located in the comment directory and will explain the changes that have been made.

Please let me know if you have any additional comments.

Thanks

Login Information
Browser link: https://tmpsftp.stantec.com
FTP Client Hostname: tmpsftp.stantec.com **Port:** 22 (can be used within an FTP client to view and transfer files and folders; e.g., FileZilla)
Login name: s0210142755
Password: 7230313
Disk Quota: 2GB
Expiry Date: 2/10/2017

From: John Henderson [mailto:JHenderson@erca.org]
Sent: 2017-01-19 10:00 AM
To: Innes, Jayson <jayson.innes@stantec.com>
Cc: Tim Byrne <TByrne@erca.org>; Mike Nelson <MNelson@erca.org>; Richard Wyma <RWyma@erca.org>; Godo, Anna <agodo@citywindsor.ca>; Winterton, Mark <mwinterton@citywindsor.ca>
Subject: RE: Upper Little River Study - Status

Good morning Jayson,

Please push your environmental group. We need to get this completed ASAP.

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: John Henderson <JHenderson@erca.org>
Sent: 2017-03-06 9:44 AM
To: Innes, Jayson
Cc: Daniel Piescic; Phil Bartnik; Brian Hillman; Winterton, Mark; Godo, Anna; Richard Wyma; Tim Byrne; Mike Nelson; Dan Lebedyk
Subject: Upper Little River Study - Comments
Attachments: 2017 Response Matrix Upper Little River MP Tecumseh Comments March 1 2017.pdf

Importance: High

Good morning Jayson,

Please find attached comments from the Town of Tecumseh. In addition, we have reviewed these comments with the Town and the following items are provided as additional clarification points to be read in conjunction with the Town comments.

1. Does this document satisfy Schedule B EA requirements? If not, what is needed? The Town needs assurances because they are planning to move forward with Secondary Plans. If Schedule B requirements are not satisfied, they will not be able to commence Secondary Plans. What Approach number is satisfied under the EA process. It appears to be Approach 1, but the Town believes this study should at least satisfy Approach 2.

2. Climate Change – Additional generic information has been added regarding climate change. Dillon and the Town are concerned that the document does not provide enough information/analysis to demonstrate an appropriate duty of care regarding this matter. The Town suggests that a climate change analysis should be completed on one of the proposed subcatchment areas to determine if the proposed corridor is sufficient to provide for a potentially larger pond due to climate change. Completion of this analysis could then be used to further support for the proposed SWM corridor widths. This analysis could also set out a framework for future climate change assessments during subcatchment functional and detailed design processes. The Town wants it clearly identified that climate change must be addressed in future subcatchment functional and detailed designs.

3. Fisheries Habitat Offsetting – Appendix F contains a Table "Summary of Proposed Municipal Drain Modifications". This is an important piece of information which should be included in the main body of the report. This table identifies where habitat will be lost and where there is potential for enhancement opportunities. At this time, it is unclear if Tecumseh can address their enhancement needs in waterways situated within the Town limits or if development in Tecumseh will also require enhancements in City waterways. While this may not be known until the recommended fisheries offsetting study is completed, the report should identify these types of issues. Could fisheries offsetting needs impact the functionality of the recommended alternative? It should be confirmed that sufficient investigations have been undertaken through this EA process to ensure that fisheries offsetting needs can be satisfied through functional/detailed design. The report should include some typical fisheries offsetting techniques that could be considered in the future fisheries offsetting study. It would also be helpful if the report recommended a scoping strategy for the future fisheries offsetting study.

4. Conceptual vs. Functional – The recommended alternative should provide functional scenarios that will be further detailed in the next step subcatchment functional/detailed designs. The word conceptual could be taken to mean that the functionality of the scenario has not been confirmed. We believe that this is mainly an issue with terminology, however, it must be clear in the report that the solution is functional. The use of these words in the report must be reviewed and modified as required.

5. It is identified in the report that the ponds have been sized with a 1.5 m permanent pool and that the SWM corridors provide room for additional depth if required. This was added to address the Town's concern that they may want deeper ponds based on there desire to make these facilities amenities within their parkland features. The Town wants it stated in the report that they anticipate requiring deeper permanent pools for their ponds.

6. The study area includes portions of Tecumseh on the south side of Highway 401. The report must clearly identify the criteria that is applicable to future development in this area.

7. It was previously identified that there appeared to be a datum issue between the storm sewer invert elevations provided by Tecumseh and the ground elevations that were used by Stantec for this study. Was this datum difference resolved and is there an impact on the anticipated HGL's in the upstream Tecumseh storm sewers?

We have also received the following additional comments from the City of Windsor:

"Looking at the PIC material, it appears that we have published a variety of names for this study:
1. *Notice of Study Commencement – Upper Little River Watershed Master Drainage Plan & Stormwater Management Plan*
2. *PIC #1 & 2 notices – Upper Little River Watershed Master Drainage Plan & Stormwater Management Plan*
3. *PIC #1 & 2 display boards – Upper Little River Stormwater Master Plan Class Environmental Assessment*
4. *Draft report cover pages in July 2014, Sept. 2016, & Jan 2017 – Draft Upper Little River Master Plan Environmental Assessment*

I think that the name of the study should match either the notices or the display boards. At least it should include a term such as watershed, drainage, or stormwater."

Please ensure that all of these comments, in addition to the previously submitted comments, are addressed in the final report. Due to the substantial review that has already occurred, we do not believe that another round of review is required. If you have any questions regarding the comments, please contact us before finalizing the report to ensure that the revised final report satisfies the questions raised.

Thank you,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Forest, Flavio [mailto:fforest@dillon.ca]
Sent: Thursday, March 2, 2017 1:13 PM
To: John Henderson <JHenderson@erca.org>; Tim Byrne <TByrne@erca.org>; Dan Lebedyk <DLebedyk@erca.org>; Mike Nelson <MNelson@erca.org>
Cc: Phil Bartnik <pbartnik@tecumseh.ca>; Daniel Piescic <dpiescic@tecumseh.ca>; Tecumseh, Town of <bhillman@tecumseh.ca>; Anna Godo <agodo@city.windsor.on.ca>
Subject: Re: FW: Upper Little River Study - Comment Table

Hi John, on behalf of the Town of Tecumseh, we are hereby attaching our comments on the summary table that was provided.
Please contact us should you have any questions or wish to review this in further detail.
Regards,

Flavio Forest
Partner
Dillon Consulting Limited
3200 Deziel Drive Suite 608
Windsor, Ontario, N8W 5K8
T - 519.948.4243 ext. 3233
F - 519.948.5054
M - 519.791.2166
FForest@dillon.ca
www.dillon.ca
Please consider the environment before printing this email

On Fri, Jan 27, 2017 at 1:56 PM, Phil Bartnik <pbartnik@tecumseh.ca> wrote:

Flavio,
Can you please review on behalf of the Town.
Thank you.

Phil Bartnik, P.Eng., PMP
Manager Engineering Services
The Corporation of the Town of Tecumseh

From: John Henderson [mailto:JHenderson@erca.org]
Sent: January-27-17 8:26 AM
To: 'Godo, Anna'; Daniel Piescic; Phil Bartnik; Brian Hillman; Tim Byrne; Dan Lebedyk; Mike Nelson
Cc: Winterton, Mark; Richard Wyma
Subject: Upper Little River Study - Comment Table
Importance: High

Good morning Everyone,

Please find attached Stantec's table showing the submitted comments and related responses.

Stantec has advised that a revised report will be provided today.

As per our last conference call, Windsor Administration is planning to get this report to their February Standing Committee meeting for approval which means they need to submit it next week to ensure it gets to the February meeting.

Please review the attached and forthcoming information ASAP.

If you have any questions, please do not hesitate to contact me.

[cid:image002.jpg@01D27877.0D6F3940]

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)

360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

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____

[logo]<http://www.tecumseh.ca/files/exchange/logo.gif> Phil Bartnik
Manager, Engineering Services
pbartnik@tecumseh.ca
Town of Tecumseh - 917 Lesperance Rd. - Tecumseh, ON. - N8N1W9
Phone: 519 735-2184 ,148 Fax: 519 735-6712 - www.tecumseh.ca

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From: John Henderson <JHenderson@erca.org>
Sent: 2017-04-28 10:37 AM
To: Innes, Jayson
Subject: RE: Upper Little River Cross sections
Attachments: 2017-04-28-ULR-wider cross sections.pdf

Importance: High

Hi Jayson,

The cross-sections look good for the ponds and channel, however, they do not show the full corridor. City and Town Administration are going to want to see the full corridor width and why it is needed.

I think we should be including at least 6 m for maintenance from the edge of the corridor to the start of the pond. For channel maintenance, we also will likely need more than 1 m between the pond and channel. Please refer to the attached mark-ups on Figures 13B and 14B. If we show 6 m on each side of the cross-section, and 6 m between the pond and channel, we will almost be at the 200 m width. The trail system could be located within the 6 m maintenance corridors.

We also need a cross-section of the 250 m wide SWM corridor that runs along Little River. The property owner that is raising a concern is along Little River.

Please let me know if it will be possible to get this today.

Thanks,

Essex Region Conservation Authority
sustaining the place for life

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Friday, April 28, 2017 10:06 AM
To: John Henderson <JHenderson@erca.org>
Subject: Upper Little River Cross sections

Attached are the cross sections for the 24-hr events that the corridor width is based on. The ?A figures are for the 24 hour event and the ?B are for 120 % of the 24 hour event (accounting for climate change).

I think this is what you are looking for your meeting, but if I am missing something let me know.

Thanks

Jayson Innes, M.A.Sc., P.Eng.
Senior Water Resources Engineer
Stantec
100-300 Hagey Boulevard, Waterloo ON N2L 0A4
Phone: (519) 585-7282
Cell: (519) 569-0518
Fax: (519) 579-6733
jayson.innes@stantec.com

Stantec

From: Phil Bartnik <pbartnik@tecumseh.ca>
Sent: 2017-05-17 4:21 PM
To: John Henderson; Innes, Jayson
Cc: Godo, Anna; Daniel Piescic; Brian Hillman; Tim Byrne; Chad Jeffery
Subject: RE: Upper Little River Study
Attachments: dwg4-160311265_C-SD-land use.pdf

Importance: High

Jayson,
The Town also has some serious concerns with the land use designation of "Employment" lands within the Oldcastle Hamlet (and surrounding area) south of Highway 401. We understand that this was used primarily for the Stormwater Design and does not reflect the actual (or future) zoning. However based on our recent history with OMB Hearings, as well as a current OMB Hearing for land within this area, the Town would like to further discuss having the Figure, associated text within the report, and references to 'Employment Lands' within calculations and/or appendices revised to something more appropriate.

I would like to suggest we schedule a teleconference at your earliest convenience to discuss these final revisions prior to finalizing the ESR.

Regards,

Phil Bartnik, P.Eng., PMP
Manager Engineering Services
The Corporation of the Town of Tecumseh

From: John Henderson [mailto:JHenderson@erca.org]
Sent: May-17-17 12:22 PM
To: Innes, Jayson
Cc: Godo, Anna; Daniel Piescic; Phil Bartnik; Brian Hillman; Tim Byrne
Subject: Upper Little River Study
Importance: High

Hi Jayson,

As per our discussion last week, we were anticipating receiving the cost estimates for the alternatives and the typical pond plan views that were to accompany the cross-section that were provided last week. Please send this information as soon as possible.

In addition, there are a couple of minor comments on the attachments that need to be addressed.

FYI – I will be presenting the study to Tecumseh Council next Tuesday. It will be similar to the Windsor presentation.

If you have any questions, please contact me.

Essex Region Conservation Authority
sustaining the place for life

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246

Fax: 519-776-8688

Phil Bartnik
Manager, Engineering Services
pbartnik@tecumseh.ca
Town of Tecumseh - 917 Lesperance Rd. - Tecumseh, ON. - N8N1W9
Phone: 519 735-2184 ,148 Fax: 519 735-6712 - www.tecumseh.ca

From: John Henderson <JHenderson@erca.org>
Sent: 2017-05-29 4:58 PM
To: Godo, Anna; Brian Hillman; Flavio Forest; Innes, Jayson
Cc: Dan Piescic (dpiescic@tecumseh.ca); Phil Bartnik; Tim Byrne
Subject: ULR Conference Call Summary - May 25, 2017
Attachments: Town Consolidated Map for Upper Little River EA, 2017 Model (1).pdf

Good afternoon Everyone,

The following is provided as a brief summary of the main items that were discussed during the conference call last Thursday:

- There was significant discussion on draft Drawing No. 4 – Proposed Development Plan
  - Windsor is in agreement with the land uses that were used for modelling purposes for the lands within the City limits.
  - Tecumseh is concerned with the land uses that were used for some of the areas within the Town limits.
    - Lands south of Hwy 401 were assumed as Employment lands for modeling purposes. The Town Official Plan does not show most of these lands as future Employment lands and the Town does not anticipate them being developed. The existing and future conditions for the majority of these existing agricultural lands should be agriculture as per the Town Official Plan. Some areas in the Oldcastle Hamlet are designated as residential in the Town Official Plan but on Drawing No. 4 they are shown as Employment lands. After substantial discussion, it was agreed that the Town would provide a map showing the Official Plan land uses (attached) and that Stantec would revise Drawing No. 4 and the modelling to correspond to the Official Plan land designations.
    - The above approach is also to be followed for sub-catchment 2145 which shows no proposed development on Drawing No. 4 but was assessed with future low density residential development in the modelling (refer to Appendix F). As per the attached Town map, future development is not planned for sub-catchment 2145.
  - The title of Drawing No. 4 should be changed to clearly identify that the assumed land uses were for modelling purposes. A qualifier may also be needed.

- An additional drawing should be developed showing the current existing land use designations for all lands within the study area.

- The Town is concerned that the level of detail provided with regard to the SWM corridors and related pond configurations may not satisfy the requirements of a Schedule 'B' Class EA. Drawing No. 3 shows the proposed SWM corridors with proposed widths, but the location and extent of these corridors is not clearly identified. It was discussed that, in addition to Drawing No. 3, Drawing No. 3 should be split into 3 or 4 sub drawings that include road names, existing drain names/locations, additional dimensions locating the SWM corridors from known features, etc. The purpose of the additional drawings is to clearly document where the SWM corridors are located. Stantec is also to confirm that this additional information, along with the pond cross-sections, pond plan views and the supporting information in the report/appendices, provides enough detail to satisfy the requirements of a Schedule 'B' Class EA.

- Draft pond/channel cross-sections were provided showing ponds with gravity outlets. Both the City and Town have advised that the storm sewers draining to the ponds are to be dry after storm events. Due to the flat topography in the study area, the ponds will need to be pumped. As a result, the pond/channel cross-sections showing gravity pond outlets should not be included in the final report.

- Stantec provided draft order of magnitude costs for the 6 alternatives. These numbers have not yet been reviewed by the partners, however, it was noted that 5 alternatives had the same cost. It is understood that these are high level cost estimates, however, the differences between the options should result in varying costs. Stantec advised that they would review the estimates and make them more alternative specific. The Town indicated that they would see if they have any recent cost estimates for similar undertakings that could be used for comparison purposes to ensure the numbers are consistent with local works.

- Stantec advised that they will provide a matrix of the last comments received and their proposed responses. The responses will also identify which sections of the report have been modified to address the comments.

- Stantec will provide one more draft report for review.

If you have any questions, or wish to add to or clarify the above summary points, please respond to me by the end of the day on June 1, 2017.

Best regards,

Essex Region Conservation Authority
sustaining the place for life

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Enrico De Cecco [mailto:edececco@tecumseh.ca]
Sent: Monday, May 29, 2017 10:46 AM
To: Innes, Jayson (jayson.innes@stantec.com) <jayson.innes@stantec.com>; John Henderson <JHenderson@erca.org>; FForest@dillon.ca; Phil Bartnik <pbartnik@tecumseh.ca>; Daniel Piescic <dpiescic@tecumseh.ca>
Cc: Brian Hillman <bhillman@tecumseh.ca>
Subject: Town Official Plan Map for the Upper Little River SWM Study

Hello to all,
Please refer to the attached PDF document.
Regards,
Enrico

Enrico De Cecco
Junior Planner,MCIP,RPP
edececco@tecumseh.ca
Town of Tecumseh - 917 Lesperance Rd. - Tecumseh, ON. - N8N 1W9
Phone: 519-735-2184 ,123 Fax: 519-735-6712 - www.tecumseh.ca

APPENDIX D

Minutes of Meetings

Meeting Notes

Start-up Meeting

Upper Little River Master Plan Environmental Assessment

Date:	Thursday, July 14, 2011	
Place/Time:	1:00 PM, Stantec Windsor Office	
Next Meeting:	To be scheduled	
Attendees:	Jayson Innes	Stantec
	Alain Michaud	Stantec
	Jeremy Wychreschuk	ERCA
	Janusz Czuj	MRC
	Anna Godo	City of Windsor
	Patrick Winters	City of Windsor
	Dustin Cierpisz	City of Windsor
	Chad Jeffery	Town of Tecumseh
	Rick Wellwood	Town of Tecumseh
	Daniel Piescic	Town of Tecumseh
Distribution:	All attendees plus distribution list	

Item: **Action:**

Introduction

1. All team members were introduced.

Purpose

2. Stantec described the purpose of the meeting. "To have a discussion with all of the stakeholders involved in order to determine their project preferences and any known project constraints".

Background

3. Stantec presented an overview of the project scope and a brief background of the project. In general terms, the assignment consists of the completion of an EA to determine the preferred Stormwater Management (SWM) Plan for the study area.

4. Stantec noted that the project start has been delayed. Stantec will attempt to maintain the original schedule. — Action: Stantec

5. MRC presented an overview of the Lauzon Parkway EA and Sandwich South Secondary Plan. Their preferred plan would be to have SWM controls for the road and surrounding development provided in a shared facility.

Item: **Action:**

Stormwater Management Alternatives

6. The 5 EA alternatives to be considered during the project were reviewed. They include:

- Alternative 1 - Do Nothing – no development
- Alternative 2 - Water Quality and Erosion Control - no water quantity control required
- Alternative 3 - Communal Online Facilities – several large online SWM Facilities (SWMFs) where all SWM controls (water quality, water quantity, erosion control, etc) would be provided
- Alternative 4 - Online Quantity and Offline Quality and Erosion Control - this alternative would have several online regional food control structures and numerous offline water quantity and erosion control facilities
- Alternative 5 - Offline or Distributed SWM Controls – numerous offline SWMFs where water quantity, water quality, and erosion control were provided

7. Alternative 1 does not allow for the study area to be developed and the stakeholders agreed that this would not be the preferred solution given the purpose of the project.

8. For Alternative 2, ERCA stated that lands downstream of the study area are currently impacted by flood waters and any increase in flows would require channel improvements with significant costs.

9. The City stated that they would prefer fewer SWM facilities in order to reduce maintenance costs. The area will likely be developed over an approximately 25 year time period, so some flexibility in the construction/phasing of the SWMFs would be preferred in order to reduce up front construction costs and unused SWM infrastructure.

10. Alternative 3 will be difficult to construct given the limitations imposed by the Airport. To provide water quality control for large areas, typically a large permanent body of water is required, which would attract birds, which in turn will impact the Airport. It is difficult to provide water quality control for large areas without large bodies of water.

Item:	**Action:**
11. For Alternative 4, separate water quality facilities would be designed for events up to the 5-year rainfall event in alignment with standard storm sewer design flows. Minor flows would drain to smaller facilities while major flows would be conveyed to online flood control facilities.	
Stormwater Management Types	
12. The Study Area is located adjacent to the Windsor International Airport. The Airport Authority prefers that permanent bodies of water be avoided around the airport because they attract birds. The exact airport requirements are unknown at this time but generally dry ponds are preferred. Several alternative designs were proposed in order to include SWMFs with permanent water within the study area including heavy vegetation, wetlands, and long narrow ponds. Stantec and the City to follow up with Phil Roberts (Windsor Airport) to confirm airport requirements.	City/Stantec
13. City noted that there have been two expensive bird strikes at the Airport so far this year.	
14. City noted that there are currently no traditional SWMFs with permanent bodies of water (wet ponds or constructed wetlands) near the airport. There are several dry ponds, a pond with underground storage, and a pond with a serpentine layout (to discourage bird landing). .	
15. Underground storage has been used around other airports,since they are unusable by birds, but they tend to be more costly than above ground storage.	
16. The City has had success using Regional flood control facilities within the study area. One of these is currently used as a recreational sports field.	
17. Stakeholders are to forward pond examples to Stantec for review. These would include successful ponds in the area or other pond examples they would like to see implemented in the area.	City/Town
18. Little River requires a Normal level of water quality control as specified in the Ministry of the Environment's SWM Planning and Design Manual. Water quantity control is proposed such that post development flows are controlled to predevelopment levels for all storms up to and including the 100-year rainfall event in order to limit	

Item: **Action:**

flooding impacts downstream of the site.

19. The City expressed a preference to have most roads in the study area with urban cross sections ultimately.

20. Most municipal drains will likely be retained in some form of open channel (that is not enclosed) due to fishery concerns.

21. OGS could be combined with dry ponds to provide Normal water quality control.

22. MRC noted that MTO has a preference to avoid Oil and Grit Separator (OGS) units. The SWM controls for MTO roads (and all other roads) will ideally be located in SWMFs on adjacent lands. Separate facilities for the roads are not preferred. It is unknown if MTO would be OK draining to an OGS unit if they were not responsible for maintenance.

23. Low Impact Development/Green Infrastructure/Lot Level/Conveyance Control Options were discussed. These could be combined with a dry pond facility to meet the MOE Normal water quality control requirement. Infiltration based options are not feasible given the clay soils in the area and the costs involved with importing suitable soils. Possible options include green roofs, bioswales/vegetated channels, buffer strips, cisterns, and rain barrels. Enforcement of these options would be required to ensure they are constructed and operating as intended in order to maintain MOE water quality standards.

24.

25. In Essex Region industrial areas typically provide their own water quality controls onsite. Downstream infrastructure (storm sewer and SWMFs) is designed for a runoff coefficient of 0.6 and onsite water quantity control is required for a any development/imperviousness in excess of this.

Project Schedule

26. Stantec is to develop preliminary drawings and a description for Alternatives 3, 4, and 5 with a tentative completion data of early to mid August. This package will include preliminary sizing, locations, and form/function of the proposed SWMFs (i.e. dry ponds, OGS, LID, etc). The project team will then meet to discuss the alternatives. Stantec

Item: **Action:**

Other

27. The City stated that the 6th Concession Drain is currently too close to Baseline Road, creating maintenance concerns. Ultimately Baseline Road will be widened to an urban cross section and the City would like to see the 6th Concession Drain moved away from the road.

The meeting adjourned at 3:00 PM.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

STANTEC CONSULTING LTD.

Jayson Innes

Jayson Innes, M.A.Sc., P.Eng.
Project Manager, Water Resources
jayson.innes@stantec.com

Meeting Notes

Progress Meeting 2

Upper Little River Master Plan Environmental Assessment

Date:	Tuesday, August 16, 2011	
Place/Time:	10:00 AM, Stantec Windsor Office	
Next Meeting:	To be scheduled	
Attendees:	Jayson Innes	Stantec
	Alain Michaud	Stantec
	Jeremy Wychreschuk	ERCA
	Stan Taylor	ERCA
	Phil Roberts	Windsor Airport
	Anna Godo	City of Windsor
	Patrick Winters	City of Windsor
	Tiffany Pocock	City of Windsor
	Brian Hillman	Town of Tecumseh
	Rick Wellwood	Town of Tecumseh
	Daniel Piescic	Town of Tecumseh
Distribution:	All attendees plus distribution list	

Item: **Action:**

Introduction

1. All team members were introduced.

Purpose

2. Stantec described the purpose of the meeting, which was to discuss the form, function, and location of the stormwater management (SWM) features within the Study Area.

Airport Discussion

3. Windsor Airport described SWM Facilities (SWMFs) around the Windsor Airport that are not desirable to birds. The Twin Oaks site and the modified Central Avenue Ponds were two of the better facilities. Generally heavy vegetation and less open water/fetches resulted in fewer birds. These features make the ponds less attractive to bird species as it makes entering and exiting the water and the identification of predators more difficult.

4. Windsor Airport generally preferred SWMFs that were undesirable to birds over exclusion methods (such as barriers, scaring, hazing, and lethal methods).

Item: **Action:**

5. Dry ponds would provide the least attractive end-of-pipe SWMF but do not provide the required water quality controls. A dry pond would have to be combined with a pretreatment device (either an Oil/Girt separator or a grass swale) to provide the required level of water quality control. This may be possible in some of the Study Area but the City of Windsor was not willing to maintain these over their entire portion of the site (this may be possible in industrial areas). Therefore constructed wetlands or wet ponds will be required within the Study Area near the Airport.

6. Windsor Airport had no preference between constructed wetlands and wet ponds for the end-of-pipe SWMFs. Their primary concerns are that the pond be designed to be unattractive to bird species.

Stormwater Management Alternatives

7. Stantec presented an overview of the remaining alternatives under consideration which are:

   - Alternative 3 - Communal Online Facilities – several large online SWM Facilities (SWMFs) where all SWM controls (water quality, water quantity, erosion control, etc) would be provided

   - Alternative 4 - Online Quantity and Offline Quality and Erosion Control - this alternative would have several online regional food control structures and numerous offline water quantity and erosion control facilities

   - Alternative 5 - Offline or Distributed SWM Controls – numerous offline SWMFs where water quantity, water quality, and erosion control were provided

8. Most groups liked the appearance of Alternative 3. Difficulty in conveying flows to a central location from a water quantity (expanded channel sizes would be required to pass the higher developed flows) and a water quality (untreated runoff would be required to flow through water courses and would impact existing fish habitat) perspective were the greatest drawbacks.

9. Alternative 4 includes aspects of Alternative 3 and 5 with a centralized corridor for water quantity control and somewhat distributed water quality control.

10. A traditional SWM approach (included as a version of alternative 5), where each development would have its own SWMF, results in

Item: **Action:**

approximately 100 facilities in the Study Area (assuming 1 facility for approximately 30 ha). Generally most stakeholders did not like the look and operation of this alternative.

11. A version of Alternative 5 was also shown which included 50 larger facilities (assuming 1 facility for approximately 60 ha). These facilities were also distributed across the site and received similar feedback to the 100 facility alternative.

12. Following the discussion the stakeholders preferred the more centralized design of alternatives 3 and 4.

13. A preliminary plan to reestablishing the Little River watercourse upstream of baseline road and adding in a new drain/watercourse along the new E-W Arterial (parallel to Highway 401 and Baseline Road) to funnel drainage to the Little River was discussed. The new east-west channel would funnel flow to the Little River and would remove flow from the 6^{th} concession drain which currently experiences flooding.

Other Items

14. Development interest within the Study Area is generally occurring in approximately half of the Study Area including: The Banwell Road, 8^{th} Concession Road, eastern portions of the airport, and areas south of Highway 401.

15. The McGill Drain on the Airport Lands currently experiences flooding during heavy rainfall events.

16. Stakeholders were generally in agreement with SWM strategy that utilized permanent water bodies in a water quality cell adjacent to a riparian corridor with additional water quantity control similar to the Twin Oaks site as the preferred method of SWM controls.

17. Further discussion is required to determine the location of the SWMFs and the layout of the conveyance channels. These discussions will include the planning groups in order to ensure that the SWM and planning strategies are compatible.

Project Schedule

18.	The SWM strategy will be discussed with the planning groups the week of August 22, 2011.	Stantec

The meeting adjourned at 12 noon.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

STANTEC CONSULTING LTD.

Jayson Innes, M.A.Sc., P.Eng.
Project Manager, Water Resources
jayson.innes@stantec.com

Meeting Notes

Planning Meeting

Upper Little River Master Plan Environmental Assessment

Date:	Monday, August 22, 2011	
Place/Time:	2:30 PM, Stantec Windsor Office	
Next Meeting:	To be scheduled	
Attendees:	Jayson Innes	Stantec
	Alain Michaud	Stantec
	Phil Roberts	Windsor Airport
	Anna Godo	City of Windsor
	Patrick Winters	City of Windsor
	Tiffany Pocock	City of Windsor
	Dustin Cierpisz	City of Windsor
	Michael Cooke	City of Windsor
	Erica Ogden	City of Windsor
	Josette Eugeni	City of Windsor
	Brian Hillman	Town of Tecumseh
	Rick Wellwood	Town of Tecumseh
	Daniel Piescic	Town of Tecumseh
Distribution:	All attendees plus distribution list	

Item: **Action:**

Introduction

1. All team members were introduced.

Purpose

2. Stantec described the purpose of the meeting, which was to discuss the location of the stormwater management (SWM) features and to combine them with the planning vision for the Study Area.

Stormwater Management Plan

3. Stantec reviewed the preferred form and function of the SWM Facilities (SWMFs), which will consist of an off-line water quality control section with a permanent water surface and an on-line water quantity control portion. This will take the appearance of a wide watercourse channel with periodic ponds adjacent to the channel.
4. Heavy vegetation adjacent to all water bodies along with less open water/fetches are also important design features to make the ponds less attractive to bird species.
5. Stantec presented a preliminary drawing of the SWMF locations within the study area. This drawing combined aspects of the Draft Secondary Plan for Sandwich South prepared by Meridian Planning Consultants and the existing drain network.

Item: **Action:**

6. The plan showed two major SWM trunk lines along the Upper Little River and the new East-West Arterial alignments, with other smaller branches scattered throughout the study area. It was suggested that the Upper Little River channel not cross Highway 401 at the proposed Lauzon Parkway interchange in order to avoid the interchange ramps at that location. The 9th Concession Road was mentioned as a possibility.

Planning Discussion

7. A Secondary Plan is currently under way for the Town of Tecumseh Lands. Some preliminary information is available now, with more detailed information available in a few months. A business park is planned for the area south of Highway 401. Additional development is also planned north of County Road 42 in the Town of Tecumseh lands.

8. The Secondary Plan for The City of Windsor is still in draft form and will be subject to change based on the other studies currently underway in the area. Further changes are also expected when plans of subdivision are submitted for individual developments.

9. The land uses shown on the City of Windsor Secondary Plan can be moved around the Study Area depending on the outcomes of the other studies, but the percentage land class allocation should remain approximately the same. Some modifications of the plan are possible to converge the Secondary Plan with the Lauzon Parkway EA and the Upper Little River EA.

10. A Secondary Plan for the East Pelton area (located west of the Sandwich South lands) has already been completed.

11. Most parties were in agreement that drains beside roads present safety and planning issues and should be avoided. The current plan calls for a channel beside the Lauzon Parkway Extension and the new East-West Arterial, but a buffer will be used to separate these features. Drains separate from the roads, currently in agricultural fields, will be maintained where possible.

12. Most of the drains in the Study Area will require some modification (enclose/decommission/realign/widen) under the proposed SWM plan. This will likely result in a Harmful Alteration Disruption or Destruction of Fish habitat which will require approvals from the Department of Fisheries. It is though that some of these impacts can be mitigated by watercourse improvements in other areas. Drains could be moved or realigned away from the roadways depending on the findings of the ecology studies.

Item:	**Action:**
13. The plan for the SWMFs is to construct them with a phased approach so that individual development will not be dependent on other areas. These SWMFs could be constructed by the municipalities or individual developers depending on the development process.	
14. The riparian corridor would be a natural corridor linking the various features in the Study Area. The corridor would be wider than the current municipal drains and would include a low flow channel and floodplain areas. Trails and sports fields could also be incorporated.	
Other Items	
15. The Lauzon Parkway EA is currently has a scheduled Public Information Centre on November 17, 2011. Stantec is planning to conduct their PIC concurrently (on the same date at the same location).	Stantec
16. Stantec is to produce a map of the study area showing SWMF locations and land use.	Stantec
Project Schedule	
17. The next meeting is tentatively scheduled for late September, 2011.	Stantec

The meeting adjourned at 4:30 PM.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

STANTEC CONSULTING LTD.

Jayson Innes

Jayson Innes, M.A.Sc., P.Eng.
Project Manager, Water Resources
jayson.innes@stantec.com

Meeting Notes

Progress Meeting No. 3

Upper Little River Master Plan Environmental Assessment

Date:	Tuesday, November 1, 2011	
Place/Time:	2:00 PM, Stantec Windsor Office	
Next Meeting:	To be scheduled	
Attendees:	Jayson Innes	Stantec
	Alain Michaud	Stantec
	Phil Roberts	Windsor Airport
	Anna Godo	City of Windsor
	Patrick Winters	City of Windsor
	Michael Cooke	City of Windsor
	Jeremy Wychreschuk	ERCA
	Brian Hillman	Town of Tecumseh
	Rick Wellwood	Town of Tecumseh
	Daniel Piescic	Town of Tecumseh
Distribution:	All attendees plus distribution list	

Item: **Action:**

Introduction

1. All team members were introduced.

Purpose

2. Stantec described the purpose of the meeting, which was to discuss to progress of the study and to further discuss the location of the stormwater management (SWM) features and to combine them with the planning vision for the Study Area.

Stormwater Management Plan

3. Stantec reviewed the current plan for the study area. SWM Facilities (SWMFs) consist of water quality control section with an on-line water quantity control portion.

4. Heavy vegetation adjacent to all water bodies along with less open water/fetches are also important design features to make the ponds less attractive to bird species.

5. Modifications were made to the preliminary drawing based on comments received by the City, Town, Windsor Airport and ERCA. This drawing combined aspects of the Draft Secondary Plan for Sandwich South prepared by Meridian Planning Consultants and the existing drain network.

Item: **Action:**

6. The plan showed two major SWM trunk lines along the Upper Little River and the new East-West Arterial alignments, with other smaller branches scattered throughout the study area.
7. It was proposed that the SWM corridor would be aligned away from the roads (in backyards) where frequent entrances to the road are required. When frequent access is not required (along Baseline Road and the E.W arterial), the SWM corridor would be aligned along the roadway.
8. Concerns with maintenance and accessibility of the SWMFs were expressed. Multi-use pathways were proposed to provide maintenance access as well as establishing recreational areas within the study area. Multi-use pathways would be required if the SWM corridor was not adjacent to a roadway.
9. The City requested that the Multi-use pathways are to be located outside the 100-year flooding elevation. Buffers from the SWM corridor to the existing/proposed road right-of-ways are also required. The buffer zone has not been established at this time.
10. Essex Region Conservation Authority (ERCA) requested that water levels for the 5-year and 100-year storms be indicated along the drainage corridors.
11. Ice jams were express as a concern by ERCA associated with road/hydraulic crossings. It was recommended to minimize the number of road/hydraulic crossings to reduce seasonal maintenance of the Drainage System.
12. ERCA suggested that the berms within the proposed SWMFs be raised to provide runoff control for the major storm events prior to discharging to the channel. Stantec to investigate
13. There is an opportunity to re-naturalize existing straightened channels in areas with sufficient space.
14. Lands south of Highway 401 are far enough away from the Windsor International Airport (>4 km) allowing more conventional SWMFs if desired. Two (2) options could be presented within the EA for these lands. Option 1 would entail SWM corridors similar to the proposed SWMFs nearer the Airport. Option 2 would entail more conventional SWM facilities, utilizing wetland/wet pond type facilities.
15. Based on studies completed by the USDA National Wildlife Research Centre (Bird Use of Stormwater Management Ponds: Decreasing Avian Attractants on Airports, 2008), to minimize avian use of airport stormwater-management ponds, it was suggested that access to openwater be reduced by frequent drawdown or use of a cover. As such, minimizing the overall footprint of the pond and/or

Item:	Action:
increased cover should be considered in the selection process for ponds.	
16. The Town, City and ERCA requested to add a SWMF maintenance section to the EA report.	
Airport Land SWM Discussion	
17. SWM facilities in the Airport lands are proposed to have more vegetation, with smaller ponds/shallower pools/channels to discourage bird habitats. Possible designs include pit and mound layout or long, thin, sinuous channel.	
18. Alternatives to the existing outlet locations were discussed. The majority of the existing the Airport lands outlet to the McGill Drain which is at capacity and experiences frequent flooding. Directing a portion of the stormwater to the Lappin Drain is a potential option. The diversion can occur within the Airport SWMF.	
SWMF Design Discussion	
19. The proposed SWMFs are to be designed assuming a runoff coefficient of C = 0.60 for all developed lands within the study area.	
20. On-site stormwater management control will be required for developments that exceed the assumed runoff coefficient to control runoff prior to outletting to the proposed SWMFs. This would include water quality and water quantity controls.	
Other Items	
21. The Lauzon Parkway EA has rescheduled their Public Information Centre from November 17th, 2011 to early 2012. Stantec is planning to conduct their PIC concurrently (on the same date at the same location).	Stantec
Project Schedule	
22. The next meeting is to be determined at a later date.	Stantec
23. Existing conditions modeling to be finished by the end of the year.	Stantec
24. Stantec to develop proposed conditions modeling.	Stantec

The meeting adjourned at 4:45 PM.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

STANTEC CONSULTING LTD.

Jayson Innes, M.A.Sc., P.Eng.
Project Manager, Water Resources
jayson.innes@stantec.com

Meeting Notes

Progress Meeting No. 4

Upper Little River Master Plan Environmental Assessment

Date:	Tuesday, November 1, 2011	
Place/Time:	9:30 PM, City of Windsor	
Next Meeting:	To be scheduled	
Attendees:	Jayson Innes	Stantec
	Alain Michaud	Stantec
	Phil Roberts	Windsor Airport
	Anna Godo	City of Windsor
	Patrick Winters	City of Windsor
	Mario Sonego	City of Windsor
	Chris Manzon	City of Windsor
	Simona Simion	City of Windsor
	Wes Hicks	City of Windsor
	Dustin Cierpisz	City of Windsor
	Tiffany Pocock	City of Windsor
	Mike Clement	City of Windsor
	Tom Hunt	City of Windsor
	Jeremy Wychreschuk	ERCA
	John Henderson	ERCA
	Brian Hillman	Town of Tecumseh
	Rick Wellwood	Town of Tecumseh
	Chad Jeffery	Town of Tecumseh
	Daniel Piescic	Town of Tecumseh
Distribution:	All attendees plus distribution list	

Item:	Action:
Introduction	
1. All team members were introduced.	
Purpose	
2. Stantec described the purpose of the meeting, which was to discuss to preferred plan with the larger group and work out further details related to implementation, construction, operation and maintenance.	
Overview	
3. Stantec gave a brief summary of the preferred plan which includes: Normal (Level 2) water quality control Maintain existing flows and water levels in the downstream system Erosion control provided in the SWM Facilities SWM Facilities designed as linear facilities which will be incorporated into green spaces with heavy vegetation to discourage bird use	
4. General Design information for SWM facilities	

Item:	**Action:**
5:1 slopes in pond 3:1 to 5:1 slopes in drainage channels 1.5 m permanent pool depth 100-year active water level in ponds to be less than 2 m (from permanent pool)	
5. Little River upstream of Baseline Road is proposed to be realigned along its historical alignment with a wider riparian corridor	
6. The Windsor Airport is concerned with SWM Facilities acting as bird habitat/attractions. The Proposed design includes heavy vegetation growth and short fetches of open water. Permanent water is required in order to provide water quality control as per MOE guidelines	
7. The preferred plan shows two major SWM corridors along the Upper Little River and the new East-West Arterial alignments, along with other smaller branches scattered throughout the study area	
8. Planning preferences are to have facilities in backyard areas away from roadways where frequent entrances to the road are not required. When frequent access is not required (along Baseline Road, Lauzon Parkway, and the new East-West arterial), the SWM corridor could be aligned along the roadway if there is a sufficient buffer	
Discussion	
9. Proposed subcatchments have been delineated based on proposed road alignments and land use. Each catchment has been assigned an area within the SWM corridor where facilities would be constructed.	
10. Lands south of Highway 401 are far enough away from the Windsor International Airport (>4 km) to allow for more conventional SWMF design if desired. Two (2) options could be presented within the EA for these lands. Option 1 would entail SWM corridors similar to the proposed SWMFs nearer the Airport. Option 2 would entail more conventional SWM facilities, utilizing wetland/wet pond type facilities	
11. The SWM concept in the Airport lands will also be different since they are adverse to any significant bodies of water. SWM will likely be composed of very small bodies of water or long thin channels amongst trees	
12. General concerns are: maintenance, land requirements, vegetation growth	

Item: **Action:**

Item:	Action:
13. Concerns with maintenance and accessibility of the SWMFs were expressed. Multi-use pathways were proposed to provide maintenance access as well as establishing recreational areas within the study area. Multi-use pathways would be required if the SWM corridor was not adjacent to a roadway.	
14. The City requested that the Multi-use pathways are to be located outside the 100-year flooding elevation. Buffers from the SWM corridor to the existing/proposed road right-of-ways are also required. The buffer zone has not been established at this time.	
15. Standard City of Windsor trail corridors are 10 m in width, including a 3 m wide trail.	
16. Maintenance of the SWM Facilities will ultimately be the responsibility of the municipalities	
17. Unclear who would do the final design and construction of the SWMFs. If the municipalities are involved significant upfront land acquisition costs would be involved. Private developers may also be viable with the location of the SWMFs determined in through the current EA	
18. Establishing full vegetation growth prior to use of SWMFs will reduce the establishment of phragmites, but could take 2 to 5 years. This time frame will be difficult given development pressures in the area	
19.	
20. Design should evaluate which areas can gravity drain to Little River and which areas will need pumping	
21. Secondary plan blocks have been defined for the Sandwich South Secondary Plan. Ideally the secondary plan bocks and the proposed SWM subcatchments would be coincident. City of Windsor requested the proposed catchment areas. *This information was subsequently sent to the City.*	
22. Removal/decommissioning of the existing Municipal Drains will constitute a HADD (Harmful Alteration, Disruption, or Destruction) of fish habitat and will require a permit from the DFO. It will also likely trigger the CEA (Canadian Environmental Assessment).	
23. Both the City of Windsor and the Town of Tecumseh plan to implement Permanent Private Stormwater systems within the Study Area such that the runoff from commercial, industrial, institutional, medium and high density residential land uses is equivalent to to that from an area with a runoff coefficient of 0.6. These systems would generally be relatively simple such as depressed storage in parking lots, green areas or roof top storage for quantity control and oil grit	

Item: **Action:**

Item	Action
separators or like devices for quality control	
24. Town of Tecumseh would like all SWM controls for Town lands to be provided on Town lands.	
25. City of Windsor plans to tie natural heritage areas into the SWM features.	
26. Some difficulties with staging are anticipated given the availability of storm and sanitary servicing to most of the study area. The sequence of land development is difficult to predict. Flexibility in SWM construction is required to accommodate several development options.	
Airport Land SWM Discussion	
27. Airport drainage system is generally at capacity with regular flooding	
28. No communal ponds are to be proposed for the Airport Lands	
29. Due to bird attraction constraints, no large open bodies of water are permitted on the Airport Lands, as such the required area is larger	
30. It is recommended that denser vegetation, bird attractiveness be incorporated progressively as the SWMFs get closer to the Airport	
31. Concerns about how the vegetation will be established. At least 1 growing season is required to achieve some growth before full use.	
32.	
33.	
34.	
35.	
City Operations	
36. Phramites growth is a concern. Maintenance consists of physical removal from ponds. It does not grow well in the shade.	
37. Pumping is likely required at some locations due to flat topography. Will pumps be designed for dewatering of submerged storm sewers or with the capacity to handle peak flows?	Stantec
38. Dense vegetation in channels may constrict conveyance and require more frequent maintenance. The channel sections are environed to look similar to the existing sections of Upper Little River with an open channel (no vegetation) with trees and shrubs on the banks.	
SWMF Design Discussion	
39. The proposed SWMFs are to be designed assuming a runoff	

Item:	**Action:**
coefficient of C = 0.60 for all developed lands within the study area.	
40. On-site stormwater management control will be required for developments that exceed the assumed runoff coefficient to control runoff prior to outletting to the proposed SWMFs. This would include water quality and water quantity controls.	
Other Items	
41. The Lauzon Parkway EA has rescheduled their Public Information Centre to late 2012. The Upper Little River EA will plan to conduct their PIC concurrently (on the same date at the same location).	Stantec
42. During the meeting the possibility of holding an introductory PIC to present the needs assessment, planning, and stormwater management alternatives. This PIC would introduce the project to the public and solicit initial public feedback on the alternatives being considered. This PIC has subsequently been agreed to and is scheduled for May 29, 2012.	
Project Schedule	
43. The next meeting is to be determined at a later date.	Stantec

The meeting adjourned at 4:00 PM.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

STANTEC CONSULTING LTD.

Jayson Innes, M.A.Sc., P.Eng.
Project Manager, Water Resources
jayson.innes@stantec.com

Upper Little River EA – Meeting – 2016-12-20

Attendees:

Brian Hillman	- Town of Tecumseh
Phil Bartnik, P.Eng.	- Town of Tecumseh
Wes Hicks, P. Eng.	- City of Windsor
Flavio Forest, P. Eng.	- Dillon Consulting Ltd.
Jayson Innes, P. Eng.	- Stantec Consulting Ltd.
Dan Lebedyk	- ERCA
Michael Nelson	- ERCA
John Henderson, P. Eng.	- ERCA

The following is provided as a brief summary of the main items discussed:

1. There is a need to have a better understanding of the fisheries offsetting that may be required as this area develops. Based on the conceptual land use plans, open waterways will be removed in certain subcatchment areas and potential habitat offsetting will be required in open waterways that are to remain in other subcatchment areas. Accordingly, offsetting will not always be available within the same subcatchment area. It should be identified that a next step following the completion of this report should be the development of a fisheries offsetting plan for the entire study area. The current study, however, should provide estimates of the habitat that will be lost (i.e. length of open drain, square footage of direct and indirect habitat, etc.), a list of the open drains proposed to be removed, a list of open drains to remain and the potential location of fisheries offsetting opportunities.

2. Plans are included that identify proposed land uses within the study area. Completion of this EA study does not result in changes in land uses. Other *Planning Act* processes must be followed to change land use designations. The following items where discussed:
   - The report must clearly identify and qualify the information that was used in reference to proposed land uses.
   - The report must clearly identify that future *Planning Act* processes are required to change current land uses.
   - The title of Drawing 4 should be modified so as to not imply that the proposed land uses are approved.
   - Based on the typical scope of an EA study, the current environmental investigations are not sufficient to support land use changes under a *Planning Act* process. It was recommended that 120 m offsets be shown around all natural features to indicate that additional environmental studies will be required within these areas to support future *Planning Act* approvals/processes.

- This EA covers a very large area. The report should identify that future EA Addendums may be required to address the ultimate land uses that may be proposed in this area.

3. Review of submitted City comments:
   - The City raised a question about the municipal boundary between the City of Windsor and the Town of Tecumseh shown on Figure 3. The City will provide Stantec with a plan showing the legal boundary.
   - Order of magnitude costs for the different options that have been considered are to be included in the final report.

4. Review of submitted Tecumseh comments:
   - The Town raised a question regarding the proposed 1.5 m depth of the permanent pools and noted that pools up to 4 m may be preferred for habitat.
     - The proposed stormwater ponds are sewage treatment facilities. Typically, it is not recommended to encourage wildlife to use these facilities even though it is inevitable. It was agreed that the ponds should follow the design guidelines found in the MOECC Stormwater Management Planning and Design Manual (March 2003).
     - Stantec advised that the conceptual ponds have sufficient room to have a varying depth. This will be identified in the report.
   - The Town noted a difference between the proposed pond normal water levels in the current report and in the previous report. This further raised the question about the size of the proposed SWM corridors.
     - Stantec advised that all ponds have been sized based on gravity outlets and that MOECC recommends a maximum depth for active storage. Stantec further advised that the same storage volume will be required for pumped ponds, however, the active storage will be at a lower elevation resulting in a larger top of the pond area. Stantec advised that this was considered when the SWM corridors were sized.
     - Stantec is to include a cross-section that shows the worst case scenario pond configuration that resulted in the proposed 150 m SWM corridor width. This cross-section should also show how the gravity versus the pump option was considered in the pond/corridor sizing.
     - The report should include a discussion on how the pond sizes and SWM corridors were developed for this project.
   - The Town recommended that all comments received and the related responses should be included in the report Appendices. All were in agreement.
   - The Town asked if any further studies would be required to confirm the available capacity in the downstream drains and the related pond outlet release rates that have been considered in this report.
     - Stantec confirmed that the downstream drain capacities have been based on information provided by the municipalities and standard *Drainage Act* procedures. This is considered a table top exercise since undertaking

surveys of all drains to calculate actual drain capacities is beyond the scope of this EA. The assessment produced small allowable release rates for the proposed ponds. Modification to these release rates are not expected to have a significant impact on the storage volumes required. Finalization of the ultimate drain capacities and related pond release rates is required in future functional design studies.

- The Town asked how, or if, climate change has been considered and if increased intensity storms have been modelled.
    - Increased intensity storm have not been modelled.
    - The report should include a discussion on the need to consider climate change in the future functional design studies.
    - The report should identify how the current conceptual pond designs have the ability to be modified within the recommended SWM corridors to provide for additional storage that may be required under future climate change scenarios.
    - The report should identify that, in addition to traditional stormwater ponds, future functional designs studies may need to consider LID alternatives. A list of potential LID alternatives should be included and it should be noted that all LID's may not be suitable for the existing physical constraints within the Essex Region.
- The Town requested that the final report be as detailed/specific as possible with regard to infrastructure needs and criteria.
    - Based on existing functional design studies that have been completed by the Town, all of the Town ponds will be required to be pumped. This criteria is to be included in the final report.
    - The City does not have functional design studies for their portion of the study area, however, they have advised that all sewers are to be dry between storm events. The City also advised that they want pond normal water elevations to be at or below the sewer inverts versus sewer dewatering pumps. Accordingly, if functional design results in sewers that are lower than the inverts of the outlet drains, pumping will be required. The report should include this criteria.

5. Review of Submitted ERCA comments:
    - ERCA raised a question about when the proposed improvements to the Upper Little River are required to be completed.
        - Stantec advised that the improvements are required to improve existing flood elevations in the Little River. With the proposed pond restrictions, development should not worsen the existing conditions if the improvements are not completed immediately. These channel improvements are also planned to address some of the anticipated fisheries offsetting needs. Accordingly, the need to undertake the improvements may be driven by when certain sections of the area are developed. The schedule for

  undertaking the improvements to the Upper Little River channel requires further discussion with the City.
  - The cross-sections of the proposed channel improvements for the Upper Little River, the 6th Concession Drain, etc. that were used in the hydraulic model should be included in the final report. This will provide the minimum channel dimensions required for flow conveyance and storage. All fisheries offsetting requirements would be an expansion of the minimum hydraulic channel dimensions.
- Stantec requested a copy of the 1992 City of Windsor Candidate Natural Heritage Site Biological Inventory Report. A copy of this report is attached to this e-mail.

The above provides a summary of the comments that were discussed during the conference call. Other comments were submitted that were not discussed. It was agreed that, prior to preparing the final report, Stantec will prepare a table that includes all of the comments provided and their proposed responses/method of addressing the comments for all to review. Once all parties have agreed with Stantec's proposed responses/method of addressing the comments, Stantec will prepare the final report.

It is desired by all parties to have the final report completed by the end of January 2017.

APPENDIX E

Part II Order Request

OCT 2 7 2017

October 27, 2017

Minister
Ministry of the Environment and Climate Change
Floor 11
77 Wellesley St. W.
Toronto, Ontario
M7A 2T5

Director, Environmental Approvals Branch
Ministry of the Environment and Climate Change
135 St. Clair Ave West, 1st Floor
Toronto, Ontario
M4V 1P5

John Henderson, P.Eng.
Water Resources Engineer
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311
Essex, Ontario
N8M 1Y6

Jayson Innes, M.A.Sc., P. Eng.
Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, Ontario
N2L 0A4

Dear Sirs:

Re: Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan

We are enclosing herewith our request for a Part 2 Order on the above mentioned proposal.

386823 Ontario Limited

William Balazs
Encl.

PART 11 ORDER SUBMISSION

Minister of the Environment and Climate Change

Ministry
Minister of the Environment and Climate Change
77 Wellesley West,
11th Floor, Ferguson Block,
Toronto, Ontario, M7A 2T5

Report Topic; Environment Assessment Environmental Study Report Windsor and Tecumseh Ontario (here in after referred to as ULRSWM-EA-Report or ULSWM-)

Dated; Oct. 26, 2017

Submission By;

386823 Ontario Limited (William F. and Theresa Balazs)– who are the registered owners of the property legally know as Part Lot 18,Conc 9, City of Windsor –PIN 75236-006 (LT) at 6825 County Road 42, Windsor, Ontario.

Location:

These lands' are located on the south side of County Road 42 and west of Little River and consist 28.3 acres/ 11.42 hectares of vacant lands that are farmed. (herein after referred to as - the subject lands or said land) - see figure #1, #2 and 3 (in this section, these are only used to provide a visual for location)

CC – As Listed Below;

-John Henderson, P. Eng.
Water Resources Engineer
Essex Region Conservation Authority
360 Fairview Avenue West --- Suite 311
Essex, Ontario, N8M 1Y6

-Jayson Innes, M. A. Sc., P. Eng.
Project Manager

Stantec Consulting Ltd.

100-300 Hagey Boulevard
Waterloo, Ontario, N2L 0A4

- Director, Environment Approvals Branch
Ministry of The Environment and Climate Change
135 St Clair Ave West, 1st Floor
Toronto ON M4V 1P5

-Philip D. McCullough
Salem, McCullough & Gibson

2828 Howard Avenue

Windsor, Ontario N8X 3Y3

Date; October 26, 2017

UPPER LITTLE RIVER WATERSHED MASTER DRAINAGE PLAN AND STORMWATER MANAGEMENT PLAN

386823 Ontario Limited is the owner of certain lands in the City of Windsor, that are adjacent to the Little River and will be significantly impacted by the above Storm Water Plan, which will also impact a significant number of neighboring lands.

We are responding to the notice which was published in The Windsor Star, regarding this plan, and for reasons below as outlined as follows, we object to the proposed plan and are seeking a Part II Order under the Environmental Assessment Act because we feel this project requires the intervention of the Minister of Environment either by way of mediation or imposing conditions on this proposal.

We will now set the reasons for our objection as follow;

386823 Ontario Limited

William F. Balszs
President

Table of Contents;

OBJECTIONS -----(COMMENTS AND CONCERNS:)

Before starting, it must be noted that this process as it relates to this specific EA is truly flawed, because this report consist of 625 pages to be reviewed and only allows a response time of 30 calendar days or approx. 19 working days to respond with comments.

In a nut shell, we had about 19 days to review the report, consult with legal counsel, sit down with any consultants, ask questions of the ministry of this process, ask questions/clarify with propponent and submit any comments or objection with in the outlined period.

It is also concerning that the Standing Committee for the city as well as the Mayor and City Council members have only now the first opportunity to view the report, that they had previously approved, without the knowledge of any further impact or lack of consideration to provide a process to compensate land owners inside the city or site location plan

The previous pages provide facts with illustrated views in support of our position.

We are very concerned that this Design Study will become the guiding document for stormwater management controls on the Upper little River, that will applied to upcoming project with respect to Lauzon Parkway and County Road 42 or current development (Hospital) and any future developments, as well as the statement in Code of Practice: Consultation/ section Glossary – commitment – once approved, the commitments within the document are often made legally binding as a condition of the approval

2.0 The Upper Little River EA Report outlines the OBJECTIVES as follows;

- The study area will be developed by multiple land owners and the preferred alternative should allow for individual land owners to proceed.

- 1) -to implement a cooperative and solution-direction approach to liaison with the property owners, general public and other representative leading to a consensus oriented design. -further reference of other key points state "a thorough approach **was taken to general liaison over the course of the project. At all times, constructive dialogue, in a cooperative environment,** was promoted so that the preferred concept represented a **consensus** oriented design"

- 2) –To identify – "and address how the identified solution can be planned to **best service future development lands, conserve the natural ecosystem, and reflect a cost effective and technically sound approach.**"

- 3) To summarize the above

3.2 Issues And Constraints;

- The only key point that has a significate issue is, attractiveness of SWM facilities near the Windsor International Airport to avian species.

* The 363..02 m of frontage of our land runs along County road 42, which is 40 m across the road from the Windsor International Airport and the fact they are just outside the 2 km radius from the airfield center (wild life control zone), this also covers a large section of airport lands.

3.4 Consultation Process

- A consultation plan was developed with the objective of targeting stakeholders potentially affected by the EA, while providing them with an opportunity to comment on the proposed improvements.

Meetings # 1 held on May 29, 2012 and the 2nd on Oct. 22, 2012, which also a PIC #2 for the Lauzon Parkway EA and the 3rd workshop for the Sandwich South Secondary Plan were held concurrently at the same location.

*- note a summary letter of the meeting that was held on November 28 ,2012 with individual " Stakeholders" is not reference as per letter (Fiqgure – 4) on Balazs's property

The content in the letter as it relates to SWM and its direct impact on development plans as it relate to the report/EA study have not been followed;

- The PIC details related information on the SWM EA were last presented in Oct. 22, 2012 with the next time any follow up or review was on September 22, 2017, that released the final completed report.
- ***1-**{that is almost 5 year since any up dated information}
- The Reserved Corridor Size was no not stated until the meeting held on Nov. 28th 2012 as less than 100 m to 125 m or 150 m and could be reduced subject to review of requirements and design, with the size to be split 50/50.
- Then on September 22, 2017 the new confirmed size was to be 325 m size corridor and 200 m on the tributaries. Note, - we were told at our meeting on Oct, 10th,2017 it would not be a 50/50 m split and it would be more like 225 m on said land and 100 m on east side of Little River.
  *2-{ the dramatic size change should have been communicated to or at a stakeholders meeting for land owners impacted by corridor size change before the report was released to allow for comments and address any issues}
  *3 as a result of the meeting they did agree to mark some of the lands as future employment, but continue to state the need to reserve the balance as Open Space> The change resulted from the fact that they had not justification to designate these lands as open space

The point *1 and * 2 do not support the (objective) evidence that land owner were involved in developing the study area, general liaison over the course of the project or any constructive dialogue in a cooperative environment or a consensus oriented design by impacted land owners from the period after Nov. 28th2012 to Sept. 2, 2017.

The point *3 does show how a targeted stakeholder, with discussion can change by constructive discussion a concern with respect to land use. (this process shows and meets the objective of involvement with stakeholders)

- It is further evidence with respect to intent of (Objective 2) that they did not address and identify a solution "that can be planned to -best service- future development lands and another one that reflect a cost effective and sound approach."
- As for (Objective 3) –Project Study does not contain any of the above objectives truly in summary, but rather presents or give perception of evidence that they have followed and included the requirements of the Code of Practice.

The study does not reference the impact of corridor size to land owners and restrict available lands for future development as well as the amount that will be placed in a hold pattern or frozen in time until development size and needs have been designed.

The study did not release any cost till now and it does not include any property cost or compensation values or process. *3 {again, no land owner involvement over the course of the study project, or being informed at all times with constructive dialogue, in cooperative environment, was promised so that the preferred concept represented a consensus design} (**no involvement or** being **informed at all time)**

The consultation plan (3.4 Consultation Process) lacks the evidence that it was developed with the objective of targeting/involving stakeholders potentially affect by the EA, while providing them with an opportunity to comment on the proposed study. Again, no involvement over the course of the study project being informed at all times with constructive dialogue in a cooperative environment.

It also needs to be stated that in Appendix C – page 297- email correspondence sent by John Henderson, dated 2016-12-21 outlining a brief summary of the main items discussed at a Project Team meeting. Review- Item #2 –" Plans are included that identify proposed land uses within the study area. Completion of this EA study does not result in changes in land uses." The report does reference a plan (Windsor South Sandwich Draft Secondary Plan) that shows proposed lands use (page 466 in App. G.)

The point I wish to make is that the EA Study can impact the land owner with respect to the corridor size, as well as it gives a perception that since lands are shown open space and will be referenced by the Project Team that they do not risked or cause an impact to a land owner assuming someone can in fact state that there is a major impact.

Further more- the section states, "this EA study covers a very large area. The report should identify, that EA Addendums may be required to address ultimate lands uses that may be proposed."

The study report not does reference any of the above, as well as a study for the Hospital Lands under County Road 42 Secondary Plan, which is underway and the reserve corridor size clearly does impact said lands and does restrict my land use available for development and does place a large portion of our lands in limbo as seen on (Figure - 14).

Note, as per (Figure -3) said land frontage is 363.02 m and the rear is 247.94 m and as per are understanding the impact of our share of 325 m corridor that will be 225 m, therefore the corridor will result in balance of about 138.02 frontage and the rear will be 22.94. It will clearly impact the potential for any land development into the future. Said lands will be frozen for development until the corridor size has been confirmed.

*{ We could miss out on being included " in the planned to best service future development lands". Per item 2 under objectives}

The Code of Practice also states in the Glossary that defines - " impact management measures" as follows, Measures which can lessen potential negative environmental effect(this is corridor size and land use) or enhance positive environment effect (this is corridor size and land use). These measure could include mitigation, compensation, or community enhancement."

One of the key point is compensation that has not been covered for a specific reason that we have not been informed or been involved in any discussion

-With respect to compensation the study does not reference or contain in any sections

- PIC 1 and PIC 2 in 2012 and the meeting of Nov. 28, 2012, were the only times any two-way exchange of communication process that occurred that involves affected and interested persons in the planning, implementation and monitory of the undertaking and further lacking a key objective, "over the course of the project" and again further evidence that over the period of almost 5 years (2017) since we have been allowed to provide or submit comments or permitted a two-way communication by interested persons and the public.

As well through this period (2012 to 2017) many email and correspondence letters were sent to members' of the Project Team, with specific reference to Anna Godo and Michael Cooke and none were found in App. C or our comment sheet submitted at PIC-2 in App. in 2012. (Times and Dates as outlined in package)

-Failure to provide all communications as they relate to the study and only a few were included to show evidence, that they followed the requirement as outline in Code of Practice.

7.0 Design Consideration

7.6 Climate Change

Under Consultation Requirement Based on Complexity and Environmental Sensitivity (the Project Study contains a section, Climate Change) therefore, one would assume that the reserved corridor size, that was only presented as a illustrate views with no real size in 2012, other than at Stakeholders meeting on November 28, 2012 of less than 100 m to 125 m or 150 m. and then the new sizes of 325 m on the river and 200 m on tributaries was released in this EA Study Report.
The fact that we are dealing with a dramatic increase in reserved corridor size, that will impact land owners directly and the fact that dealing with an increasing Environmental Sensitivity and Complexity with respect to Climate Change.

It must warrant a position of a upper level of Medium, if not High level as -Figure 1- in Code of Practice, that require affected land owners a greater consultation and a requirement of at least meeting to discuss the report before it was released for approval, to allow for comments and to address any proposed guide lines or process as it relates to compensation to be covered in the report. Please review figure -3 and figure 14 for possible impact to a said land owner.

As well this section states that it will continue to have a greater impact with an increase in frequency that it was a major factor in the SWM changes and they also stated at our meeting of Oct. 10, 2017, that they included a margin of safety to the increased corridor size to address Climate Change.

Clearly again no evidence and as per stated commitment to inform impacted parties throughout or on an ongoing notification process per objectives.

7.1 Windsor Airport- Avian Management

The section makes reference various radius (2 km and 4 km), that describe points of Zone of No Tolerance, Zone of No Confidence, and the preference of Dry Pond. They state that Wetland or wet ponds are accepted provided they meet certain conditions that **vary depending on the distance from the airport.** On airport property, permanent water is **not general permitted** and make reference to water treatment and must have features that minimize attraction of birds with specific reference to geese and gulls.

Note per report (CR191/2012) adoption by Windsor City Council on August 27,2012, make reference is currently working on completing Upper Little Storm Watershed and further state the potential to be used for storm water management facility for the overall development of the airport employment lands.

This study states the airport could utilize open space lands for a natural storm water treatment and possible detention. Swamp wetlands, due to high vegetation are not habitat species which rank high for risk and further state that stormwater feature could be designed and constructed between existing woodlots and provide for necessary parklands and more,(such as needed or outlined in the study that address the points used to grade the alternative and final present the prefer Alternative #6.

Note- the Airport Development Lands state they have 113.2 hectares of Total Open Space and that is located in the south east corner as well as vast amount **Developable Lands-354.0 Hectares,** with a significate amount along the north side of County Road 42.

This results in a combined total of **467.3 hectares** that can be used to support Upper little River SWM Master Drainage Plan.

We have throughout this process, at meetings and ask questions as to why they have not considered the airport lands be allowed to provide or supply/utilized a greater portion for the for the SWM plan. We did again ask at our meeting on Oct. 10th 2017 why the airport lands help with SWM, especially with the massive increase in corridor size resulting a greater impact on neighboring lands/ direct impacted land owners then presented in 2012.

We have been told by everyone from the City and ECRA that the airport lands cannot be used for any additional requirement because of the birds, no water contained ponds, cannot build new channels, or provide water treatment and will be required to control and maintain their outflow rates, as their facilities will not be required to help other neighboring lands or contribute to any cost sharing process to the system.

It must be noted that said lands of 11.42 hectares are 40 m directly south across from the airport property and our frontage of 363.02 runs along County Road 42 that divides us. They can clearly do everything on our lands as outlined in the study and that totally impacts our land use, as well a significant number of neighbouring lands.

This clearly presents and shows no consideration or intent to involve, give any input, to be transparent and act with a fair and in a just approach, that was present or outlined in the begin of this process, but rather the intent to isolate the airport lands from the plan for another purpose, or intent that will result in the development of these lands that will benefit the City of Windsor, while others will not be able to share or they will be delayed in possibly any development of their lands and if any remaining lands can be considered for a meaningful development.

We have been involved in many conversations/correspondences, meetings as of recently this past July 26, 2017 and after the report was released on Oct. 10th, 2017.

We feel or have an impression, that they did not have an answer or were not direct in response, as well as a sense of going in circles, or providing an explanation or discussing points, but not really providing an answer or resolve (ex, they have been in discussions since June 14, 2017 to provide for a process that will be fair and just in their approach, provide guidance, with required conditions, will account for time delays that may impact any benefit , a formula used for calculation and address any related items.)

They also at times were not straight forward or upfront, because they did not know what was going or, if they did know what was going on, they didn't want to share any of that information.

Summary:

CONFUSION -It must be noted- We were some what confused and miss directed as well required to review a lot of information at three meetings with a lot of cross referenced material, since on the day of October 22, 2012 the following PIC meeting were held at the same times and the same place: 1) Upper Little River Stormwater Master Plan EA Pic #2, Lauzon Parkway EA and the Sandwich South Secondary Plan EA . Submission were to be submitted by Nov. 5, 2012 for UPLRS MS PLAN EA and Stake- holders meeting was to held on Nov. 28, 2012.

The above has outlined the failure or the lack of involvement with the intent at all times for constructive dialogue, in a cooperation environment especially with myself or other land owners directly impact by the Stormwater Corridor.

This process did not allow for any further comments or criss-cross related correspondence to a Project Team member to be included, as well as any matters that are not outlined or part of the EA consultation process that they have outlined.

Clearly, we have been restricted in not being able to take part in the beginning as well throughout the process/plan over time.

At various times they have made statements, but now they have changed or now they are claiming, we were informed about a matter, but to the best of our knowledge they were never revealed.

They provided a reply on some question, but really did not answer the question, but go on to quoted an intent of the process, that no one else to date has provided a written reply or forwarded to another team member to confirm the correct reply.

On occasion they have answered a question, but it has confused us further.

They missed answering the question completely or confirming our understanding that we have been previously, but it seems to them they have answered with a full reply.

The Code of Practice, "The Environmental Assess Act defines environment to mean: per item, (c) The, social, **economic** and culture conditions that influence the life of humans or a community." The important word **economic (of the reserved corridor size) will influence the life of humans (will impact the life of lands owner) has not been addressed in this process, communicated or allow for input, as per their objective, "at all times throughout this process".**

They have not mentioned, or full addressed or included a section, that covers the requirement as stated above.

The other point is that we all have been under a crunched time line to address any issues, since we have not been allowed to sit down and review the document prior to Sept. 22 2017.

Conclusion:

- Must require a meeting with impacted land owner/stakeholder with respect to SWM and corridor size, that we allow them to point out issues and address the lack of information to be included in the process. (and fully transparent)
- Possibly consider ways to reduce the impact and look at transference to another landowner like the airport property
- The report states that any group or block of land owners may be able to work together to reduce facilities, as well as an individual must be required to have their facility to support other in the system.
- To make sure the land owner that will gain benefit will be required to follow a process that make those that cannot participate because of the impact, as a result of those land owners being required to support the SWM reserved corridors.
- A guidance that will provide assure that a fair and just compensation is outlined and includes all the land within the study

Note - there may be more to be included once the stakeholders meeting is held and a clearer understand of the study report may require additional requirements.

*Note-1) it is assumed if the any responses are submitted from directed individuals Mr. John Henderson or Jayson Innes, they will be forward to us.

Responses to be forwarded to the following senders;

Philip D. McCullough
Salem, McCullough &Gibson
2828 Howard Avenue
Windsor, Ontario N8X 3Y3

Email: salmmcc@netscape.net

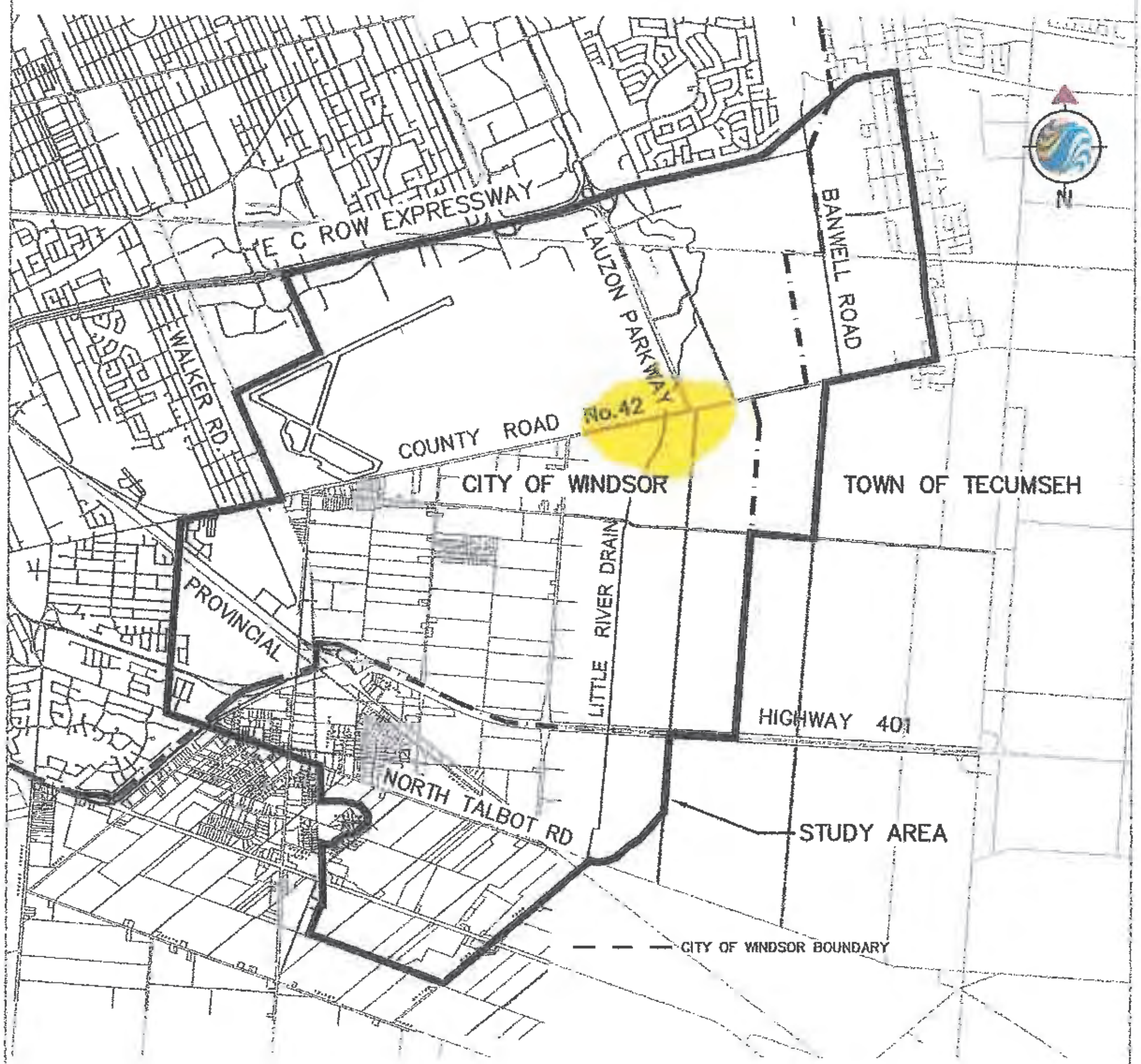
Telephone; 519 966 3633

William F. Balazs
386823 Ontario Limited
3850 Dougal Ave.
P.O. Box 31025
Windsor ON N9G 2Y2

Cell : 519 999 9698

Email; bbalazs452@ Hotmail.com

Note; Once- a File Number or Case Number has been assigned, please forward by email or by mail, thereby allowing us to have a reference # that can be labeled on the additional material to be forwarded.



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2017/01/25 1:46 PM By: Brook, Randy

ORIGINAL SHEET - ANSI A

September 2016
160311265

Client/Project

ESSEX REGION CONSERVATION AUTHORITY

Stantec

300 Hagey Blvd. Suite 100
Waterloo, ON, N2L 0A4
Tel. 519.579.4410
www.stantec.com

FIGURE-1

SITE PLAN LOCATION

YELLOW AREA CLOSER VIEW ON (FIG.-2)

Figure No.

1

Title

SITE LOCATION PLAN

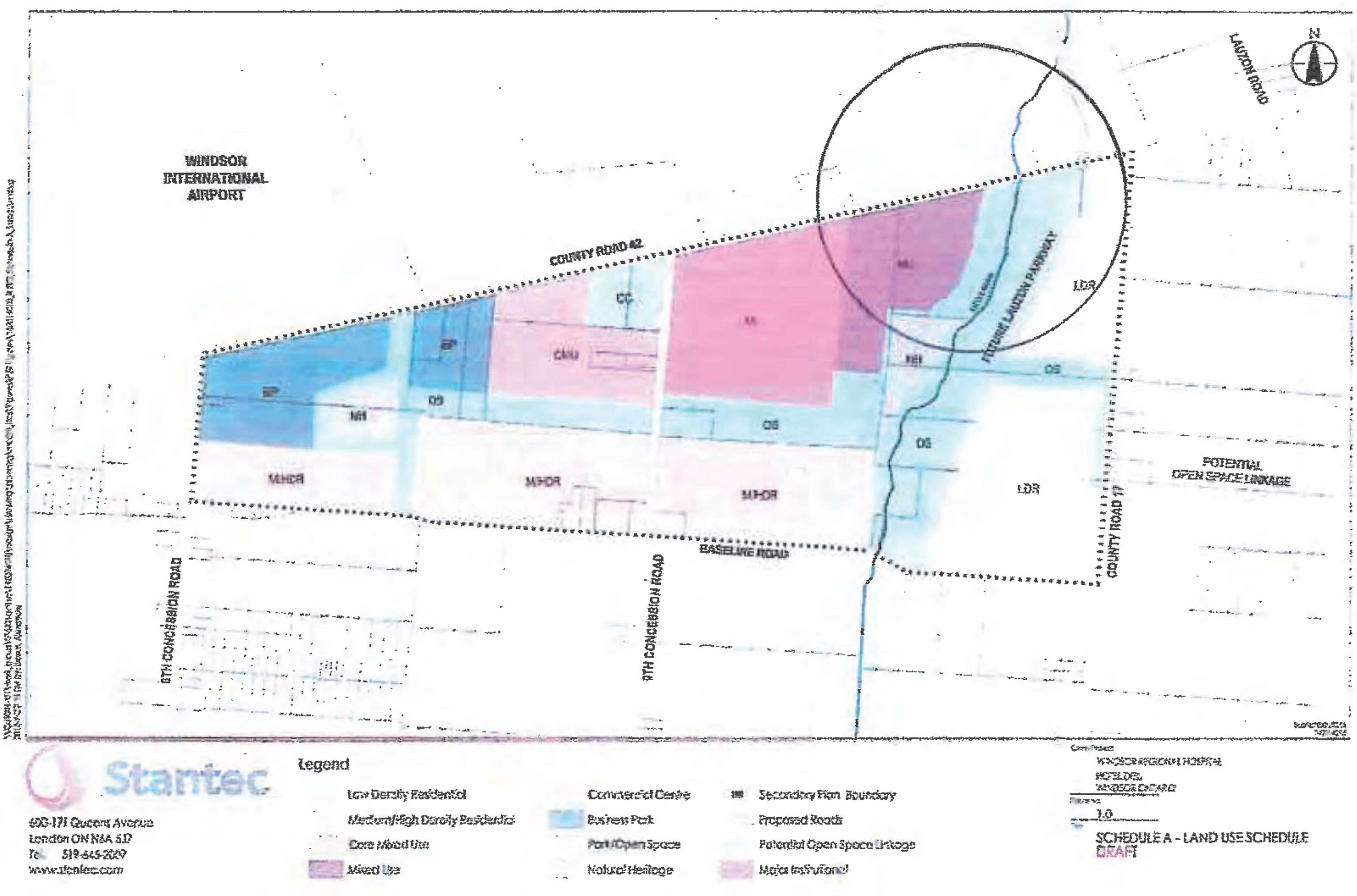


FIGURE -2

A ZOOMED VIEW OF SITE

BLACK CIRCLE BORDER ON (FIG-3)

TECHNICALLY PREFERRED PLAN

.KER ROAD TO CITY / COUNTY BOUNDARY

FIGURE -3
BLACK BORDED AREA YELLOW SHADE
6825 COUNTY ROAD 42
SUBJECT LAND

MRC McCORMICK RANKIN
A member of MMM GROUP

2655 North Sheridan Way, #300
Mississauga, Ontario, L5K 2P8
Tel: (905)823-8500
Fax: (905) 823-8503
E-mail: mrc@mrc.ca
Website: www.mrc.ca

STAKEHOLDER MEETING
MINUTES OF MEETING

PROJECT:	Lauzon Parkway Project		
STAKEHOLDER:	**Bill Balazs**		
FILE NO.:	3211012		
DATE:	November 28, 2012	**TIME:**	9:15 a.m. – 10:15 a.m.
PLACE:	City of Windsor Office - 1266 McDougall Street		
	Bill Balazs	386823 Ontario Limited	
	Theresa Balazs	386823 Ontario Limited	
	Rakesh Shreewastav	MTO Windsor BIIG	
	Bob Felker	MTO Windsor BIIG	
	Amber Turvey	MTO Windsor BIIG	
	Josette Eugeni	City of Windsor	
	Michael Cooke	City of Windsor	
	Anna Godo	City of Windsor	
	Michael Chiu	MRC	
PURPOSE:	To discuss the impacts of the proposed land use designation and the proposed Little River Corridor on Balazs's property.		

MEETING MINUTES:

1. R. Shreewastav provided a brief background of the study and noted that Mr. Balazs' concerns are mostly related to the Sandwich South Secondary Plan and the Stormwater Management Study.

2. B. Balazs advised that his property, which is located on the south side of CR 42 immediately to the west of Little River, was designated Open Space in the City's Official Plan in 2006. He has the following concerns/questions:

   - Concerns about the Open Space designation on his property
   - Would like to know more about the proposed Little River Stormwater Management Corridor
   - Have some questions about the widening of CR 42

3. Land Use Designation
   M. Cooke explained that the boundary of land use zoning typically uses property line as the demarcation line. Balazs's property is located next to Little River and the woodlot to the

FIGURE- 4 (3 pages)

LETTER – STAKEHOLDER MEETING

MINUTES OF MEETING

south, this has resulted in the Open Space designation. However, M. Cooke noted that the City is open to extending the Employment Land designation on the property immediately to the west into part of Balazs's property. The limit of the employment land designation will depend on identifying any negative impacts of proposed development on Little River and the woodlot. For the purpose of the Secondary Plan, the extension of the employment lands on to the Balazs property can be generally shown. The actual limit would be determined based on the findings of environmental studies that would be required as part of any future development proposal.

B. Balazs asked how much buffer would be needed for the river and the woodlot. M. Cooke advised that the property owner will need to submit at a future date, a development plan and demonstrate how the proposed development would not impact the natural features. He added that it is too early at this stage to define a 'line' now without details on the nature of the development and servicing study.

In summary, M. Cooke suggested that:

- The City will extend the employment land designation to include a portion of the Balazs' property
- This would confirm a development opportunity at the property subject to environmental study
- The City will prepare a draft of the change for review/consultation in the next 2 to 3 weeks
- The City will provide the draft for Balazs' review
- The exact limit of lands that can be developed for employment uses and those that must remain as open space will need to be determined in the future subject to additional development details and environmental studies

Bill Balazs' agreed but requested that the draft be provided to him and his counsel for review preferably before January 10 (prior to his vacation).

4. Little River Stormwater Management Corridor
   A. Godo explained that there are constraints to the stormwater measures that can be used in the area due to the need to decrease the attractiveness of wildlife and waterfowl in the vicinity of Windsor Airport. As a result, a wide Little River Corridor with a width between 100 m to 150 m is needed, i.e. approx. 50 m to 75 m each side from the centerline of the river.

   She noted that there is a possibility that the corridor width could be reduced subject to a review of further details based on future land development. The exact corridor width will be finalized on a case-by-case basis.

   She added that seven stormwater management alternatives were considered in selecting the preferred plan of Little River Corridor.

5. CR 42
   M. Chiu noted that the widening will occur on the north side only.

   A. Godo advised that the future widened CR 42 would have an urban cross section with curb and gutter. This means that the existing ditch on the south side would be removed.

She noted that there would be full municipal services on CR 42 including separate sanitary main and storm sewer. However, the timing of the widening and the associated municipal services are based on development in the area and therefore are not known at this time.

6. M. Chiu provided B. Balazs with hard copies of 5 exhibits (PIC displays) as previously requested by B. Balazs.

7. Replying to B. Balazs' question about the phasing of the Secondary Plan as shown on Schedule H, M. Cooke explained that the purpose of the phasing is to allow orderly development of the area to avoid clustering of developments. He noted that this applies mostly to residential areas and not to employment lands. He also noted that Balazs' property is abutting CR 42 and phasing does not apply to this property as much as to other residential areas. A. Godo reminded that the block/neighbourhood plans would still be required and at that time, servicing plans would be required for sanitary and storm systems.

8. M. Chiu advised that there would be no more Public Info Centre planned for the Lauzon Parkway EA Study. However, the Secondary Plan will be presented to the Planning and Economic Development Standing Committee, which is a public meeting, early in the new year.

9. R. Shreewastav noted that the Lauzon Parkway EA Study will be completed in Spring next year. An Environmental Study Report will be filed with the Ministry of Environment for a 30-day period public review. The public can If any party or individual feels there are significant outstanding issues that have not been adequately addressed, they could ask for a higher level of assessment so the issues could be addressed through a more detailed study. This is known as a Part II Order. R. Shreewastav also advised that there is no program committed for future phases of this project beyond the current EA Phase.

The foregoing represents the writer's understanding of the major items of discussion and the decisions reached and/or future actions required. If the above does not accurately represent the understanding of all parties attending, please notify the undersigned within 48 hours of receiving these minutes at 905-823-8500.

Minutes prepared by:
Michael Chiu, P.Eng.
MRC, A member of MMM Group

cc: Attendees

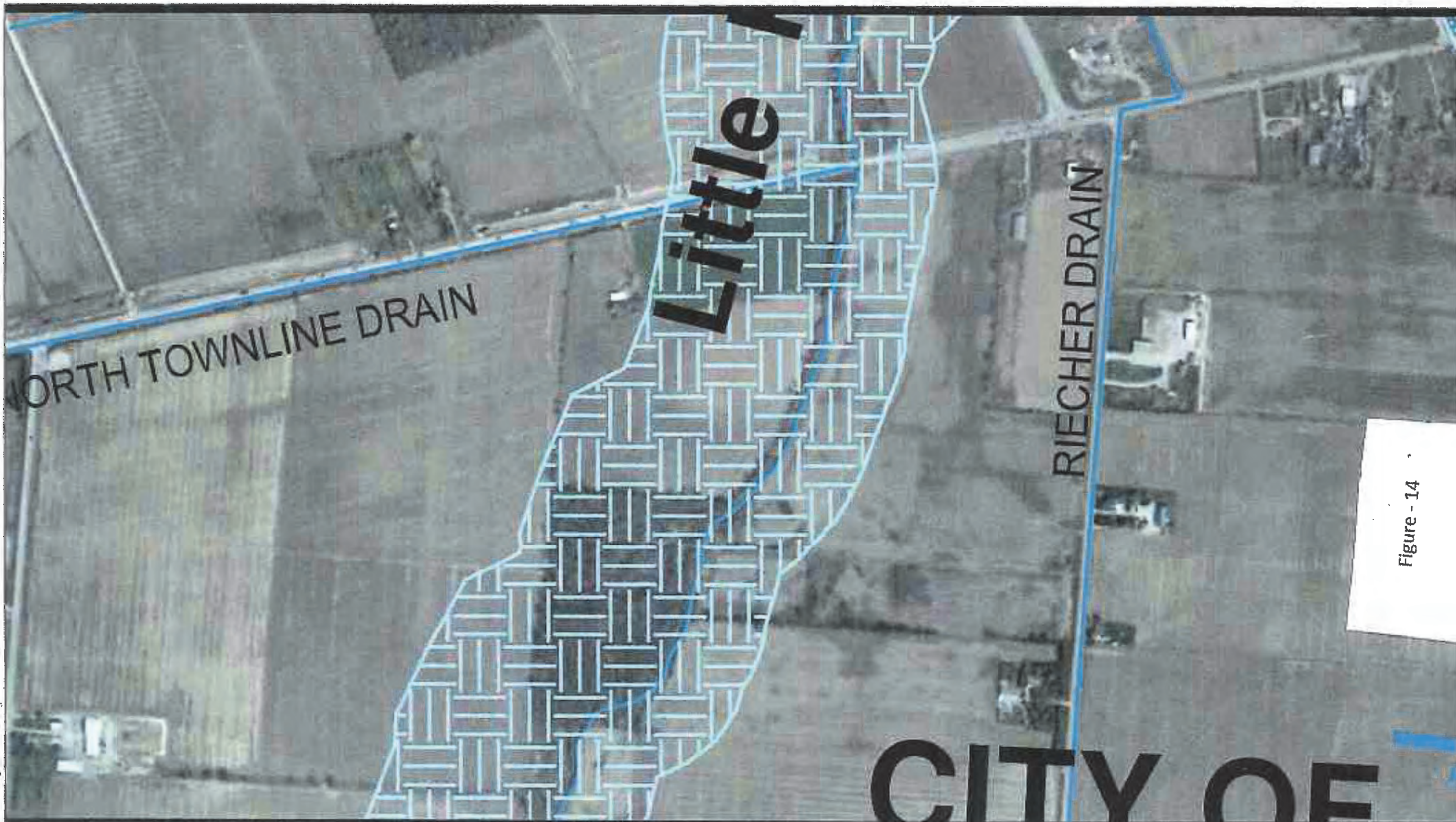


Figure - 14

Re: Planning Comment on EA Report

Ted Halwa <thalwa@bell.net>

Tue 2017-10-31 9:41 PM

To: Bill Balazs <bbalazs452@hotmail.com>;

While I would agree with the statement "completion of the EA does not result in changes of land uses" and the statement which follows "Other Planning Act processes must be followed............." it is important to recognize that the EA will provide the basis for any future land uses designations (i.e. Changes in land uses) in the EA study area. In fact, it should be anticipated that the City will, in short order, initiate changes to existing land use designations in the study area to ensure they are consistent with the completed EA. The basis for the changes will be the EA itself. If landowners are skeptical or have objections as to how the completed EA treats their holdings, they would be well advised to intervene at the EA stage before it is finalized and not wait until related amendments are brought forward to the Official Plan intended to ensure consistency with the EA. While it would be possible to wait and challenge the EA at the time amendments to the Official Plan are being considered to implement its preferred alternative, by that time the EA would have acquired status as an 'approved' document and challenges may effectively be found 'too little too late'

There is little question that in the case of the lands under the ownership of 386823 Ontario Limited (I.e. owned by you and your spouse), the preferred alternative recommend by the EA greatly impacts its future development potential to the extent that the limited amount of lands remaining and its configuration may adversely affect its viability to be developed.

Ted Halwa, MCIP, RPP
242 Edward Street,
Port Stanley, N5L 1A4
Cell 519-671-3083
E-mail thalwa@bell.net

From: Bill Balazs <bbalazs452@hotmail.com>
Date: Tuesday, October 24, 2017 at 2:02 PM
To: Ted Halwa <thalwa@bell.net>
Cc: "salmcc@netscape.net" <salmcc@netscape.net>
Subject: Comment on EA Rpoert

Good Day Ted;

Please provide your comment (per attach. email from study) as well as (scan 20171024) the full view of SWM Corridor and (scan 20171024 (2), which is a zoomed view, which specifically highlights our property around the word Little and shows our building.
Please note the impact of the corridor size and the balance of lands available for development.

Then review the brief summary email dated 2016-12-21, that was sent by John Henderson (from ECRA) with specific note of key individuals included and cc .(Anna Godo /City of Windsor Drainage Superintendent, and Jayson Innes/ from Stantec /responsible for preparing the Report/ Consulting Firm)

The section for your review and specific comment is item (2) " Plans are included that identify proposed land uses within the study area. Completion of this EA study does not result in changes in land uses." They do not comment on any impact to future land use, but do state further, " This EA covers a very large area. The report

Figure 21 (2 pages)

November 6th, 2017

Re: Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan

Submission By: 386823 Ontario Limited/ William F. Balazs

We are enclosing additional support information with Figures that relate to our submitted Part II Order of October 27, 2017 and email of October 30, 2017.

Minister
Ministry of the Environment and Climate Change
Floor 11
77 Wellesley St W.
Toronto, Ontario M7A 2T5

Dorothy Moszynski
Project Evaluator
Environmental Approvals Branch
Ministry of the Environment and Climate Change
135 St Clair Avenue
7th Floor
Toronto ON M4V 1P5

John Henderson, P.Eng.
Water Resources Engineer
Essex Region Conservation Authority
360 Fairview Ave West, Suite 311
Essex, Ontario
N8M 1Y6

Jayson Innes, M.A.Sc., P. Eng.
Project Manager Stantec Consulting Ltd
100-300 Hagey Boulevard
Waterloo, Ontario
N2L 0A4

386823 Ontario Limited

William F. Balazs

William F. Balazs

TABLE OF CONTENTS;

Summary: (Up Dated – Nov. 3rd, 2017)

CONFUSION -It must be noted- We were some what confused and miss directed as well required to review a lot of information at three meetings with a lot of cross referenced material, since on the day of October 22, 2012 the following PIC meeting were held at the same times and the same place: 1) Upper Little River Stormwater Master Plan EA Pic #2, Lauzon Parkway EA and the Sandwich South Secondary Plan EA . Submission were to be submitted by Nov. 5, 2012 for UPLRS MS PLAN EA and Stake- holders meeting was to held on Nov. 28, 2012.

The above has outlined the failure or the lack of involvement with the intent at all times for constructive dialogue, in a cooperation environment especially with myself or other land owners directly impact by the Stormwater Corridor.

This process did not allow for any further comments or criss-cross related correspondence to a Project Team member to be included, as well as any matters that are not outlined or part of the EA consultation process that they have outlined.

Clearly, we have been restricted in not being able to take part in the beginning as well throughout the process/plan over time.

At various times they have made statements, but now they have changed or now they are claiming, we were informed about a matter, but to the best of our knowledge they were never revealed.

They provided a reply on some question, but really did not answer the question, but go on to quoted an intent of the process, that no one else to date has provided a written reply or forwarded to another team member to confirm the correct reply.

On occasion they have answered a question, but it has confused us further.

They missed answering the question completely or confirming our understanding that we have been previously, but it seems to them they have answered with a full reply.

The Code of Practice, "The Environmental Assess Act defines environment to mean: per item, (c) The, social, **economic** and culture conditions that influence the life of humans or a community." The important word **economic (of the reserved corridor size) will influence the life of humans (will impact the life of lands owner) has not been addressed in this process, communicated or allow for input, as per their objective, "at all times throughout this process".**

They have not mentioned, or fully addressed or included a section, that covers the requirement as stated above, with reference to economics that will influence the life of humans (will impact the life of lands owners)

They, themselves have stated that the study purpose is to recommend (outline a process) as it relates too the strategy (provide guidance) under SWM to allow for development, with the input from the public.

The study has failed to include the above and have further stated the City Administration is reviewing the funding strategy, but it would clearly be understood that the study must have an outlined process or provide guidance/controls to follow or address the intent of covering impact individual stakeholders or those land owners, that can be restricted and delayed from development, that must address a fair and just strategy to compensate lands owners. Therefore, the study must include recommendations that will provide City Administration a process for addressing any future funding strategy with respect to infrastructure and development

This study has stated that the City of Windsor and the Town of Tecumseh area down stream from the study area is at capacity and it would be too costly to address any additional flows.
They have carefully protected the airport employments lands and have excluded them as an option to support SWM, because they have plans to benefit from future development as seen by the County Road 42 Road construction, with a round-about at Conc. 9 and Cty. Rd. 42 leading into airport lands.

It would seem that individual stakeholders across the street (40 m) will not be able to benefit from any development, but will be able to meet all of the requirement to support a SWM System not permitted on airport lands.

We have been always concerned with the key point (by Ted Halwa) from a completed EA having an acquired status as an approved document, that will negate any challenges, since they may well effectively be found to "too little and too late".

As further noted by Ted Halwa; **"that in the case of the lands under the ownership of 386823 Limited; the preferred alternative recommend by the EA impacts its future development potential to the extent that the limited amount of lands remaining and its configuration adversely affects its viability to be developed." (It clearly makes reference to today and into the future development, which is the key point as outlined in the study.)**

The area along Little River, South of County Road 42 to Baseline Road will be an import holding area to support SWM as seen by the size of the reserved corridor and meander belt, that will be needed to provide support to the system to the south beyond of Baseline, east and west along Baseline, east and west of County road 42, and north and south along Lauzon Parkway. Please reference study Figure # 16 page # 174 as illustrates Final Meander Belt Width and said lands under LRD-4.

The other point is that we all have been under a crunched time line to address any issues, since we have not been allowed to sit down and review the document prior to Sept. 22 2017. (almost 5 years, with major changes)

Please refer to Figure 12, 13, 15, 16 and the final impact on development of said lands as per completed study of Sept. 22,2017 with Figure 14 and the final conclusion that has not been addressed or avoided in the study and not answered in meetings or final group of questions.

Conclusion:

- Must require a meeting with impacted land owner/stakeholder with respect to SWM and corridor size, that we allow them to point out issues and address the lack of information to be included in the process. (and fully transparent)
- Possibly consider ways to reduce the impact and look at transference to another landowner like the airport property (City Of Windsor)
- The report states that any group or block of land owners may be able to work together to reduce facilities, as well as an individual must be required to have their facility to support other in the system.
- To make sure the land owner that will gain benefit will be required to follow a process that make sure those that cannot participate because of the impact, as a result of those land owners being required to support the SWM reserved corridors will also share and receive the same benefits.
- A guidance that will provide assure that a fair and just compensation as it relates to a delayed timeline or lost development is outlined as it relates to the SWM corridor/system.
- Must address key points as outlined in the Summary and be monitored or viewed by the Ministry for full compliance.

Note - there may be more to be included once the stakeholders meeting is held and a clearer understand of the study report may require additional requirements.

*Note-1) it is assumed if the any responses are submitted from directed individuals Mr. John Henderson or Jayson Innes, they will be forward to us.

Return to original page 8

BACKGROUND:

Subject lands' have been owned by the family since 1965

Even though these lands are immediately adjacent to the Little River there has never been a flooding issue of any kind and the land has been actively farmed for all of these years and continue, without any difficulty. The owners do not have any development plans underway but, do not want to have anything done to their lands that would significantly restrict their development potential.

Said land owner has been actively involved since 2007 on land use (Open Space and Little River Stormwater Corridor –SWM Corridor-) and with respect to this matter at PIC#1 and PIC#2 and the PIC meeting of Lauzon Parkway Improvement Class EA Study and included members from the Project Team for ULRSWM-EA (Michael Cooke and Anna Godo), which was held on Nov. 28th 2012.

Note-with reference to all or partial land designated as Open Space- subject lands do not have any supporting finds, justification or facts (such as a large flood plain) to be marked as Open Space with respect to Land Use. These lands do not have any natural features in supporting or justifying the amount of land potentially required to support the corridor size or open space. (Figure – 17 / Greenway System)

The only points with respect to said land that impact or influence the land use is the size of the Little River, which is about 20 m/65 ft. wide, as well the SWM corridor that addresses a possible flood plain size of 30 m / 98 ft.

Said land owner has attend meetings or reviewed matters reporting on the Extension of Lauzon Parkway, Reconstruction of County Road 42, Airport Property as it relates to (Land Use on the North Side of CTY Road 42, as it relates ideal condition available to support SWM and future employment, additional amendments to expand zoning, Solar Farm and purchase additional lands not owned on the airport site) , the discussions of the Sandwich South Secondary Plan on Land Use and the current discussion with respect to County Road 42 Secondary Plan on Lands Use as it relates to the hospital site.

Important Notation; As per the Stakeholders Meeting Minutes of November 28, 2012 prepared by, Michael Chiu, P. Eng./ MRC, A member Of MMM Group. (Figure- 4) and (Figure- 16)

Place; City of Windsor

Purpose; to discuss the influence/impact of the Little River SWM corridor of the development or proposed land use designation and proposed Little River Corridor on Balazs's property/ 386823 Ontario as well as guidance to the Lauzon Parkway Improvement ES Study

-Summary Points, that at that time did provided information about the SWM plan and the corridor size, which would outline and influence/impact land use to said land owner and concerns with respect to Lauzon Road Improvement.

-Little River Stormwater Management Corridor-

By Anna Godo/ City of Windsor; explained that there are constraints to the stormwater measures that can be used in the area due to the need to decrease the attraction of the wildlife and water fowl in the vicinity of the Windsor Airport. As a result, a wide Little River Corridor with a width between 100 m to 150 m is needed, ie. Approx. 50 m to 75 m each side from the centerline of the river.

She noted that there is a possibility that the corridor width could be reduced subject to a review of further details based on the future land development. The exact corridor width will be finalized on a case-by-case.

She added that seven stormwater management alternatives were considered in selecting the preferred plan of Little River.

-Land Use Designation-

Michael Cooke/ City of Windsor, did after discussion of our position with respect to SWM corridor and open space responded with a portion of said lands to include future employment, thereby reducing the amount of open space. He further stated that, " The exact limit of lands that can be developed for employment uses and those that remain as open space will need to be determined in the future subject to additional development details and environmental studies." We later concluded that both Anna Godo and Michael Cooke responses would be influenced/ impacted by SWM Study.

Response to minutes and additional points were sent to M. Chiu, M. Cooke, Anna Godo and cc attendees as follows;

Key Points-

A discussion of the extension of Lauzon parkway, with reference to road way location and little river will result in a portion remaining open/ or gap that permits the corridor to shifted east and therefore reducing the amount of corridor width on said lands. (figure 3).

It was also stated at the meeting that going forward and allowing the remaining portion to be marked Open Space and may be required by SWM, therefore will result in and impose restrictions or conditions, unfair limitations and be perceived as lands available for other uses such as the SWM Corridor and not for prime and premium valued lands for development and related compensation.

Again the clear conclusion is the fact that SWM Plan will set out guidance, requirements to be included, governing conditions, process to be followed and to be used in any future surelated EA Studies.

This is further supported by section B.5.6.1 Lauzon Parkway EA Study -Consultation with Individual Stakeholders (figure 18)- " to discuss their concerns regarding the land-use designation of their property in the Lauzon Parkway Study as well as the Sandwich South Secondary Plan and the Upper Little River Stormwater management Study.

The Lauzon Parkway EA does not designate land-use: therefore further correspondence with this owner was arranged through the Sandwich South Secondary Plan and Upper Little River Stormwater Management Study. "

Additional support was referenced in the Lauzon Parkway EA study and governing of ULTRSWM Study

By Jay Goldberg MMM Group (figure 5)

In regards to the comments about the Little River crossing of County road 42 (culvert DC1) and the proposed stormwater management ponds located northwest of the future County Road 42 & Lauzon Parkway intersection, DC1 is the existing culvert that conveys the existing crossing the Little River under County Road 42 and will be maintained in the future. Also, the exiting alignment of the Little River is being maintained from north of County Road 42 to south of Baseline Road. Roadway runoff from the improved County Road 42 will be accommodated via new storm sewers to be constructed under County Road 42 and by the proposed Upper Little River Class EA stormwater management plan. The County Road 42 storm sewers will outlet to the Little River and the ponds proposed on the north side of county Road 42 are required to provide water quality treatment. (letter shared with Anna Godo, P.Eng., City of Windsor contact for the Upper Little River Stormwater Master Plan study and CC to Michael Cooke form the City of Windsor).

Further involvement includes having our solicitor attend and speak at Standing Committee and solicitor and owner attending and spoke at City Council meeting that were requesting Direction for the Notice of Study Completion for the Upper little River Master Plan Environmental Assessment Planning Process to commence the 30 day review period. (none of these were reference in the Study or further follow-up correspondence from ULTRSWM Study and SSSP.)

Note: As per (Figure 6) the SSSP has been deferred, but as highlighted from Thom Hunt, City of Windsor City Planner " Together, all three studies (ULTRSWM Study EA, Lauzon Parkway EA, and SSSP **have worked together to comprehensively evaluate the future requirements of land use, transportation and stormwater management within the City of Windsor and beyond.)** As well as **the purpose to examine future requirements and environmental assessments.** (Note; Michael Cooke has also signed the letter/ Manager of Planning Policy for The City of Windsor/ and he is also a member of the Project Team for ULTRSWM Study)

*Further support to our conclusion that the ULTRSWM study/Corridor is the governing factor for land use that will influence said land owner.

Throughout this period many emails from said land owner have been sent to many individuals at City Hall, consulting firms performing the studies or attendees and correspondences from retained solicitor and planning consultant for the said land owner. (No reference in the report)

Note- Key Project Team Members or Attendees for the ULRMSWM EA Report for the City Of Windsor and ERCA.

Michael Cooke - City of Windsor - Project Team Member/ Manager of Planning Policy/ Project Team Member for ULTRSWM EA Study

Thom Hunt - City of Windsor - City Planner

Anna Godo - City of Windsor - Drainage Superintendent/ Project Team Member for ULTRSWM EA Study/ and City of Windsor contact for the ULTSWM Plan Study

Mark Winterton - City of Windsor - City Engineer

Don Wilson - City of Windsor - Manager of Development Applications

John Henderson - ERCA – Essex Region Conservation Authority

Jayson Innes - Stantec Project Manager for ULTRSWM EA

Representatives for (Balazs Land);

Philip McCullough ---- Solicitor

Ted Halwa ---- Planning Consultant

Other Key Contact;

Hilary Payne ---- City of Windsor, Councillor - Ward - 9

TIME LINE DATES AND INFORMATION:

--**October 17, 2007** -Meeting and correspondence from solicitor (Philip D. McCullough, Salem, McCullough and Gibson) **with** Jim Abbs and Thom Hunt from the City of Windsor Planning Department

--**2010** Airport Master Plan Land presented Land Use.

--**Oct. of 2011** adopted the Windsor International Airport- Master Plan of 2010 with further discussion of Provincially Designated Wetlands and related woodlots.

--**May 29, 2010** PIC #1 for the Upper Little River Stormwater Master Plan Assessment

--**October 22, 2012** PIC #2 for the Upper Little River Stormwater Master Plan Assessment as well the Lauzon Parkway EA, at the same location. (note- ULRSWMP to " have Finalized Environmental and File Class EA by the Winter of 2013 and the Lauzon EA is scheduled to end in 2013)

-- **November 28, 2012 Stakeholder** Meeting, (-these were individual meetings) as per Figure -4 and the list of attendees, with specific reference to Michael Cooke and Anna Godo from the City of Windsor

-- **January 2013** Hospital announcement and the final approval of SSSP placed on hold, with a key statement made by the City Planner of Windsor, Thom Hunt and confirmed by the Manager of Planning Policy for the City of Windsor, Michael Cooke.

-- Jan. 30,2013- SSSP letter -"While not formally part of the SSSP/ Lauzon EA processes, the Upper Little River Stormwater Master Plan Class EA (Little River EA) is also being conducted at the same time under the leadership of the Essex Region Conservation Authority and their consultant Stantec Engineering. **Together, all three studies have worked together to comprehensively evaluate the future requirements of land use, transportation and stormwater management within the City of Windsor and beyond.** (Figure – 6)

--**July 17,2013** a letter was sent to Michael Cooke Manager of Planning Policy for the City of Windsor from said land owner planning consultant (Ted L. Halwa, associate Planner with Monteith Brown Planning Consultants to assist them in dealing with issues potentially affecting their holdings. The letter references the fact that the SSSP process has been put "on hold" and that the ULRSM Plan EA has slowed, which further states it **may potentially have a direct impact on the subject said lands.**

--**2013&2014** Throughout the calendar year, the said land owner sent emails to main contact for the City of Windsor with respect to the ULRM plan study, requesting release time lines that forecasted upcoming dates' that would pass without any update till another request for status was requested.

- **Jan. 20th, 2014** the Lauzon Parkway Improvement Class EA Study and Report was released along with reconstruction of County Road 42 and included the Final Drainage and Stormwater Management Report per the Lauzon Parkway Class EA Study. (reference to follow up response in Fig 5)

-- **May and June of 2014** provide PIC of proposed Renewable Energy Project/ Windsor Solar Farm with Windsor International Airport property and Samsung

--2014 – year end Lauzon has received approval and no discussions of SSSP.

--**June 1st of 2015** changing or amending Future Employment Areas to expand and clarify designation, as it relates to Airport Lands in the City of Windsor, on the north side of County Road 42 between Concessions 8 and 9. It was stated in the report the stormwater management plan was also recently completed for the airport area. As well as a reference to the Economic Revitalization Community Improvement Plan with specific reference to employment land- particularly within the Sandwich South Planning Area and the Community Strategic Plan. This requested amendment was concurred by Thom Hunt/ City Planner for the City of Windsor and Don Wilson/ Manager of Development Applications.

--**July of 2015** the City of Windsor posted a notice of application for approval to Expropriated Land, these two separate lots' of land are located on the north side of County Road 42 on Airport Property, as well as just east of Conc. 9, across from the proposed hospital site on the south side of County Road 42.

-- **2015** Hospital Selection Committee releases selected site to be located on County Road 42 and ninth Concession, which is 154.7 m / 508 ft. west of subject lands'.

--**Throughout 2015**, various email were sent out for update on ULRSWM plan. The key point asked and replied, was the public review would be in the Spring of 2016 and the hope to have the final report by February 1st 2016 and to go before Standing Committee at the Feb.17,2016 meeting and then at the first available City Council meeting.

We asked, does the final report not require a public review before going to Standing Committee and City Council? The **required public information sessions on May 29, 2012 and Oct. 22, 2012** with the preferred alternative being presented at PIC#2 as **required** by the EA Process . We did asked to be notified when report will be released to allow for a review with a **reasonable** amount of time to provide comment and submissions, any changes to the corridor size as presented at Stakeholders meeting in the later part of 2012. As well, no response for having additional meetings. (only during 30 day review)

--August of 2015, Subject land owner receives and signs an - Agreement of Purchase and Sale- from a major developer, with various conditions and specific reference to -Zoning in Final form- means the fulfillment of the following conditions : -

"the by-law or by-laws which permit on the Property such use(s) which are satisfactory to the Buyer (the Rezoning By-law) have come into full force and effect and without limiting the generality of this requirement, with specific impact issues to official plan amendments necessary to ensure the conformity of the Rezoning By-law to the Official Plan and that no zoning or service impediment prevents the issuance pf the building permit."

Buyer and Seller (said land owner) attended an informal meeting with members from the City of Windsor Planning Department covering possible development of –said land-. The main point that would have an impact on any development was the finalization of the ULRSWM study, that may impact the Official Plan and zoning, corridor size and timing. The Buy after further review of development and potential conditions of SWM corridor, buyer forwarded a termination of this Purchase Agreement.

-- **Sept 7th, 2016** the 1st Draft of County Road 42 Corridor Secondary Plan was held with members of the Stantec Team and the City of Windsor. Recall seeing Don Wilson from the City of Windsor Planning Department and spoke with Nancy Reid, contact representative for said Project for Stantec.

An, important statement was contented in the notice- **The new Windsor Regional Hospital will serve not only the citizens of Windsor, but also residents of the broader Essex County and beyond.**

We spoke in length about land use and development, and corridor size as well as display board that illustrated the 100 year Flood Plain per ECRA, which clearly showed the flood plain would not exceed 40 m for 100 years and how it relates larger amount Open Space/ Park space or corridor size. (Figure-2) and the 100 Year Flood Plain (Figure -19) The display board showing the 100 Year Flood Plan was not included in the released summary.

As well, further discussion the influence of Park/Space Lands or SWM corridor lands and the possible consideration of lands being purchased and the compensation value must consider values for lost development and include a time line.(It would be a given, that some points would have been forwarded or discussed with Jayson Innes/ Stantec/ Project Manager ULRSWM EA Study

Nancy did receive email from Ted Halwa planning consultant with providing comments to lands use.

Fall of 2016 did ask Nancy Reid for update, the reply was that they are no longer involved and all information has been forwarded to the City of Windsor.

--**Balance of 2016 and early 2017** - many email exchanges were sent to Valerie Critchley/ City Clerk for the City of Windsor, Councillor, Hilary Payne/ City of Windsor, Mark Winterton, City Engineer/ City of Windsor as it relates to the matter of release of the ULRSWM study.

--**March 14, 2017** final a confirmed date was posted as public notice for the Standing Committee to have their meeting on March 22, 2017 at 4:30 at City Hall to hear the ULRSWM report.

The report contained about 19 pages, with same information outlining the preferred alternative and the other 5, and some additional section providing information

Key points covered- as per Recommended Alternative;

*The SWM facilities can provide controls for more than one property and will be located adjacent to a water course.

*Heavy vegetation adjacent to all water bodies and minimal open water will be implemented in order to make water features less attractive to bird species, a specific **request from the Windsor Airport.**

Risk Analysis;

* However, since the permanent stormwater management facility construction is not imminent/ this is confusing, since the city is looking at the upcoming new hospital, Lauzon Parkway/ County Road 42 reconstruction and other developments at this time.

Key points not included;

*Landed needed to be purchased, impact on land owner, compensation and no dollar values outlined in summary report.

* Did not contain any major changes like corridor size or changes to airport lands from original presentation.

The solicitor for said lands, attended meeting and asked for and adjournment, since said land owner was out of the country till March 30th 2017. (Figure- 7)

The committee stated that they cannot provide an adjournment and with some minimal discussion, if owner would be back for City Council meeting (that was confirmed by legal council) and a statement from councillor, Hilary Payne that the EA has been long in waiting and must go forward, then to pass to go City Council.

It would have been important for the committee to know that at the Stakeholders meeting of Nov.28,2012, that the SWM corridor was to be a width of 100 m to 150 m and could be further reduced subject to review of additional details based on future land development. ((fig. -4)

-Mar. 11 2017, email correspondence from Anna Godo, owner asked for the size of the corridor- and the new size as of 2017, - **almost 5 years later the corridor size along Little River from the north of the future East-West Arterial Road to CP Railway increased to 250 m, and 150 m wide along other tributaries.**

Further more, a statement that says, "these corridors are reserved until functional and detailed designs have confirmed the required corridor width, following which surplus lands will be released. (this creates delay to land owner, by being placed in limbo or frozen in time), (figure- 8)

Please note, that councillor- Hilary Payne and other Project Team Members(Joh Henderson) was included in the email from Anna Godo. (Not covered in Appendix C)

--**April 24, 2017**– Notice of Upper Little River Master Plan Environment Assessment- Filing the Notice of Study Completion (Ward 9)

Legal Council, for said land owner submitted letter as (per Figure-9) requesting the opportunity to address Council regarding this matter and Mr. William Balazs and the undersigned will be in attendance as a delegate at the Council meeting on Monday, April 24, 2017.

The above (Figure -9 A, B, C) was provided to Mayor, all Council Members and administrative members in attendance. As well the brief contains of Decision Number: CR247/2017 was also provided to Mayor and City Council and similar summary report to the Standing Committee.

The first to speak was Anna Godo, City of Windsor (Engineer III for SWM) and John Henderson from ERCA. They presented some factual information as it relates to the report.

Then the owner made a presentation with the following key points;

- Establishing in 2007- planned land use as Open Space/ per Official Plan clearly presents or resulting in a perception/ or misleading that the land use notation of Open Space and resulting in less compensation, that these lands can be available for the SWM corridor or reserved for a corridor . As well as troubling that we would be allowed to farm the lands until they are needed for the corridor.
- In Nov. 28 2012 at Stakeholders Meeting per (Figure-4), we were informed the corridor range may be less then 100 m to 150 m and a possibility that the corridor may be shifted or the width could be reduced subject to review and needs.

- But rather, as of March 14, 2017 we have been informed the corridor size has been increased to 250 m on the river and 150 m on tributaries , these lands will be reserved until designs have been confirmed and any surplus lands will be released, resulting in a period the will create and impact on land development being frozen in time. (Not contained in summary)

- no alternatives provides any projected cost values or amount of required lands to be purchased, addressing impact to land owner as it relates to compensation, or why airport lands cannot be used to support SWM. Especially with the large increase in corridor size.

-this process disallows any further discussion with the city or from the Mayor and City Council, but only by submitting objection by the Part II Order process.

- We requested the report must be sent back to administration, the support summary is missing some vital information as to the true size, cost impact, compensation and outline a process of addressing corridor lands being reserved by an unfair width or location resulting in placing land owners along Little River and tributaries to bear the full burden of lost opportunities and value, while other benefit.
- Did not cover any process or guidance that address any required controls, that would provide a fair and just compensation to potential impacted land owner, that would not be able to develop.

- The report must be changed to a Draft Report and presented to impacted land owners (stakeholders) along the corridor, that would allow everyone a chance to review and provide feed-back before the release of the report as a Part II Order.

Some councillors asked further question as to the dramatic size change and if anyone else has knowledge of the facts and with a request to have report released today, but the report is not complete and would be ready in about 6 weeks. (released, 5 months later)

But council was asked to approve the process and allow the report to be completed since it would be ready shortly for public review and in the meantime directing administration to have a meeting with Mr. William Balazs to discuss his concerns.

Council approved step 1 and 2 as requested per Decision Number CR-247/2017 **Be Directed to finalize and issue Notice** of **Study Completion.** (it would be interesting to know how council would have reacted with the new size of 325 m on the river and 200m for the tributaries.

We had a follow up meeting outside chambers with Mark Winterton , Anna Godo and John Henderson about setting up a meeting time to discuss concerns and the attendance from the planning department be included and concluded that they would provide possible dates and times.

--**May 09, 2017**, said land owner felt it to be import to sit with the planning department and refresh past discussions and discuss some current matters

-- **May 31st, 2017** - The following were in attendance, Thom Hunt Executive Director/ City Planner, responded with a date of May 31st 2017 consisting of owner, owner's solicitor, Philip McCullough, Thom Hunt/ City of Windsor, Michael Cooke/ City of Windsor and member of Project Team for ULRSWM Plan, Donald Wilson/City of Windsor and Justina Nwaesei/ City of Windsor.

Discussion started per meeting of 2007 involving Thom, Jim Phil and owner;

- designation of said lands marked as Open Space/ SWM Corridor for Planning and not future employment.

-the fact that we have followed the SSSP (that is still on hold), Extension of Lauzon Parkway, Reconstruction of County, Airport Property, land use as presented at Draft County Road 42 Corridor Secondary Plan (held on Sept. 7th, 2016 by Stantec), New Hospital Site and the Upper Little River SWM Master plan and corridor size, which will impact land use, lost development and compensation, since all plans are directly connected.

The meeting was in general with no real direction or specific response and presenting an impression of not being fully informed in all of above items or were not prepared to discuss. They did inform us that a County Road 42 Secondary Plan for review was occurring in June, 2017, with MHBC Planning Urban Design and Landscape Architecture. We spoke of the dramatic change in corridor size, but they presented an atmosphere of not sure of the impact and more or less said that it is their project and did not offer any possible influence that it may impact development. We also informed them we were awaiting for a scheduled meeting with team members relating to SWM and have requested their involvement.

--**June 14, 2017**- a Stakeholders Workshop for the County Road 42 Secondary Plan took place, with key points discussed as followed;

* review -of Open House held on September 7th, 2106 –location of hospital climate change (which has been a factor for more then, 10 years), revised word of Park/Open Space to be corrected to SWM System, reflecting larger corridor size to increase corridor size 250 m of river from County Road 42 to Baseline and tributary size of 150 m as represented by site plan for said Secondary Plan. (reference Figure- 2 and Option 1 Figure- 10)

* as well, we were informed that they will be looking at simulation of 300m along the river and 200m on tributaries

* why, is the airport property on part of this Secondary Plan, since it is located across the street of this corridor plan and what is their impact or required support for the SWN system.

* discussion of Land Us Options 1 and 2, with clear agreement to Option# 2 and some requested changes to be included and must provide a descriptive chart of permitted Uses by designation and a site map showing property lines

* a great amount of time by MHBC was spent on cost sharing and compensation and the fact that lands needed to support SWM system should and will be just, fair, and account for lost benefit of developing as it pertains to value.

* attendees were still confused by the understanding of landowners shall enter into a private cost sharing agreement or agreements amongst themselves for the distribution of cost/ compensation in an appropriate and orderly development of plan are equal distrusted among all landowners, which then bring timing into the discussion and result in frozen in time. (where does the hospital and airport come into this process)

*then finally – individual developments in Secondary Plan Area **shall generally not be approved until the subject landowner has become a party to the landowners' cost sharing agreement.** (the words "shall generally" can provide a back door for selective development to proceed without the required cost sharing agreement)

Further to the point MHBC stated, that they are awaiting direction and guidance from the City on this matter as to how they will approach the above matter. (Still, in review, since it is the City of Windsor's call)

Key attendees from the City, were Anna Godo/contact for ULTRSWM Plan for the City of Windsor and Justina Nwaesei/ Planning Department City of Windsor.

--July 5, 2017- Public Consultation Session County Road 42- Secondary Plan that did include some requested changes or additions(Figure- 11) property lines and SWM system) and some changes in Preferred Development Plan (as seen on Figure -12).

Subject lands' have been changed to Medium Density Residential, Ted Halwa our consulting planning and Mr. Balazs spoke with Carol Wiebe from MHBC and clearly stated we did not request any change from Option 1 per meeting of June 14, 2017. Carol stated that please submit corrected position.

Spoke of new corridor size and reports of June 14th and July 5th and did contain the same Preferred Alternative for UPLR Master Plan as per 2012, which may have been over looked as to impact by viewers

Again, the public did ask about airport property and what will be their requirements for the SWM System and their planned land use, why the change in size of the corridor that could be 300 m on river and 200m tributaries and how will the Land Acquisition Options work and be applied, as well as timing.

Again, MHBC have requested direction and guidance from the city on the process of Land Acquisition, but informed attendees at the meeting that the city is still in discussions.

In attendance from the City of Windsor was Anna Godo and Justina Nwaesei .

-- **July 17, 2017**-A request to Carol Wiebe was sent to set up a meeting in London to discuss key points as per PIC meeting held on July 5th, 2017. A response was received to confirm a date of July 27, 2017.

As well as a question was sent to Anna about the corridor going to 300 m and if it would be 150 m on each side of the corridor as per past practice?

Anna, responded with some dates for a meeting as instructed by Council on April 24, 2017, with us confirming that we will be there on July 26, 2017. Anna also stated that the draft report is illustrating a couple of scenarios for SWM facilities on each side of the corridor of 325 m and one SWM facility on the 200m corridor.

--- **July 26th, 2017**meeting at City Hall with owner Mr. William Balazs, solicitor/Phil McCullough, and the following from the City of Windsor, Mark Winterton, Don Wilson and Anna Godo, as well as John Henderson from ERCA.

The following outlines points of discussion;

*the topic of the Airport Property SWM report being completed – was stated by Anna that she didn't believe that report, but they will be responsible for all their own stormwater and contain their own lands

- note, statements have made reference to stormwater plan/ report having been completed as per Report No. 304 (M197-2015), which was adopted by Council on June 1st 2015 for amending Zoning By-law as it relates to Airport Lands' on the North Side of County 42; as well as reference to SWM/ drainage matters for the Samsung Solar Farm project on Airport Property, which reference Stormwater Management Report as per Draft Windsor Solar Report of November 2014..

*with respect to the 325 m corridor width, we asked about 50/50 split and impact to the Balazs lands; with a response - that it may not be 50/50 and may require a larger set- back on one side of the corridor and did not provide an further plans

* clarified the information per Anna on statement of 325 m per scenarios having facility on each side of corridor and one for 200 m section/tributaries. As well as address Climate Change.

*we asked about employment lands on airport property on the north side of County 42, but really didn't get any response.

* Anna and John did provide explanation why airport lands cannot be used to support the ULRSWM plan, with reference to restriction hazardous species (gulls and geese), wetland and open water facilities;

-- per CR 191/2012 that reference Airport Development Lands;

Provincially Designated Wetlands	30.4 Hectare	
120 m adjacent land/buffer	42.5	" "
Additional Open Space (linkage & storm water facility)	40.3	" "
Total open Space	113.2	" "
Total Developable Lands	354.0	" "

The above states Airport Lands have the potential to be used for a storm water management facility for the overall development of the airport employment lands. It also that will require limiting the attraction of wildlife (birds) to storm water retention features and stormwater retention to be considered for both the airport property **and within the vicinity of the airport. (said lands along County Road 42 are 40 m across the from the airport lands and the fact the airport lands have 354 hec. Employment Lands)**

It also states that the airport lands can be utilized these open space lands for a natural storm water treatment and possible detention. Swamp wetlands, due to high vegetation are not a habitat for gulls and geese, species which rank highest for risk to damage aircraft.

Clearly this provides for an ideal expansion of SWM lands with reference to above hectares available for employment lands

*With reference to Land Acquisitions/ Compensation as presented at MHBC:

-- that they recognize the philosophy of land owners compensated for taken lands, but we were reminded that per the Drainage Act , part of needed lands are now automatically encumbered and that the city never guaranteed any payment or cost sharing, as well as any requirement by the hospital or airport lands. We stated that per meetings held by MHBC these fact were presented and that they were awaiting direction from the city, as well as no reference to the Drainage Act and the fact that needed lands are now automatically encumbered for SWM management. (the Drainage Act does state that compensation for lands needed must be outlined)

-- we did ask if they have provided their direction for cost sharing and Land Acquisitions to MHBC,- they stated that the City are still have decisions on this matter.

* do to timing and commitments by attendees we could not get to the point of lands to be reserved until the full determination on amount lands needed, and any surplus lands would be returned and the intent of owners signing agreement of cost sharing and may allow for SWM plan to have facilities cover other properties to support the system.

*we did not get to ask about SWM impact on land use and their statement that SWM management plan will develop as developments occurs and how will it impact lands placed in reserve and in limbo or frozen in time.

* it must be noted that we felt they were a little evasive on some of their response, as well as avoided specifics and not wanting to fully share information.

--**July 27th 2017** Meeting with MHBC- Carol Wiebe/ MHBC, Eric Miles/MHBC, William Balazs/ Said Owner, Phil McCullough/Owner Solicitor, and Ted Halwa/ Planning Consultant.

* we discussed many points as it related lands use and description, change in our preferred designation from 1st meeting of option #1 shown as Business Type 2 and then why it was changed to Medium Density Residential, but it is reviewed by the city for input and direction as to their preference. We did further our request that why covered in our submission to her office on land use.

*We had quite a discussion about the SWM plan and the size of the corridor and fact that as of yesterday they are looking at 325 m along the main part of Little River from CP track to new road and that the tributaries were to 200 m as it relates to their current Secondary Plan along County Road 42. – stated that she had not heard of this change and are having difficulty in getting information out of the City of Windsor on the width of the stormwater corridor.

She also stated that the illustrations does not reflect the proposed size of 300 m corridor, but does show 250 m, with a larger position of the corridor on our lands and the fact that it is not 50/50.

* It was clearly understood that the SWM plan will impact the work on a Secondary Plan as it relates to Land Use and the amount land available and that it will impose time delays for development to land owners. (specially our lands)

*We spoke about the hospital lands and their plan for SWM and she did state that the hospital will contain and control SWM on their property for an interim period, but will connect into the system at a later date

* with reference on how to address land acquisitions/options with a process, Carol did say they are still waiting for guidance from the City of Windsor, but they have replied that they are still in discussions.

---**Aug. 17, 2017** An email was sent to Anna Godo, requesting for a follow up meeting to cover missed questions, as well as additional questions that resulted in our meeting with MHBC/ Carol Wiebe, but an out of office alert stating return September 1st 2017 was forwarded by Anna.

--- **Sept. 20th, 2017** received an email informing us the ULRSWM Plan EA will be advertised to start the 30-day review period on Thursday Sept. 21, 2017 and reminded us as per our last meeting, we agreed to meet with you by day 20 of review period and a further update was sent out extending the 30 day review was changed to October 30, 2017 and as the same date for any comments or objection to be sent to the Ministry of Environment and Climate Change.

--- **Oct 10th, 2017** -at 3:30 pm was the agreed date for the next meeting, with the following in attendance at the meeting; William Balazs/ Owner of Said Land, Phil McCullough/ legal council for owner, and from the City of Windsor was Thom Hunt, Michael Cooke, Mark Winterton, Anna Godo, Don Wilson, Wira Vendrasco as well as John Henderson from ERCA.

*We spoke about how the corridor size being less then 100 m to a range of 125 m or 150 m in Nov. 2012 at the Stakeholders meeting and now the fact that we are looking at 325 m on the river and 200 m on the tributaries per released report as of Sept. 22, 2017. (WE ARE TALKING ABOUT A SPREAD OF ALMOST 5 YEARS) At no time during PIC # 1 and #2 information package reference these corridor sizes.

Further more, most members of the Standing Committee did not know of these measurements from 2012 or the new size of 250 m, since their summary package did not reference any sizes, as well the presentation to the Mayor and City Council did not contain the new sizes of 250 m until our submitted letter by solicitor to city to be placed as a speaker at the Council Meeting of April 24th, 2017. The councillors were concerned that they went from 125 m to 250 and nobody knew about this major change, but through this process everyone is expected to make an informed decision

* another important fact that no one was told about any projected costs or included compensation values or process throughout this period until the report was release on Sept. 22, 2017. The report did cover Preliminary Opinion of Probable Costs 6.3 (page 6.20) as well as Appendix K. which have an addition line stating costs do not include property or pumping stations, that was not shown in section 6.3. We asked if these cost values presented account for the new sizes of 325 m river and tributaries, which was confirmed by John.

* We asked if the public, Standing Committee, Mayor and Council were provided with enough information and facts in order to make a fair decision. (with no real defined response)

* Mr. Balazs showed them an aerial type picture (Figure- 13(-zoom view of Figure 2)and Figure-3) per larger map, part of Lauzon Parkway) from the discussions of 2012 and the **impact of 325 m** corridor and the 225 portion over his lands and the other side would be 100 m (Figure -14 a zoomed view of page 187 report)

In general they did not have any response to the points and especially the aerial view, or providing any direction or answer for the remaining or portion of lands that are now; in a holding pattern till the process provides for surplus lands being returned, thereby, not be able to attract any development, but in the meantime we will not be allowed to develop, resulting in missed opportunities and value.

*John from ERCA, attempted to go through an explanation of various issues and identified the fact they need the 325 m width with no real backup information as to where the 325 came from, but stated they chose this number to be on the safe side. (Greatly impacting land owners, since they have a new allocation for the stormwater corridor consisting of 560 hectares.)

* John and Anna kept trying to justify the dramatically increased corridor size would be needed to support Climate Change. Note- Climate Change is not something that has only been around for 2 or 3 years.

*John provided some vague explanation as to why they cannot bring the water directly over to the airport and the fact the stormwater needed to be treated and it would be too difficult to use airport lands. We did state that we will not be able to have wet ponds/water retaining ponds, but rather dry or green ponds would be needed, since we are just outside the 2km wildlife control zone, which John stated that water retaining pond can go on our lands. (-it is interesting that they cannot bring water to airport lands, it must be treated and it would be too difficult on the airport lands, but 40 m across the street on our lands everything is possible, note (they do have the Rivard Drain on the airport lands or employment lands just north of County Road 42 to support all the requirements for SWM.)

Further to the point, they continue to ignore the fact that the Airport Lands would more than satisfy a large part of their drainage issues especially with the new corridor sizes.

*We did discuss that they will need a lot of land in order to complete their drainage for SWM, yet they failed to set forth in the released report any criteria, process and compensation. As well, they stated the City of Windsor will not take part in any construction or cover any cost or compensation, but the surrounding developers will be responsible for all to construct for (ponds, meander belt, flood plain, new channel, park lands and trials), construction costs, compensation costs and will be required to make a deal with Mr. Balazs to drain their lands through his property as it abuts Little River or required to support the SWM system. (Interesting the airport property is part of the supporting SWM System).

* We stated that Carol Wiebe from MHBC still needs the information to cover direction and guidance for land acquisition and compensation as per their presentation at both meetings. (They again stated they are still in discussion)

*Mark did provide a value or formula to acquire Mr. Balazs's lands as committed at last meeting. He asked what the current lands are zoned. Mr. Balazs stated agriculture, which Mark replied, what is the going rate for agriculture land, and that would be the value.

*John did confirm that no reported evidence of noted erosion, but it did have slight aggradation, with reference LRD-4 and Meander Belt width in that area would be 86 m.

** Note- this has always been our concern, since we will not be able to develop our lands and receive a fair and true value for these lands, but will be penalized, while others will benefit. What is the current value of stormwater management lands/park lands or opens space?

*At the end, Anna and John said they would address the issue of land acquisition/ compensation and outline the process, provide guide lines and requirements. As well, they talked of how to cover/include this issue in the report at this time.

Again, we got the impression that they were evasive, not forth coming, because they did not know or not sure how to reply, but if they did know, they did not want to share the information.

--.**Oct. 16, 2017,** additional questions to Anna Godo, John Henderson and Jayson Innes with reference to meeting of Oct. 10, 2017.

-- **Oct. 24, 2017,** reply, some questions were answered, but others were missed and did not really answer the question or made a statement not previously covered in any meetings. It was further stated that EA study did not have to report this matter.

-- **Oct. 25, 2017,** follow up with additional questions and requesting answer to previous questions not answered;

--**Oct. 26, 2017 reply,** some questions were answered, but others were stated that they are outside of the EA process or best speak to Planning Department.(Figure 20)

***** They state the Study purpose is to recommend a stormwater strategy (or guidance) to allow development – A preferred option was developed as a result of an evaluation of alternatives and public/agency input, and is considered representative of the most financially and physically appropriate option to achieve the required controls ----- in the context of urban development.**

***** They further state "– their understanding is that costs, timing and funding will be dealt with outside of the EA process, and advises that City Administration is meeting to review funding strategy with respect to infrastructure." (We want to know the process or guide lines they will be required to follow as part of the strategy as stated as a requirement.)**

-- Oct. 31 2017 , the following comments were provided by Ted Halwa (said land owner planning consultant; **" it is important to recognize that the EA will provide the basis for any future lands uses (i.e. Changes in land uses) designation in the EA study area." - any challenge – by that time the EA would have acquired status as an 'approved' document and challenges may effectively be found 'too little too late' "** (Figure 21)

Print Close

RE: Lauzon Parkway Improvements Class Environment Assessment

From: **Jay Goldberg** (GoldbergJ@mmm.ca)
Sent: April-10-14 2:22:30 PM
To: Bill Balazs (bbalazs452@hotmail.com)
Cc: rakesh.sheewastav@ontario.ca (rakesh.sheewastav@ontario.ca); Felker, Bob (Bob.Felker@ontario.ca) (Bob.Felker@ontario.ca); jeugeni@city.windsor.on.ca (jeugeni@city.windsor.on.ca); jmustac@countyofessex.on.ca (jmustac@countyofessex.on.ca); Michael Chiu (ChiuM@mmm.ca); Heather Templeton (TempletonH@mmm.ca); mcooke@city.windsor.on.ca (mcooke@city.windsor.on.ca); hpayne@city.windsor.on.ca (hpayne@city.windsor.on.ca); thalwa@mbpc.ca (thalwa@mbpc.ca); salmcc@netscape.net (salmcc@netscape.net); Simona Simion (ssimion@city.windsor.on.ca) (ssimion@city.windsor.on.ca); 'Godo, Anna' (agodo@city.windsor.on.ca)

Dear Mr. Balazs,

On behalf of the Ministry of Transportation (MTO), City of Windsor and County of Essex, thank you for submitting comments on the Environmental Study Report (ESR) for the Lauzon Parkway Improvements Class Environmental Assessment (EA) Study.

As you have indicated, the land use designations applying to your parcel is a matter to be addressed in the Sandwich South Secondary Plan, and not this EA. At this time the proposed Sandwich South Secondary Plan, which was carried out in parallel to the Lauzon Parkway EA Study, is deferred until after the Lauzon Parkway Environmental Assessment is completed and approved. For further information regarding the draft Sandwich South Secondary Plan, please contact Michael Cooke, MCIP, RPP - Manager of Policy Planning at (519) 255-6543 x 6102 or Simona Simion - Planner II at (519) 255-6543 x 6397.

In regards to the comments about the Little River crossing of County Road 42 (culvert DC1) and the proposed stormwater management ponds located northwest of the future County Road 42 & Lauzon Parkway intersection, DC1 is the existing culvert that conveys the existing crossing of the Little River under County Road 42 and will be maintained in the future. Also, the existing alignment of the Little River is being maintained from north of County Road 42 to south of Baseline Road. Roadway runoff from the improved County Road 42 will be accommodated via new storm sewers to be constructed under County Road 42 and by the proposed Upper Little River (ULR) Class EA stormwater management plan. The County Road 42 storm sewers will outlet to the Little River and the ponds proposed on the north side of County Road 42 are required to provide water quality treatment.

FIGURE -5 (2 pages)

LETTER – EMAIL RE: LAUAZON PARKWAY IMPROVEMENT (REPLY)

With respect to timing of design and construction of the proposed improvements, at this time there is no commitment to move forward with the subsequent design or any other phases of this project.

By copy of this letter, we are sharing your comments with Anna Godo, P.Eng., City of Windsor contact for the Upper Little River Stormwater Master Plan study.

Thank you for your continued interest in this study.

Regards,

Jay Goldberg,

On behalf of the Lauzon Parkway Improvements Project Team

Jay Goldberg

Planner

Transportation – Planning

MMM Group Limited

2655 North Sheridan Way, Suite 300

Mississauga, ON Canada L5K 2P8

t: 905.823.8500 x1284 | f: 905.823.8503

GoldbergJ@mmm.ca | www.mmm.ca

THE CORPORATION OF THE CITY OF WINDSOR

Memo

To: Planning and Economic Development Standing Committee (P&EDSC)

From: Thom Hunt, City Planner, MCIP, RPP

Date: January 30, 2013

Subject: Deferral Request - Draft Sandwich South Secondary Plan (OPA No. 91 – OPA/3586) LL# 16333

In April 2011, work began on the preparation of a secondary plan for lands identified as the Sandwich South Secondary Plan (see Figure 1). The Sandwich South Secondary Plan (SSSP) represents a land area of approximately 1345 ha which is predominantly used for agricultural purposes. In addition to the current mix of residential properties, the study area also includes a number of natural heritage features including woodlots and the Little River watershed. The purpose of the draft SSSP is to establish detailed land use policies and land use designations to allow for the future urban development of the area.

As a result of discussions held between the City Planner and City Engineer in 2010, the SSSP and the Lauzon Parkway Class Environmental Assessment (Lauzon EA) together became part of an integrated process being overseen by the Ministry of Transportation. In this regard, the SSSP and the Lauzon EA have been conducted in a parallel process. Partners to the process have included provincial ministries, County of Essex, Town of Tecumseh, Town of Lakeshore and the City of Windsor. Consultants are Meridian/MHBC Planning (SSSP) under the direction of Jim Dyment and McCormick Rankin (Lauzon EA) under the direction of Michael Chiu.

The purpose of the Lauzon EA is to examine the future requirements and environmental assessment for the following: Lauzon Parkway (extension south to Highway 3); County Road 42 (improvements between Walker Road and Essex County Road 25); and a proposed east-west arterial road (between Walker Road and County Road 17). The public review period for Lauzon Parkway EA is scheduled to end in 2013.

While not formally part of the SSSP/Lauzon EA processes, the Upper Little River Stormwater Master Plan Class Environmental Assessment (Little River EA) is also being conducted at the same time under the leadership of the Essex Region Conservation Authority and their consultant Stantec Engineering. Together, all three studies have worked together to comprehensively evaluate the future requirements of land use, transportation and stormwater management within the City of Windsor and beyond.

Based on discussions recently held between the City Planner, City Solicitor and City Engineer, it is being recommended that the formal review of the draft SSSP by the Planning and Economic

Figure – 6 (3 pages)

Development Standing Committee be deferred until the completion and final approval of the Lauzon EA expected mid-2013.

Michael Cooke, MCIP, RPP
Manager of Planning Policy

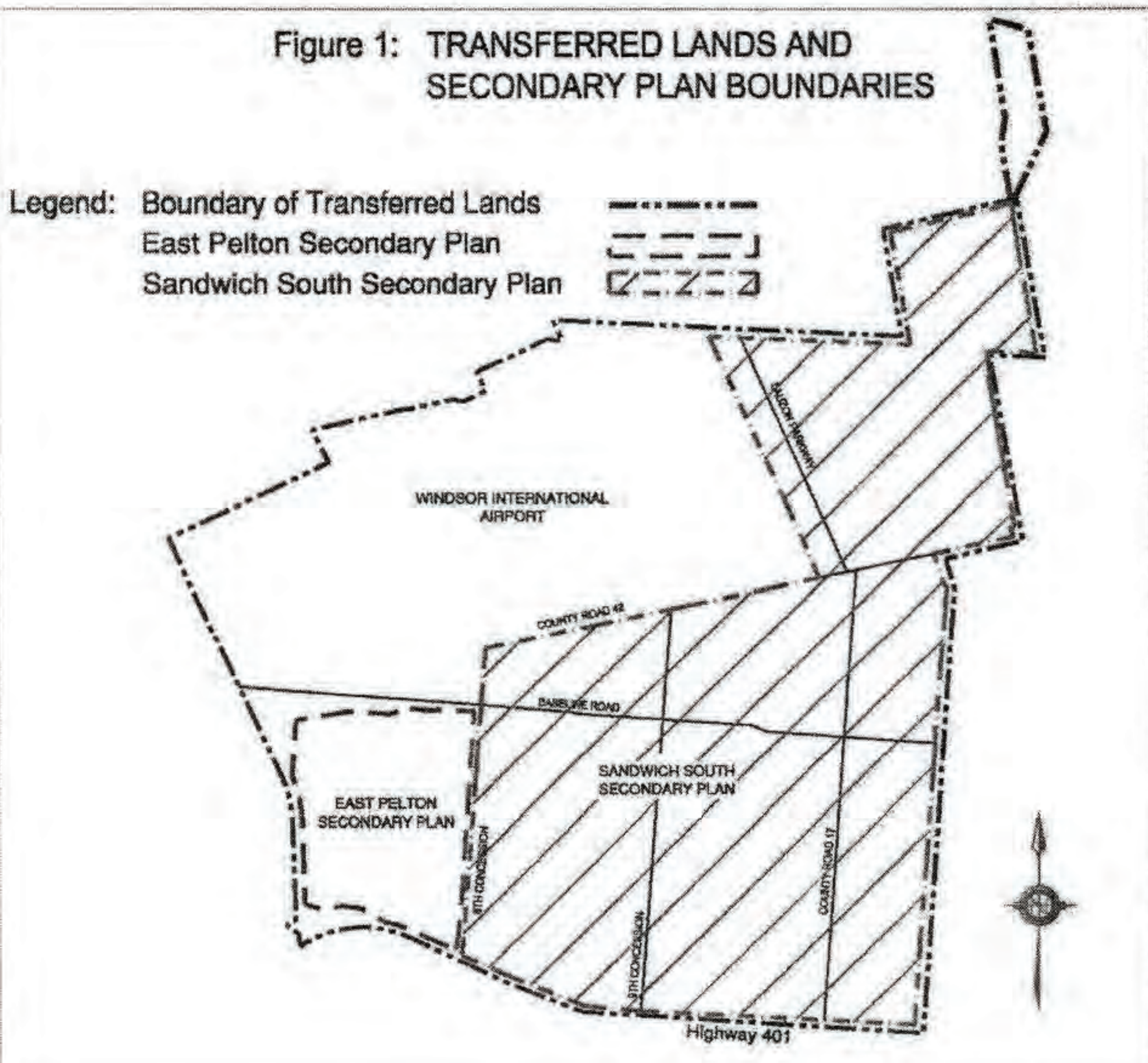
Thom Hunt, MCIP, RPP
City Planner

Mario Sonego
City Engineer

GW

HR

Figure 1: TRANSFERRED LANDS AND SECONDARY PLAN BOUNDARIES



RE: March 22, 2017 ETPS Standing Committee meeting

Godo, Anna <agodo@citywindsor.ca>

Tue 2017-03-14 2:52 PM

Inbox

To: 'Bill Balazs' <bbalazs452@hotmail.com>; Toldo, Beth <toldob@citywindsor.ca>; 'jhenderson@erca.org' <jhenderson@erca.org>; 'bhillman@tecumseh.ca' <bhillman@tecumseh.ca>; 'pmccullough@smglawyers.com' <pmccullough@smglawyers.com>;

250 m = 820 FT
125 m = 410 FT

Cc: Ted Halwa <thalwa@mbpc.ca>; Payne, Hilary <hpayne@citywindsor.ca>;

Bill,
The stormwater management corridors are 250m wide along Little River from north of the future East-West Arterial Road to CP Railway, and 150m wide along other tributaries.
These corridors are reserved until functional and detailed designs have confirmed the required corridor width, following which surplus lands will be released.
With regards,
Anna

From: Bill Balazs [mailto:bbalazs452@hotmail.com]
Sent: Saturday, March 11, 2017 9:06 AM
To: Godo, Anna; Toldo, Beth; 'jhenderson@erca.org'; 'bhillman@tecumseh.ca'; 'pmccullough@smglawyers.com'
Cc: Ted Halwa; Payne, Hilary
Subject: Re: March 22, 2017 ETPS Standing Committee meeting

Thank you for providing a location for a better resolution from PIC#2 as well as PIC#1
Please provide the proposed size of the Storm Water Management Corridor
Regards
William F. Balazs

From: Godo, Anna <agodo@citywindsor.ca>
Sent: March 10, 2017 4:20 PM
To: 'Bill Balazs'; Toldo, Beth; 'jhenderson@erca.org'; 'bhillman@tecumseh.ca'; 'pmccullough@smglawyers.com'
Cc: Ted Halwa
Subject: RE: March 22, 2017 ETPS Standing Committee meeting

Bill:

The display boards for PIC #2 are available at a better resolution at <http://www.citywindsor.ca/residents/Construction/Environmental-Assessments-Master-Plans/Pages/Upper-Little-River-EA.aspx> This includes the preferred solution sheet.

Figure – 7

SALEM, McCULLOUGH & GIBSON

PROFESSIONAL CORPORATION

Barristers and Solicitors

William A. Salem, B.A., LL.B. *(Retired)*
Philip D. McCullough, B.A., LL.B.
Deborah-Lynn Gibson, LL.B.

2828 Howard Avenue
Windsor, Ontario N8X 3Y3
Telephone (519) 966-3633
Fax (519) 972-7788
Email: salmcc@netscape.net

14 March 2017

Sent by Email: toldob@citywindsor.ca

Attention: Beth Toldo, Council Agenda Coordinator
Council Services Department, Office of the City Clerk
Corporation of the City of Windsor
350 City Hall Square West, Rm 203
Windsor, ON N9A 6S1

Dear Madam:

RE: Upper Little River Master Plan Environmental Assessment – Filing the Notice of Study Completion (Ward 9)
Our Client: 386823 Ontario Limited
Property: Part Lot 18, Conc. 9 – Vacant land on Cty Rd 42

We are solicitors for 386823 Ontario Limited who are the registerd owners of the property legally known as Part Lot 18, Conc 9, City of Windsor – PIN 75236-0066 (LT). These lands front onto County Rd 42 and are immediately adjacent on the eastern side of my client's lands with the Little River.

A shareholder of 386823 Ontario Limited, William Balazs has been communicating with various municipal officers over the last several years in relation to this property. He is currently out of the country on vacation and will not be returning until March 30th, 2017.

The major concern over the years has been the possibile negative impact on these lands as to how any proposed development will be impacted by the Little River drainage issues.

As I indicated above this problem has continued for several years and my client feels it quite important to deal with this matter personally. On that basis, we will be seeking a deferral of the meeting scheduled for Wednesday, March 22nd, 2017. I would like to be listed as a delegate on the communication only for the purposes of seeking an adjournment.

Yours truly,
SALEM, McCULLOUGH & GIBSON

Philip D. McCullough

PDM:at

Cc: 386823 Ontario Limited – Attention: William Balazs
Hilary Payne
Ted Halwa

Figure – 8

SALEM, McCULLOUGH & GIBSON
PROFESSIONAL CORPORATION
Barristers and Solicitors

William A. Salem, B.A., LL.B. *(Retired)*
Philip D. McCullough, B.A., LL.B.
Deborah-Lynn Gibson, LL.B.

2828 Howard Avenue
Windsor, Ontario N8X 3Y3
Telephone (519) 966-3633
Fax (519) 972-7788
Email: salmcc@netscape.net

21 April 2017

Sent by Email: kstuart@citywindsor.ca
And sent by Fax: 519-255-6868

Attention: Kelly Stuart
Council Services Department, Office of the City Clerk
Corporation of the City of Windsor
350 City Hall Square West, Rm 203
Windsor, ON N9A 6S1

Dear Madam:

RE: Upper Little River Master Plan Environmental Assessment – Filing the Notice of Study Completion (Ward 9)
Our Client: 386823 Ontario Limited
Property: Part Lot 18, Conc. 9 – Vacant land on Cty Rd 42

We are solicitors for 386823 Ontario Limited who are the registered owners of the property legally known as Part Lot 18, Conc 9, City of Windsor – PIN 75236-0066 (LT). These lands front onto County Rd 42 and are immediately adjacent on the eastern side of my client's lands with the Little River as shown on the attached map.

Our client's family have owned this property since 1965.

Even though their lands are immediately adjacent to the Little River there has never been a flooding issue of any kind and the land has been actively farmed for all of those years without any difficulty. My clients do not have any development plans underway but, do not, want to have anything done to their lands that would significantly restrict their development potential.

Mr. William Balazs, the president of the corporation, has been actively involved since 2007 on land use (Open Space) and with respect to this matter at PIC#1 and PIC#2 and the Stake Holders Meeting since approximately 2012. He has attempted to attend all of the meetings and listened to administration's proposal and presented our position and objections.

As well, he has attended meetings or reviewed matters reporting on the Extension of Lauzon Parkway, Reconstruction of County Road 42, Airport Property as it relates to (Land Use on the North Side of CTY 42, Solar Farm, additional land purchased on north of County 42) and the discussions of the Sandwich South Secondary Plan on Land Use.

The most disturbing thing that has come out from these discussions is the proposal to have a designated "Open Space" storm water management corridors that would be 250 meters wide along Little River. This 250 meter corridor would extend the entire depth of our client's lands. We have 28.3 acres and we have done a quick math, which means we will loss 13.6 acres of land to corridor. This corridor of 250m wide along Little River runs from the north of the future East-West Arterial Road to CP Railway.

Figure – 9 (3 pages)

Additionally, the proposal as we understand it, is that any tributaries of the Little River would have a storm water management corridor of 150 meters wide along any tributaries of the Little River. Finally it's has been stated the corridors' are (Reserved) until functional and detailed designs have confirmed the required width, following which surplus lands will be (Released).

We have some other questions with some items requiring explanation. We also want to check if our positions presented at these meetings have been addressed or what has been said is reflected in the final report. At the Stake Holders Meeting held in 2012 we were told the corridor could be less then 100m or 150m and they wish to use the Land Use description of Open Space to cover the possible requirements of the Little River Corridor, therefore providing reason to only give us a portion of said land changed to Future Employment and a large balance to remain Open Space. These are strong words –Open Space- to only reserve lands.

We understand that there is a full report forthcoming on the Upper Little River Master Pan Environmental Assessment-Filing the Notice of Study Completion, Ward 9. We have not yet received that Report nor has Council seen that Report.

As we understand this process, once the council gives direction to the Administration of the report it must go to 30-days Public Review with the above mentioned final report being available only at that time. We understand Council will only see the full report during the 30 day period. Members will also have the report available.

The public only have one way to have their objections heard through the Part II Order, which requires them to file any objection to the Minster of the Environment. The Minister will undertake a review and render a decision. We will have no further follow-up with the City or parties involved.

The effect of the storm water corridor that would be 250 meters wide will have a devastating effect on our client's use of their lands and would have a crippling effect on the value of their property. Further, we will be held in limbo until things are confirmed and miss any potential development. The key question, who is paying for the corridor lands/Open Space that will require the creation of low lands and rolling landscape with facilities, since we have no natural environment on existing lands.

It is our view that City Council should conclude the report is not complete or final and send it back to administration and insists that administration provides some credible evidence to support their demand for such an unfairly wide storm water management corridor, as well a clear break down of capital cost and who will pay for the corridor lands/Open Space. We would also request a change of the final report to a Draft, thereby allowing a public review of the report with feedback for all parties, since the last review was 2012.

We do not want council giving direction to this process based on a seven page summary with a 10 page attached appendix. In the past the City has clearly stated they are transparent, fair and will not be placed in a position that might later give rise to a private property owner claiming the city was unfairly restricting development rights or compensation.

We would like the opportunity to address Council regarding this matter and Mr. William Balazs and the undersigned will be in attendance as a delegate at the Council meeting on Monday, April 24th, 2017.

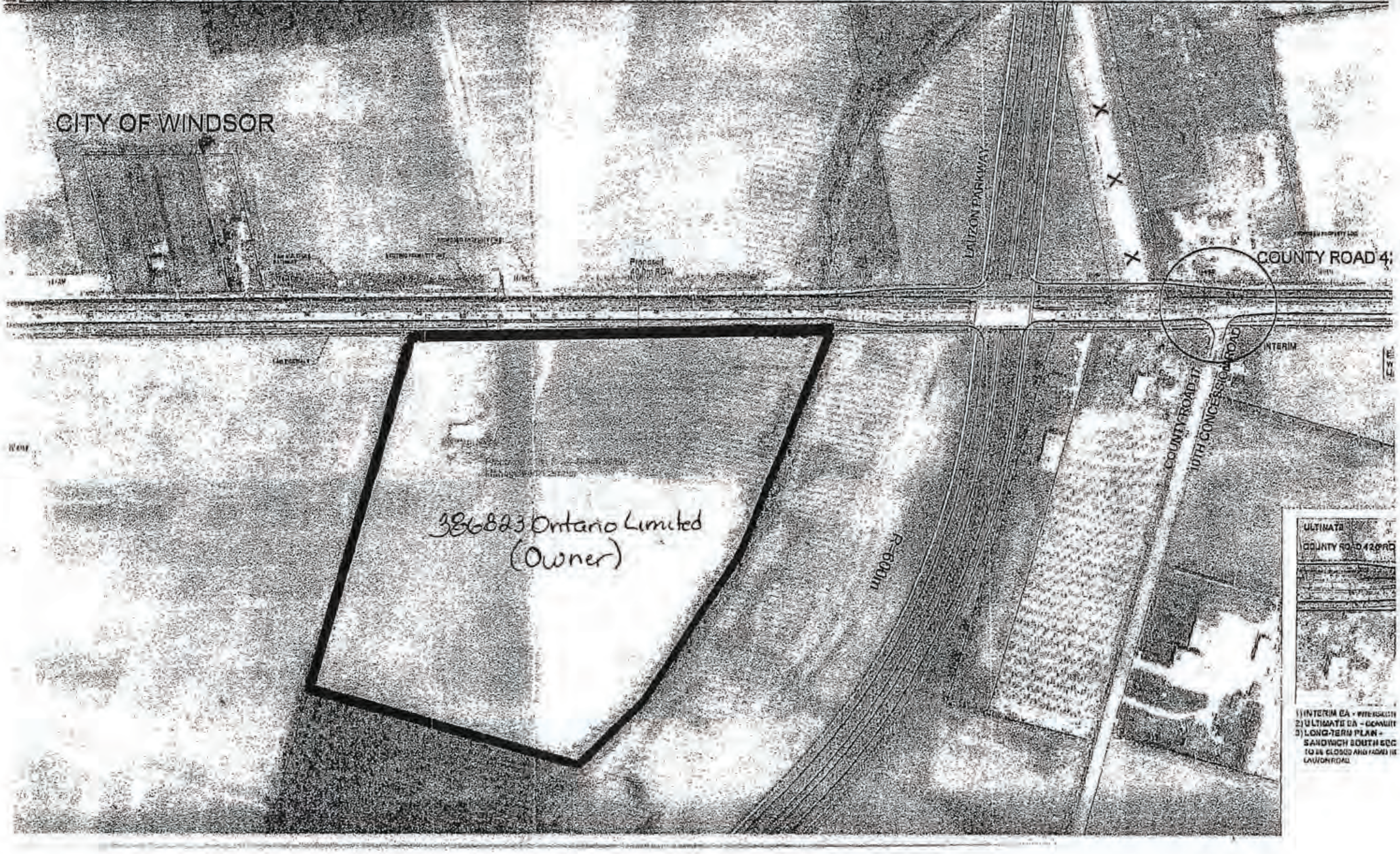
Yours truly,
SALEM, McCULLOUGH & GIBSON

Philip D. McCullough

PDM:at

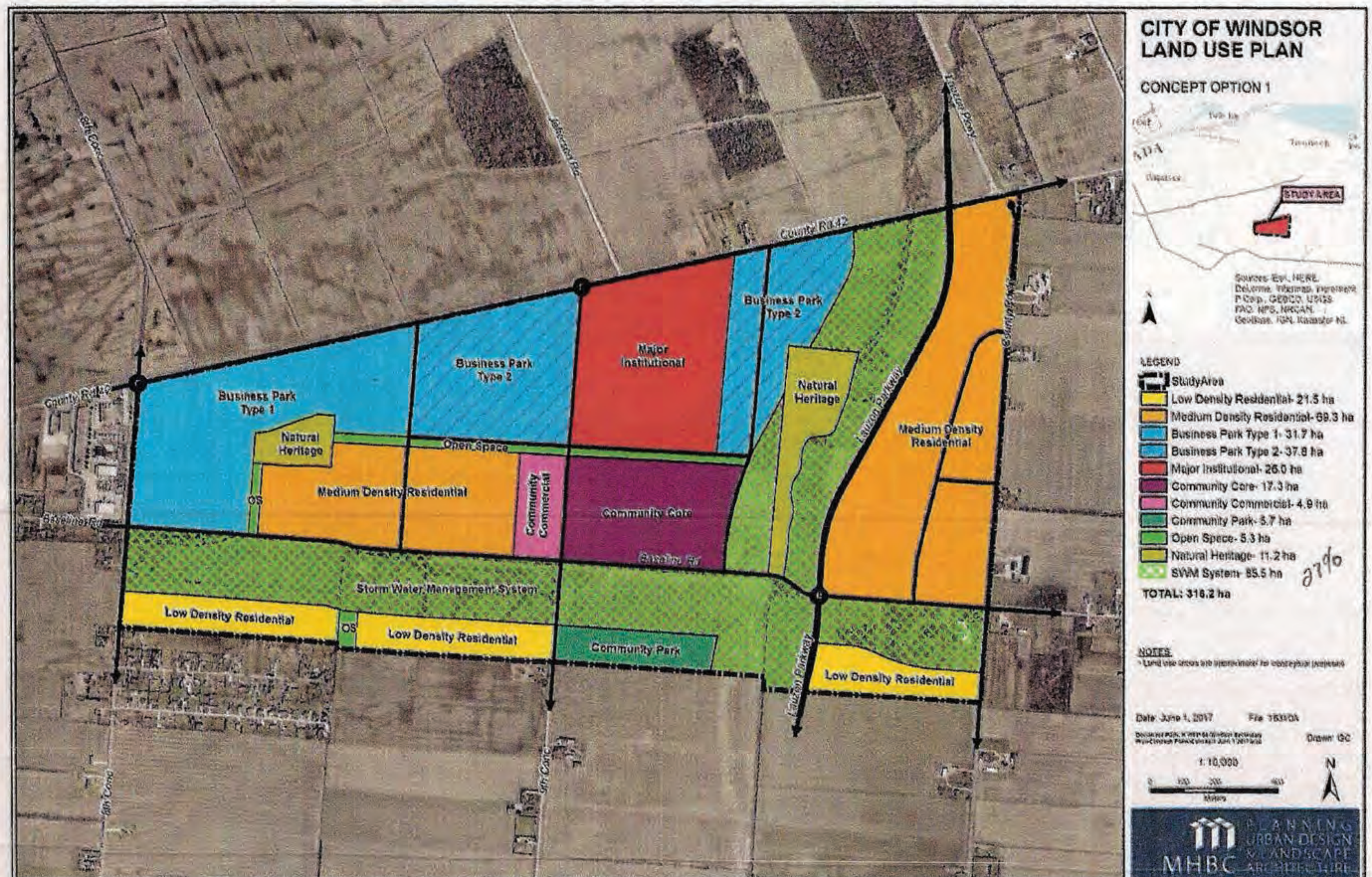
Cc: 386823 Ontario Limited – Attention: William Balazs
Hilary Payne
Ted Halwa

TECHNICALLY PREFERRED PLAN
LKER ROAD TO CITY / COUNTY BOUNDARY



Option 1

Figure – 10



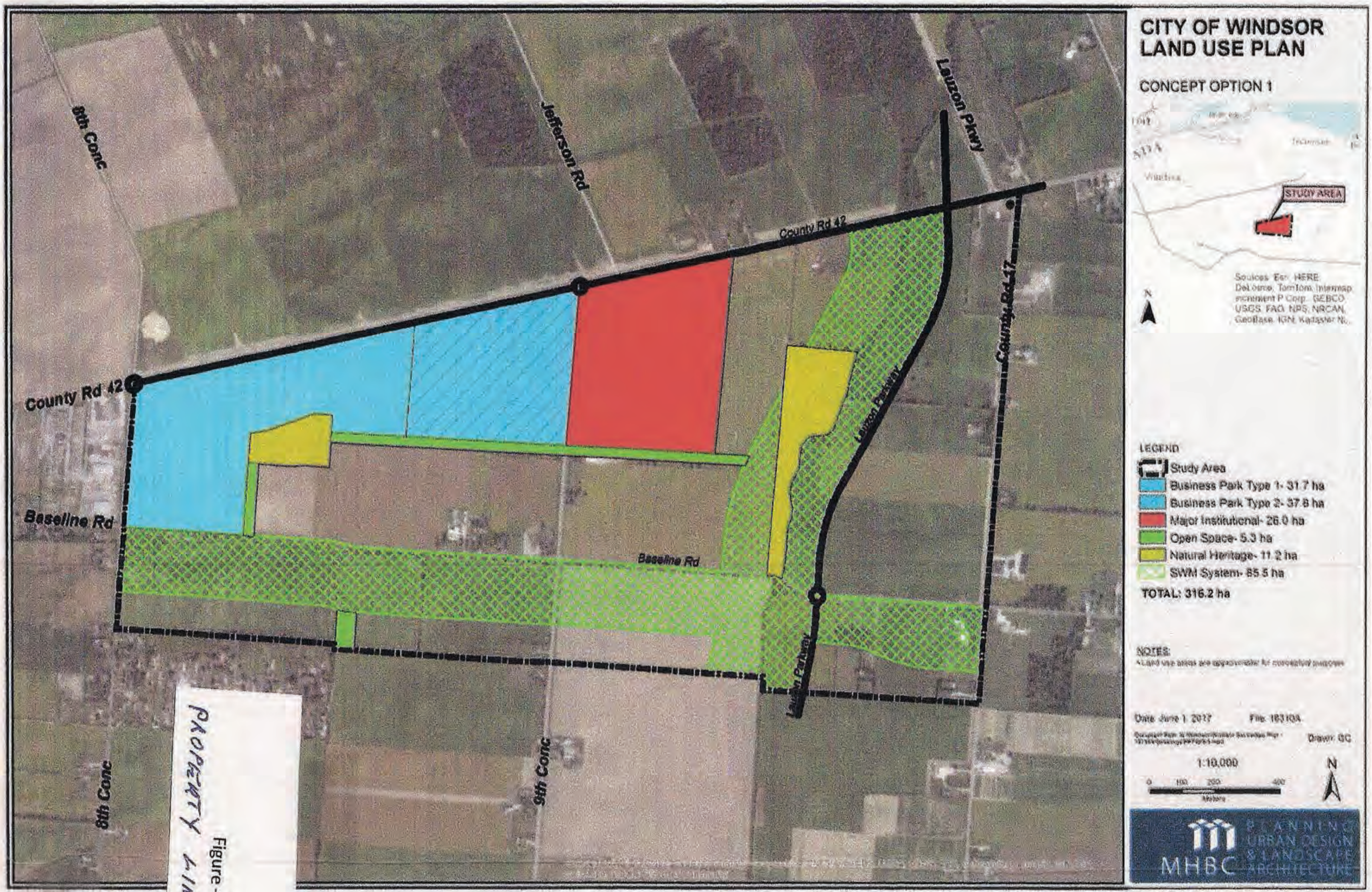


Figure – 11
PROPERTY LINES

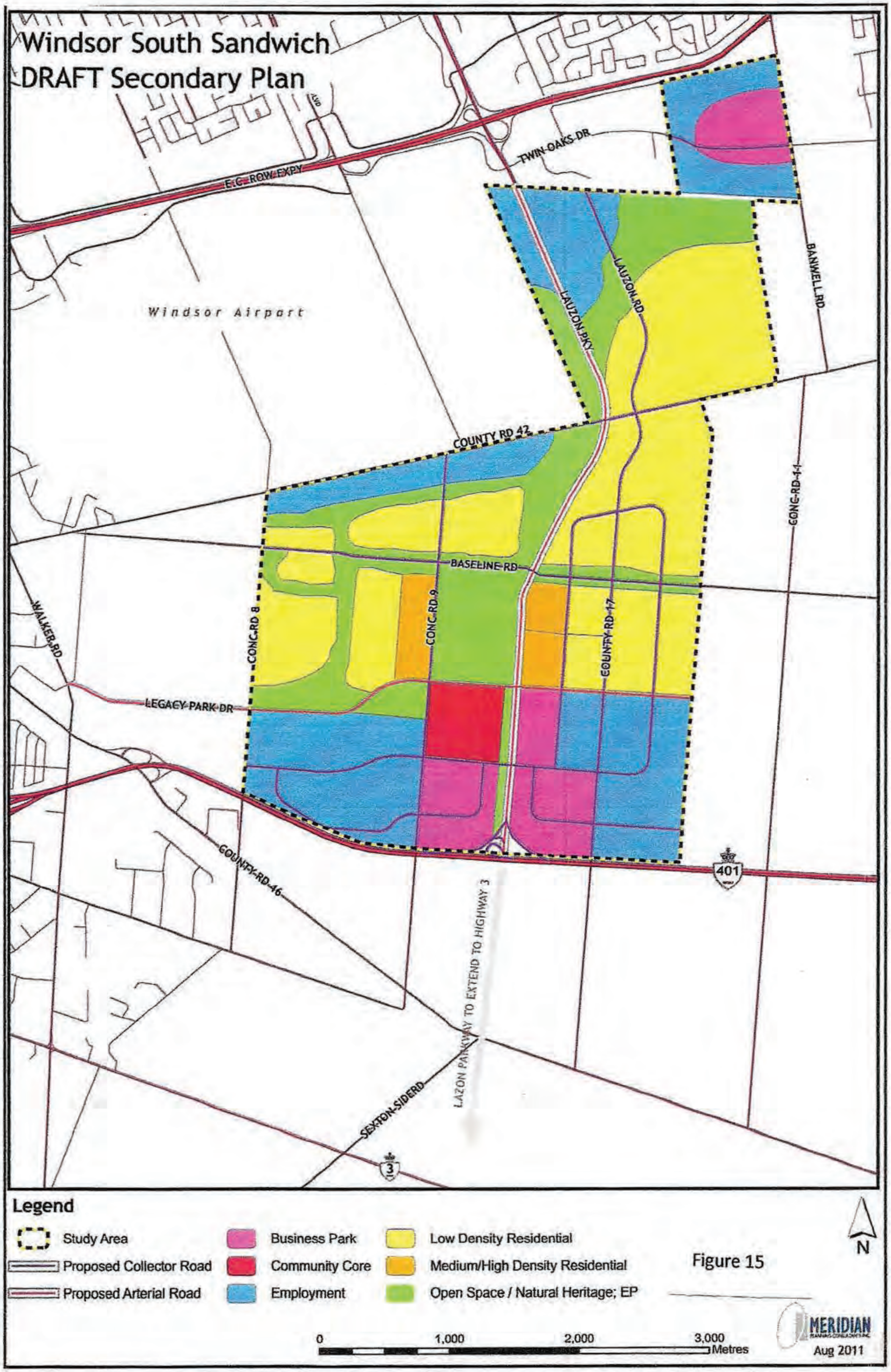
pg 12.

Preferred Development Plan

Figure – 12

Figure - 13


UNTY ROAD 42
MU
OS
MU
NH
FUTURE LAUZON PARKWAY
OS
LDR
OS
MU
POTENTIAL
OPEN SPACE LINKAGE


Windsor South Sandwich
DRAFT Secondary Plan
E.C. ROW EXPY
TWIN OAKS DR
Windsor Airport
LAUZON RD
LAUZON PKY
BANWELL RD
COUNTY RD 42
CONC RD 11
BASELINE RD
CONC RD 8
CONC RD 9
COUNTY RD 17
WALKER RD
LEGACY PARK DR
COUNTY RD 46
401
LAZON PARKWAY TO EXTEND TO HIGHWAY 3
SEXTON SIDERD
3
Legend
Study Area
Proposed Collector Road
Proposed Arterial Road
Business Park
Community Core
Employment
Low Density Residential
Medium/High Density Residential
Open Space / Natural Heritage; EP
Figure 15
N
0
1,000
2,000
3,000
Metres
MERIDIAN
Aug 2011

Att- G

pg. 466

AD 42 - TECHNICALLY PREFERRED PLAN

AD) - WALKER ROAD TO CITY / COUNTY BOUNDARY

WIN

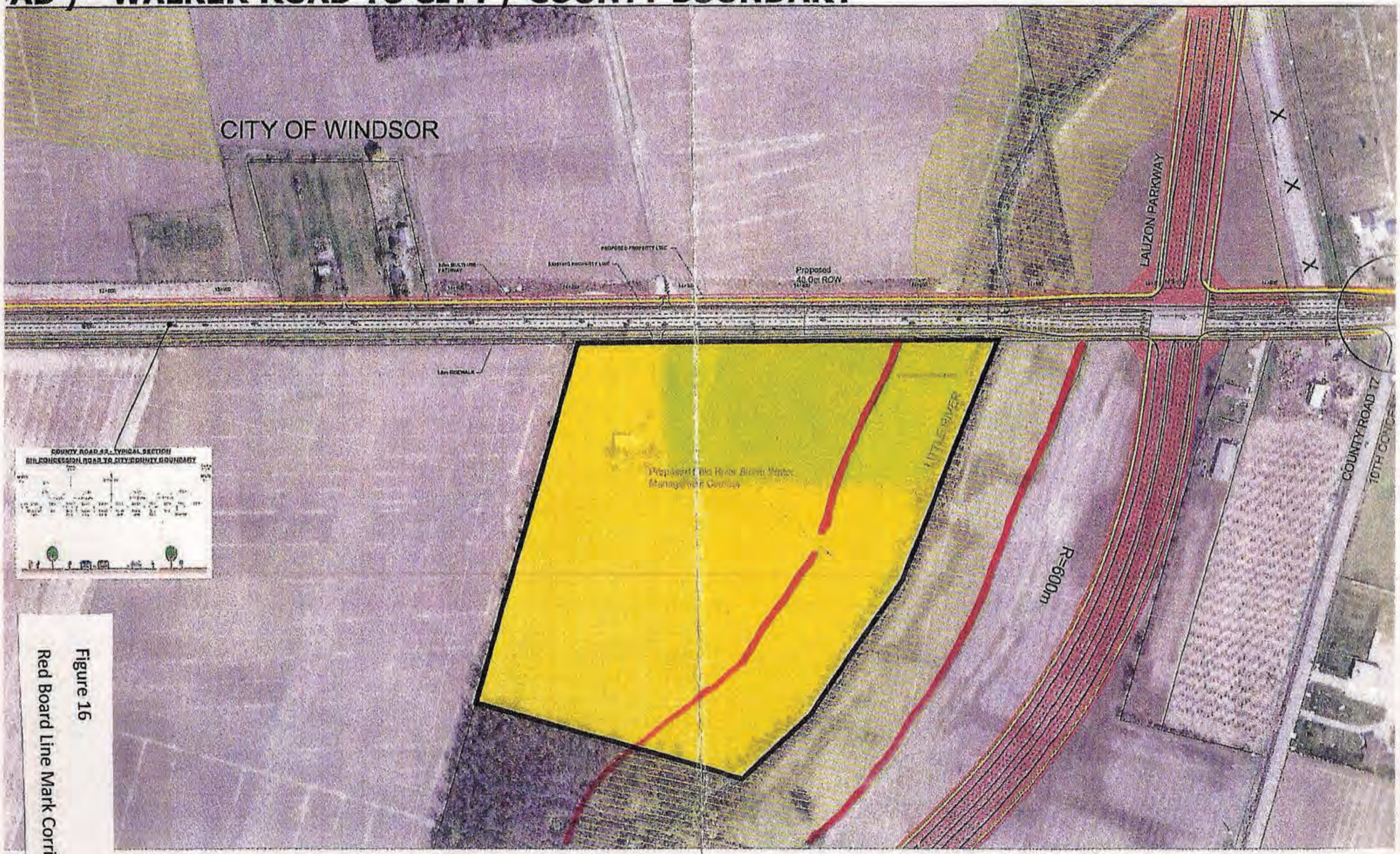


Figure 16

Red Board Line Mark Corridor (2012)

CITY OF WINDSOR
Sandwich South Secondary Plan
SCHEDULE B
Greenway System

Legend

Greenway System

- Link
- Bicycle Use Master Plan Proposed Trails
- NP-x Neighbourhood Park
- Recreation & Open Space
- RP-1 Community Regional Park
- SWM
- Provincially Significant Wetlands

Natural Heritage System

- Core Natural Heritage Features
- Supporting Natural Heritage Features
- Ecological Restoration Area
- Ecological Linkages

- Railway
- Permanent Streams
- Permanent Water Bodies
- Interchange
- Secondary Plan Boundary
- City of Windsor Boundary
- Proposed Roadway

0 500 1,000 1,500 2,000

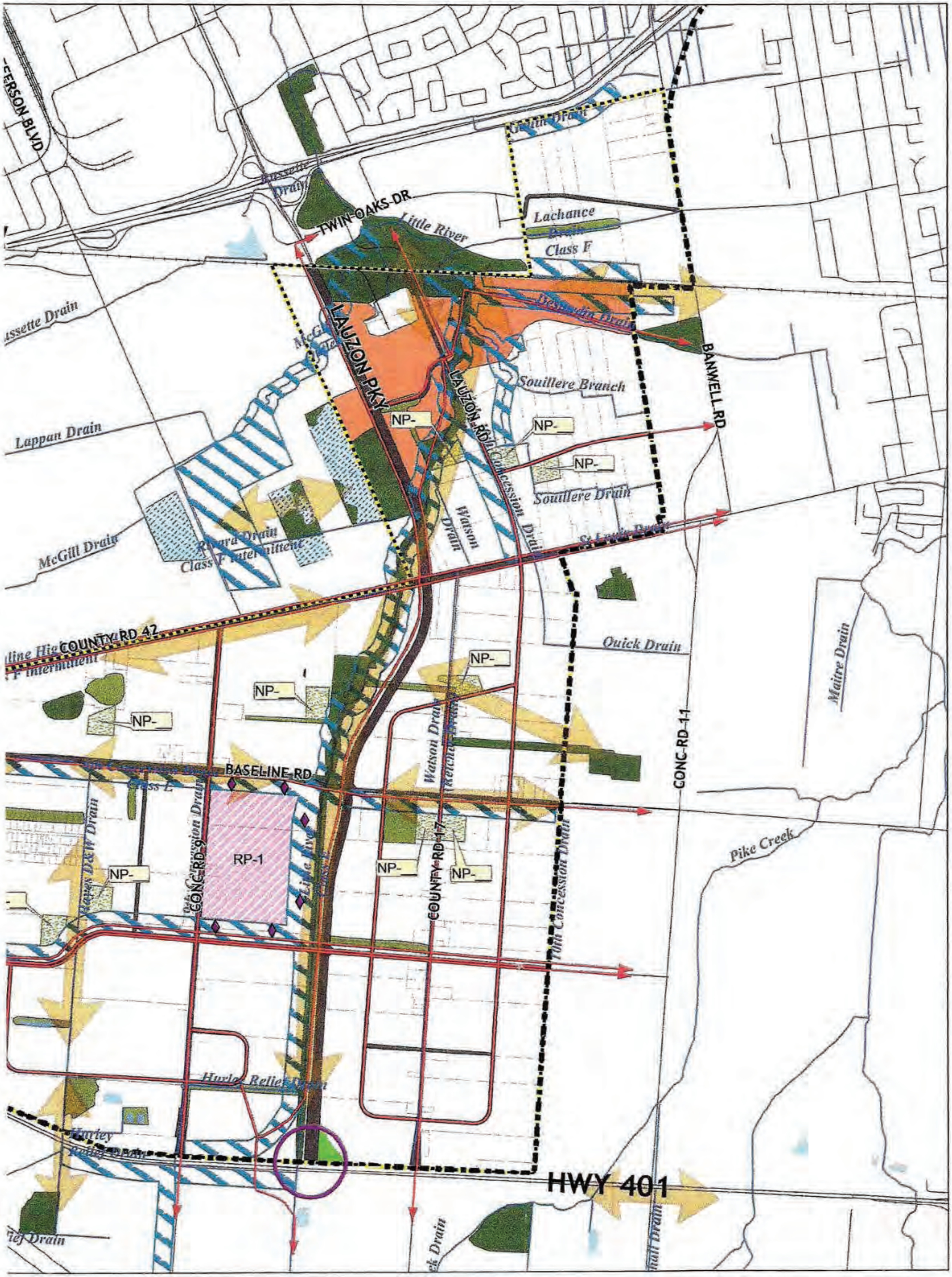
Metres

MERIDIAN PLANNING CONSULTANTS INC

Figure 17 (2 pages)

N

Oct 15, 2012



TWIN-OAKS-DR
Little River
Lachance Drain
Class F
Desjardin Drain
LAUZON PKY
LAUZON RD
BANWELL RD
Souillere Branch
Lappan Drain
NP-
Souillere Drain
Watson Drain
Concession Drain
McGill Drain
Class F Intermittent
COUNTY RD 42
Quick Drain
Maitre Drain
BASELINE RD
Class E
CONC-RD-11
RP-1
CONC-RD-9
COUNTY-RD-17
Pike Creek
10th Concession Drain
Hurley Relief Drain
HWY 401

B.5.6.1 Consultation with Individual Stakeholders

Further consultation with individual stakeholders was conducted as required, or requested. The following is a list of the key stakeholders for which additional consultation was held.

- 882885 Ontario Limited (Lauzon Parkway, Section A.5.8.1)
- 386823 Ontario Limited (County Road 42, Section B.5.6.1)
- Tecumseh Town Council (County Road 42, Section B.5.6.1)
- Windsor International Airport (County Road 42, Section B.5.2.1)
- The Windsor Christian Fellowship & Rosati Group (E-W Arterial, Section C.5.7.1)

Given that each stakeholders' concerns are related to specific elements of the Study (i.e., Lauzon Parkway, County Road 42, or E-W Arterial), details regarding the specific concerns and responses are provided in the appropriate sections of this report (Part A: Lauzon Parkway, Part B: County Road 42, or Part C: E-W Arterial).

386823 ONTARIO LIMITED

386823 Ontario Limited owns the property located immediately southwest of County Road 42 and the Little River. The property, currently used for agricultural purposes, is illustrated in Exhibit A.5-22.

EXHIBIT B.5-14: PROPERTY OF 386823 ONTARIO LTD. (0 COUNTY ROAD 42, ROLL NO. 9003001500)

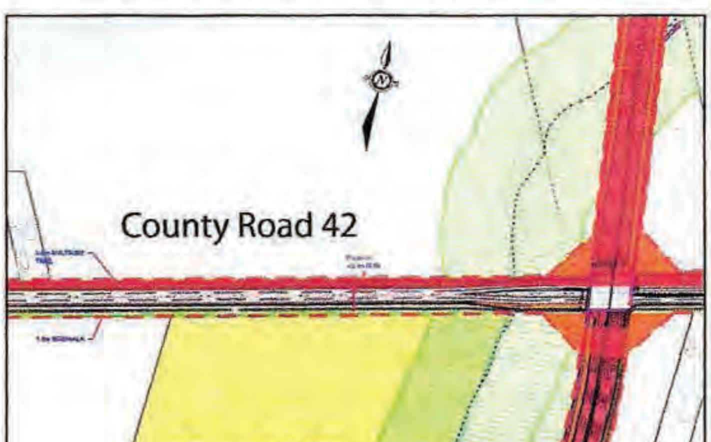


Figure 18 (2 Pages)

A meeting was held with 386823 Ontario Limited on November 28, 2012 to discuss their concerns regarding the land-use designation of their property in the Lauzon Parkway EA Study as well as the Sandwich South Secondary Plan and the Upper Little River Stormwater Management Study. The Lauzon Parkway EA does not designate land-use; therefore further correspondence with this owner was arranged through the Sandwich South Secondary Plan and Upper Little River Stormwater Management Study.

An illustration of the County Road 42 plan at these properties is in Plate 7 of Section B.6.9.

TOWN OF TECUMSEH COUNCIL RESOLUTION

The Tecumseh Town Council commented on the Lauzon Parkway Class EA Study through Resolution 18.14 which requested that the County of Essex amend the speed limit on County Road 42 from 60 km/h to 50 km/h, from County Road 19 (Manning Road) west to the City/County Boundary. The Resolution also proposed that the County consider narrower lane widths for County Road 42, and an enhanced context sensitive design taking into account the urbanized nature and multiple users of this segment of road.

The County of Essex a staff report to County council on May 8, 2013 in response to the Tecumseh Council. The report noted that the current proposed cross-section includes an undivided urban section with bike lanes and sidewalks in both directions. The right-of-way will also accommodate numerous "Urban Design Features" such as illumination, utilities, and landscaping. The standard lane width of 3.75 m has been reduced for this segment of road to 3.65 m.

The County of Essex also completed a speed study to determine an appropriate posted and design speed of the roadway. The speed study determined that the mean speed (85^{th} percentile) of the motorists was approximately 78 km/h. The results from the speed study would suggest that the posted speed of 60 km/h is too low and should more appropriately be 70 km/h. However, the County recommended a posted speed of 60 km/h to achieve a balance between the need to facilitate inter-regional traffic, and provide for local traffic access and other road users.

Upon consideration of the staff report, the County Council approved a speed limit reduction to 50 km/h from 60 km/h, on County Road 42 from County Road 19 (Manning Road) west to the City/County Boundary. It is recommended, however, that when County Road 42 is widened to 4 lanes, the posted speed should be re-assessed at that time.

B.5.6.2 Considerations to Amend Supportive Policies

The preferred plan for County Road 42 in the Town of Tecumseh identifies a context sensitive design with an urban cross-section in a rural setting that connects the City of Windsor and the Town of Lakeshore. The benefits of the context sensitive design are mainly localized between County Road 43 (Banwell Road) and County Road 19 (Manning Road). The recommended enhancements are supportive of a County Connecting Link classification and should be considered between the County of Essex and the Town of Tecumseh. This development lends itself to a higher activity of uses and further growth at a local municipal level.

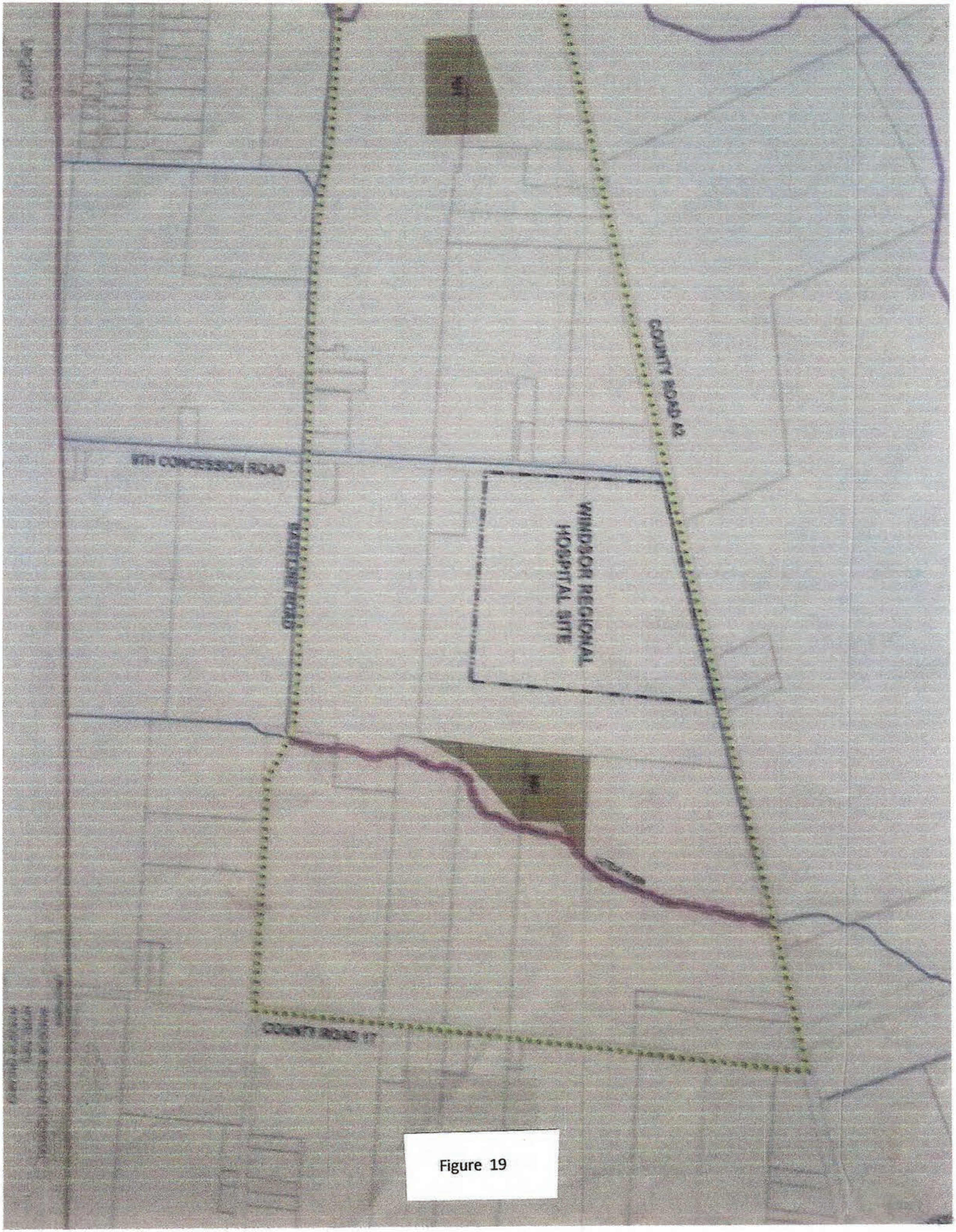

COUNTY ROAD 42
9TH CONCESSION ROAD
WINDSOR REGIONAL HOSPITAL SITE
COUNTY ROAD 17

Figure 19

RE: Oct 10/2017 Meeting Upper Little River Master Drainage and Storm Water Management

Innes, Jayson <jayson.innes@stantec.com>

Thu 2017-10-26 3:01 PM

To:Bill Balazs <bbalazs452@hotmail.com>; Godo, Anna <agodo@citywindsor.ca>; 'jhenderson@erca.org' <jhenderson@erca.org>; salmcc@netscape.net <salmcc@netscape.net>; ted halwa <thalwa@bell.net>;

Cc:Winterton, Mark <mwinterton@citywindsor.ca>; Hunt, Thom <thunt@citywindsor.ca>; Wilson, Donald <dwilson@citywindsor.ca>;

Attached are responses your additional questions and comments:

11) Drawings 3 and 4 were most recently updated on 2017-09-06 (Drawing 3) and 2017-08-03 (Drawing 4).

12) The SWM corridor is reserved until functional design has confirmed the required corridor width, which may be a reduced corridor width.

13) The letter from Monteith Brown Planning is included in Appendix C with all personal information removed. All written comments received at the PICs were included in Appendix B. Correspondence sent to City Council or the Standing Committee does not form part of the EA public consultation process.

14) The study purpose is to recommend a stormwater management strategy to allow development while protecting existing resources. A preferred option was developed as a result of an evaluation of alternatives and public/agency input, and is considered representative of the most financially and physically appropriate option to achieve the required controls, while conserving existing natural conditions in the context of urban development. Anna advises that prior to development of any lands, secondary plans, rezoning, and functional design for infrastructure will be require and that it would be best to speak to the City's Planning Department about those requirements.

15) My understanding is that costs, timing, and funding will be dealt with outside of the EA process. Anna advises that City Administration is meeting to review funding strategy with respect to infrastructure in the South Sandwich lands.

1) I agree that the proposed 325 m SWM corridor is split at County Road 42 with 225 m west of the existing Little River and 100 m east of the existing little river. The proposed SWM corridor is aligned with the proposed Lauzon Parkway.

5) The process also applies to the airport lands.

7) The costs were coved in the Preliminary Opinion of Probably Costs. The total land costs of Alternative 5 and 6 are similar and it is only the location of the SWM facilities and how they are acquired that are significantly different.

10) My understanding is that costs, timing, and funding will be dealt with outside of the EA process. Anna advises that City Administration is meeting to review funding strategy with respect to infrastructure in the South Sandwich lands.

Figure 20 (7 Pages)

Please let me know if you have any additional questions or comments.

From: Bill Balazs [mailto:bbalazs452@hotmail.com]
Sent: 2017-10-25 8:26 AM
To: Innes, Jayson <jayson.innes@stantec.com>; Godo, Anna <agodo@citywindsor.ca>; 'jhenderson@erca.org' <jhenderson@erca.org>; salmcc@netscape.net; ted halwa <thalwa@bell.net>
Cc: Winterton, Mark <mwinterton@citywindsor.ca>; Hunt, Thom <thunt@citywindsor.ca>; Wilson, Donald <dwilson@citywindsor.ca>
Subject: Re: Oct 10/2017 Meeting Upper Little River Master Drainage and Storm Water Management

Good Morning Jayson John and Anna:

Additional question and Comments-

11) The drawings #3 and #4 under Revision Date reference a date of 12/02/02 with specific corridor size illustrating the area that is designated as 325 m and another section that is 200 m.
What is the actual revision date?

12) Please confirm that the area designated as the SWM corridor are actual - (RESERVED CORRIDOR LANDS FOR THE SWM Study)

13) Your email section of internal correspondence make reference to a letter from Monteith Browm Planning Consultants, dated 2017-02-16 per item #7 . Please confirm the section it is located
Please explain why we don't see any correspondences included in Section C, between Project Team members and 386823 Ontario Limited/ William F. Balazs or representatives, or letters from legal counsel referencing the intent to speak at the Standing Committee or to appear before City Council? As well as missed comments at PIC #2 for Upper Litlle SWM.

14) We need a comment on the following matter; with reference to a zoomed view as per above attachment (Figure 14 /(scan 20171024(2)), from Drawing #4 -SWM Corridor Location and Sizes, that show a clear impact when compared to your map reference of the Windsor South Secondary Draft Secondary Plan of Aug. 2011 (App. G , page 466), that show a portion of our lands marked employment and open space Further comparison can be viewed when referencing Figure -2 (Dated Sept. 2016) and(Figure -3 from 2012)
In Fig. 3 you can see a section that references the Proposed Little River SWM corridor with borders and cross lines.
The question that is being asked does this clearly illustrate a major impact on said land owner, that can restrict or delay any possible considered development going forward, since this Design Study will become the guiding document for SWM controls on the Upper Little River?

15) Anna and John, at the end of the meeting , you stated that you would look at providing a section that would address a guidance to how cost/ compensation would be addressed in the report.

With reference to responses below:

1) you did not reply or confirm that the proposed reserved corridor size split of 325 m will result in 225 m corridor on said lands west of Little River and 100 m on the east side of Little River. (also when looking at (Figure 14 take note) of the 40 m gap which is County Road 42 between Airport Lands and Said Lands)

5) - you did miss reference to the airport lands, are they not a development block that is included in full Upper Little River SWM Master plan as shown in (E1: Site Location Plan)
on page (# i)?

7) With reference to the scores/ for Alt. 6 and Alt. 5 , a lower number was scored under Technical Environment for Ease of Construction,Implementation, with main difference of
(Construction can be phased with development with some kind of acquisitions and some up front to be borne by the municipality.
Were these costs covered in the Preliminary Opinion of Probable Costs?

!0) Your reply does not address any comment for (10 -a) and (10-b)

Regards;
386823 Ontario Limited
William F. Balazs

Cell Phone -- 519 999 9698

From: Innes, Jayson <jayson.innes@stantec.com>
Sent: October 24, 2017 3:35 PM
To: Bill Balazs; Godo, Anna; 'jhenderson@erca.org'; salmcc@netscape.net; ted halwa
Cc: Winterton, Mark; Hunt, Thom; Wilson, Donald
Subject: RE: Oct 10/2017 Meeting Upper Little River Master Drainage and Storm Water Management

Attached are responses your comments.

1. Agreed. The size of lands proposed for allocation for all of the SWM corridor plan is approximately 560 ha
2. ETPS is the City's Environmental, Transportation and Public Safety Standing Committee. The ETPS is a City Committee that is separate from the Upper Little River Study Team. Reports from Administration are considered by the ERPS standing Committee before those reports go to City Council for Consideration.
3. The SWM facility lengths are approximated in Appendix G in the model parameter table under the "Active Storage Length" column and in some areas the entire available corridor length is not required. Trails have been accommodated in the cross sections and raised areas may be possible for sports fields similar to the Windsor Cristian Fellowship SWM Facility. Any lands which are exclusively parkland are considered separately from the SWM corridor.
4. The current SWM corridor is a conservative estimate of the required lands and not all of the land will be required for the SWM facilities. The exact timing of the final SWM requirements will vary across the study area and is unknown at this time as it depends somewhat on the development of upstream areas.
5. Agreed. This process applies to the Hospital lands and reconstruction of Country Road 42 and extension of Lauzon Parkway.
6. It was discussed at the Oct 10 meeting that SWM controls will be required for County Road 42 and Lauzon Parkway. It is intended that these facilities would be constructed in the SWM corridors that are proposed in the Upper Little River study. It is our understanding that the ponds shown on Exhibit 17 that was referenced by Mr. Balazs were conceptual in nature and were shown for demonstration purpose only. Functional servicing studies have not yet been undertaken.
7. The evaluation summary scores were based on a relative comparison between the various alternatives as described in Tables 15 and 16 of the Environmental Study Report to select a preferred alternative.

8. The southeast corner of the airport lands is currently shown as open space / natural heritage on the Windsor Airport Master Plan (included in Appendix G) While dry ponds are preferred by the airport they are unable to provide the required levels of water quality control on their own. It is expected that one facility would be required in that section of the airport lands to provide SWM controls for lands west of Upper Little River.
9. Meander belts were calculated using either air photo analysis of existing meander patterns (planform method) or empirical analysis using channel parameters (field method) as discussed in section 4.5.5.2 and Appendix I of the Environmental Study Report. The "field method" compares a channel to other similar channels in southern Ontario when there has been modifications made to the channel planform. Looking at the channel alignment and Figure 16, LRD-3 (located between County Road 42 and Lauzon Parkway) has few meanders compared to sections of Upper Little River upstream and downstream of LRD-3, suggesting that it had been straightened at some time.
10. The study identifies a problem, evaluates alternative solutions, and establishes a preferred solution. Sufficient detail is required to select a preferred solution and determine environmental impacts. Most of the alternatives have similar land requirements and including specific land costs would not change their relative ranking.

Please let me know if you have any additional questions or comments.

Jayson Innes, M.A.Sc., P.Eng.
Senior Water Resources Engineer
Stantec
100-300 Hagey Boulevard, Waterloo ON N2L 0A4
Phone: (519) 585-7282
Cell: (519) 569-0518
jayson.innes@stantec.com

From: Bill Balazs [mailto:bbalazs452@hotmail.com]
Sent: 2017-10-16 5:46 PM
To: Godo, Anna <agodo@citywindsor.ca>; 'jhenderson@erca.org' <jhenderson@erca.org>; Innes, Jayson <jayson.innes@stantec.com>; salmcc@netscape.net; ted halwa <thalwa@bell.net>
Cc: Winterton, Mark <mwinterton@citywindsor.ca>; Hunt, Thom <thunt@citywindsor.ca>; Wilson, Donald <dwilson@citywindsor.ca>
Subject: Re: Oct 10/2017 Meeting Upper Little River Master Drainage and Storm Water Management

Good Day Anna, John and Jayson;

RE- subject said lands, consisting of 28.3 acres on the south side of County Road 42- abutting the west side of Little River- 386823 Ontario Limited (William F. Balazs)

Note; Said Lands **do not** have any supporting evidence or justification to have a planned designation of Open Space for all or a major portion on these land's, as well it does not clearly justify why they cannot be designated as future employment similar to lands abutting the west side of said lands. Furthermore the city has previously committed to reduce a portion of these lands to future employment with further discussions on the amount of land that can be marked future employment.

These said lands are located in close proximity to the proposed site of the Windsor Regional Hospital (lying east, virtually 'next door'), as well the proposed expansion and reconstruction of County Road 42 from Walker Road to County Road 25 and extension of Lauzon Parkway to Highway #3 (lying west, virtually 'next door').

Clearly, said land provides a great advantage of exposure and accessibility offered by what will be an increasingly high volume arterial road that will service the entire boundaries of the City Of Windsor and the entire region of Essex County.

The following is a follow up to the meeting held on Oct. 10,2017 , since the report consists of 625 pages, we still have some additional questions as well as making sure we correctly have noted your response.
Therefore the following points need to be confirmed or answered in timely period that will still allow us a review before we decide to submit any response to the ministry.

1) a) As it relates to our lands,
-confirmed the reserved corridor size width break down of 325 m
- west of Little River 225 m, our lands
-east of of Little River 100 m
b) the size of lands proposed for allocation for all of the SWM corridor per plan (550 hectares)

2) You stated the meaning of ETSP Standing Committee, is this the correct name of your Project Team that were involved in the report?

3)We did a review of the cross section of the facilities, but did not note if any possible length of the facilities were related to the typical cross sections referenced in the report?
-As well do said lands consist of any park lands, trials or sport field?

4) We started to talk about question #4 , that these **reserved corridor lands** are held until functional design has confirmed the required corridor width, following which lands not used for SWM will be released or will be returned to land owner with land use to be similar to adjacent or abutting lands. (Is this the correct understanding or intent as outlined)?
Does this process have a time line for required corridor width, since timing to settle any compensation matters as it relates to lands needed to support the SWM Plan, as well it will cause a delay in planning of said land that allow the owner to maximize their opportunity to be able to develop or sell said lands?

#5 We were not able to talk about this point, -that each development block or a single development piece would be required to provide and follow requirements for facilities, water quality, erosion, compensation and that facilities are intended to provide controls for more than one property. It is further understood that these costs related to the development must also be absorbed by the developer or developing block.
-does this process apply to the hospital and current block of lands covered in County Road 42 Secondary Plan, airport lands, reconstruction of County Road 42 and extension of Lauzon Parkway?

#6 What is the proposed SWM Plan for the County Road 42 and Lauzon Parkway or do they just empty directly on the north side of County Road 42 into Little River since the two ponds have been removed as shown per Exhibit 17 contained in the Lauzon Parkway Class EA Study - Drainage and Storm Water Management Final Report, January 2014?

#7 Please provide the actual score numbers or values as it relates to the evaluation summary chart as per Pic #1, Pic#2, Standing Committee and City Council meeting held on April 24th 2017 with specific reference to Economics Environment for Capital Cost and Total Maintenance Costs of actual dollars used in 2012.

Note- **No actual $ values** were presented at the Public Meetings that allowed for comment, or review by the Standing Committee. or Mayor and City Council that each gave their approval for the completed process in accordance with the Master Plan Environmental Assessment -"Approach 2".
One would assume that **Probable $ values** would be a given requirement?

#8 We did have some discussions as to why airport lands cannot be used to supply a greater amount of land needed to support SWM for the area/ region in the study site plan, but we have seen the increase in the corridor size from less then 125 m (fall of 2012) to the newly released current size of 325 m (fall of 2017) impacting lands outside the airport lands
What is proposed for the section of the airport lands located in the south east corner that is marked as a section for 325 m corridor, which is 40 m from said lands on the south side of County Road 42
It was stated, the facilities on said land will have water retained ponds, even though we stated that said lands are just **outside the 2 km from airfield centre (wild life control zone). It was stated by us that we would need dry or green ponds , but the reply was that these lands can have water remaining ponds on said lands.**
Therefore, on that section of airport lands, how many facilities and type are planned to support the airport lands and system?
Note - this section of land west of Little River and along County Road 42 will be 225 m wide, which is the same stated size for our lands.

#9 Why is the section of land along Little River between County Road 42 and Baseline Road state Preliminary and Final Meander Belt Widths of 86 m as "method planform" at LRD -4 and then LRD -3 state only 60.m width as a "method Field"?
What is the difference Planform and Field?

#10 Additional discussions covered the topic of lands needed for SWM Plan and how they would establish or outline a compensation process for impacted said land owners. The topic of lands purchased or compensation has not been addressed in this plan.

Further more, it was asked why a Preliminary Opinion of Probable Costs as presented in Appendix K did not include any cost for property, maintenance, and compensation to support the proposed 550 hectares for entire SWM planned corridor.
Its was stated that it would be too difficult to establish a value.
It would seem that a proposed value can be calculated and be contained in the current Upper Little River Master Plan by using the current City of Windsor Official Plan Land Use with specific reference as per site plan per SWM report and use current values for lands purchased in the study area. We know the city is currently in the process of expropriating lands down the road, which may be completed or will be completed shortly with respect to lands on the north side of County Road 42. These lands are the remaining 2 parcel of lands not owned that are located within the airport property.
One would assume that including all major potential costs would result in providing a clear and transparent understanding of the Preliminary Opinion of Probable Cost as provided in Appendix K to all parties?

It must be noted that this plan will have a direct impact on subject land as it relates to usage and value, therefore requiring the following to be addressed;

a) Must cover or provide a process and followup that addresses' any Secondary Plans as it relates to land use amendments, reconstruction or new road ways and services/infrastructure

(like stormwater sewer system) that does not results in land owners' forfeiting their right to develop said lands that result in forgoing the receipt of the true value of the lands', while others will benefit.
It was stated that this point is currently in discussion and currently impacting the discussions and completion of the current developing plan for County Road 42 Secondary Plan. (Hospital Lands)

b) Again the timing factor is also important and must be addressed, since the report states that the lands needed for the corridor will be reserved until functional designs have confirmed the required corridor width, following which lands will be released or the portion not used will be returned to the land owner with land use to be similar to abutting lands.
The elimination of placing said land owner in limbo or frozen in time should be addressed with respect to their lands being developed and should be covered in the report.

c) It must also give consideration to any cost related to the transfer of lands, ex.(legal, severance and survey)

We await your reply for the above.

Regards

386823 Ontario Limited
William F. Balazs
President

Re: Planning Comment on EA Report

Ted Halwa <thalwa@bell.net>

Tue 2017-10-31 9:41 PM

To: Bill Balazs <bbalazs452@hotmail.com>;

While I would agree with the statement "completion of the EA does not result in changes of land uses" and the statement which follows "Other Planning Act processes must be followed............." it is important to recognize that the EA will provide the basis for any future land uses designations (i.e. Changes in land uses) in the EA study area. In fact, it should be anticipated that the City will, in short order, initiate changes to existing land use designations in the study area to ensure they are consistent with the completed EA. The basis for the changes will be the EA itself. If landowners are skeptical or have objections as to how the completed EA treats their holdings, they would be well advised to intervene at the EA stage before it is finalized and not wait until related amendments are brought forward to the Official Plan intended to ensure consistency with the EA. While it would be possible to wait and challenge the EA at the time amendments to the Official Plan are being considered to implement its preferred alternative, by that time the EA would have acquired status as an 'approved' document and challenges may effectively be found 'too little too late'

There is little question that in the case of the lands under the ownership of 386823 Ontario Limited (I.e. owned by you and your spouse), the preferred alternative recommend by the EA greatly impacts its future development potential to the extent that the limited amount of lands remaining and its configuration may adversely affect its viability to be developed.

Ted Halwa, MCIP, RPP
242 Edward Street,
Port Stanley, N5L 1A4
Cell 519-671-3083
E-mail thalwa@bell.net

From: Bill Balazs <bbalazs452@hotmail.com>
Date: Tuesday, October 24, 2017 at 2:02 PM
To: Ted Halwa <thalwa@bell.net>
Cc: "salmcc@netscape.net" <salmcc@netscape.net>
Subject: Comment on EA Rpoert

Good Day Ted;

Please provide your comment (per attach. email from study) as well as (scan 20171024) the full view of SWM Corridor and (scan 20171024 (2), which is a zoomed view, which specifically highlights our property around the word Little and shows our building.
Please note the impact of the corridor size and the balance of lands available for development.

Then review the brief summary email dated 2016-12-21, that was sent by John Henderson (from ECRA) with specific note of key individuals included and cc .(Anna Godo /City of Windsor Drainage Superintendent, and Jayson Innes/ from Stantec /responsible for preparing the Report/ Consulting Firm)

The section for your review and specific comment is item (2) " Plans are included that identify proposed land uses within the study area. Completion of this EA study does not result in changes in land uses." They do not comment on any impact to future land use, but do state further, " This EA covers a very large area. The report should identify that future EA Addendums may be required to address the ultimate land uses that may be proposed in this area."

Please confirm, that the corridor size does greatly impact our future land use (on County 42 owned by 386823 Ontario Limited (William F. and Theresa Balazs) and further to the point as it relates to the current study for County Road 42 Secondary Plan, as per our discussions to land use and will be further impact the amount land available as a result of going to 325 m corridor size. We have been informed that our share will be 225 m on our land and is reflected in the above attached views.

We do know that based on our current meetings on land use as per Secondary Plan, -no proposed EA Addendums have been presented that may change or reduce the impact of the corridor size on said lands.

Regards
William F. Balazs

Stantec Consulting Ltd.
100-300 Hagey Boulevard, Waterloo ON N2L 0A4

February 2, 2018
File: 160311265

Environmental Assessment Services Section
Environmental Approvals & Permissions Branch
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto ON M4V 1P5

Attention: Mr. Stephen Deneault, Project Evaluator

Dear Mr. Deneault,

Reference: Part II Order Request – Upper Little River Watershed Master Drainage and Stormwater Management Plan Environmental Assessment (ENV1283MC-2017-3020)

Please find attached completed Tables A and B in response to the Part II Order Request that the Ministry of the Environment and Climate Change (MOECC) received during the public review period for the Upper Little River Watershed Master Drainage and Stormwater Management Plan Environmental Assessment Environmental Study Report (ESR). These Tables were prepared by Stantec Consulting Ltd. with input from the Study Team.

Following receipt of the MOECC's November 7, 2017 letter to the Proponent advising that a Part II Order Request had been received, the Requester was asked to enter into further discussions in an attempt to resolve his concerns. Accordingly, a meeting was held with the Requester and staff from the City of Windsor, the Town of Tecumseh, Stantec Consulting Ltd., the MOECC (teleconference) and the Essex Region Conservation Authority on December 5, 2017. (For your reference, a copy of the December 5, 2017 meeting summary notes is included with this response.) In addition, there were a number of e-mail exchanges with the Requester following the December 5, 2017 meeting.

After putting forth significant effort to resolve the Requester's concerns, the Study Team concluded that further discussion would not result in a resolution. Accordingly, on January 23, 2018, all parties were advised that the discussions were deemed complete and that the Proponent would be providing the MOECC with a formal response to the Part II Order Request in accordance with the MOECC's November 7, 2017 letter.

During the December 5, 2017 meeting, the Requester raised some additional questions/concerns. These questions, and our responses, have been added to the end of Table A. In addition, during the 30-day review period the Ministry of Tourism, Culture and Sport (MTCS) requested additional work to address concerns for Built Heritage Resources and Cultural Heritage Landscapes including completion of the MTCS screening checklist "Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes" and/or a Cultural Heritage Assessment Report. This work is currently underway and is expected to be completed soon. Once complete, the ESR will be updated to include a Cultural Heritage Resources Section.

Reference: Part II Order Request – Upper Little River Watershed Master Drainage and Stormwater Management Plan Environmental Assessment (ENV1283MC-2017-3020)

We trust that the above and attached information clearly support our position that the works undertaken to complete the Upper Little River Watershed Master Drainage and Stormwater Management Plan Environmental Assessment Environmental Study Report satisfy the requirements of a Master Plan Environmental Assessment – Approach 2.

If you have any questions, or if you require any additional information, please do not hesitate to contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Jayson Innes

Jayson Innes, M.A.Sc., P.Eng.
Water Resources Engineer
Tel: (519) 585-7282
Fax: (519) 579-6733
jayson.innes@stantec.com

Attachment: December 5, 2017 Meeting Summary Notes
Table A – Proponent Response to Part II Order Request
Table B – Proponent Information Requirement

cc. Anna Godo, P.Eng., City of Windsor
Phil Bartnik, P.Eng., Town of Tecumseh
John Henderson, P.Eng. ERCA

Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan
Meeting to Discuss Part II Order Request
400 City Hall Square – Meeting Room 406
Date: December 5, 2017
Time: 1:30 pm to 4:00 pm

Attendees:

William F. Balazs - Requester	Anna Godo – City of Windsor
Theresa Balazs	Don Wilson – City of Windsor
Phil McCullough – Salem, McCullough & Gibson	Phil Bartnik – Town of Tecumseh
Ted Halwa – Planning Consultant for Requester	Jayson Innes – Stantec Consulting Ltd.
Wira Vendrasco – City of Windsor	Dorothy Moszynski – MOECC (Teleconference)
Mark Winterton – City of Windsor	Jennifer Fliesser – MOECC (Teleconference)
Wes Hicks – City of Windsor	John Henderson - ERCA

The following summarizes the main items that were discussed during the meeting:

Discussion Items

1. Stantec provided MOECC Table A with draft response information for discussion purposes. The Requester advised that he had not seen Table A and time was provided to review same. MOECC confirmed that the Requester was only provided a copy of the November 7, 2017 letter that was sent to ERCA. MOECC does not provide the Requester with the attachments that accompany the Part II Order Request notification letter that is sent to the Proponent.

2. The length of the time provided for review of the final report was discussed. MOECC confirmed that the minimum required review period is 30 days after publication of the Notice of Project Completion.

3. The Requester advised that the PIC's for the Upper Little River Master Plan Study were combined with PIC's for other studies that were being undertaken in the same area. He noted this was confusing and suggested that comments provided at the multiple PIC meeting should have been included in the summary notes for all PIC's that occurred at the same meeting. Stantec advised that it is not unusual for PIC's to be combined when numerous studies are being undertaken in an area. This approach can help to introduce the public to other studies that are taking place in the area and can increase meeting turnout.

4. The Requester expressed his concern that stormwater management (SWM) facilities are no longer shown on the airport lands. He indicated that a proposal to construct a SWM facility between the airport woodlots was previously approved by ERCA. ERCA indicated

that this item had been discussed at previous meetings and reiterated that an approval had not been issued for a SWM facility between the airport woodlots. This was a preliminary concept that was considered years ago, however, due to numerous concerns (i.e. issues related to potential impacts to the adjacent provincially significant wetlands, future maintenance concerns, issues that could result from a fuel spill within the airport lands, etc.) it was not pursued as a SWM option.

5. The Requester asked why the previous 2012 information for this study and other studies in the area previously showed SWM corridors on the airport lands. These corridors have been removed from the airport lands and he is concerned that his land will be used for storage to allow for development on the airport lands. The Requester believes that the City wants to maximize the potential employment land opportunities on the airport lands at the expense of private landowners. The City and ERCA responded that all future development on the airport lands will be held to the same stormwater controls as the rest of the Upper Little River Master Plan Study Area. One of the previous corridors was removed because it was no longer needed due to the development of a solar farm on the airport lands. It was confirmed that a SWM corridor is still shown at the southeast corner of the airport lands across the road from the Requester's property. The airport is one large property that is under the control of the City. As a result, the exact location of the future SWM corridor/facility on the airport lands is not critical.

6. The Requester provided a number of conceptual plans from various previous meetings for this and other studies in the area which showed a progressively increasing width of the SWM corridor on his land and noted that size of the corridor was not provided at the PICs. The Requester advised that the increased corridor width had resulted in a dramatic impact to his lands with only a small portion remaining outside of the corridor. The Requester further indicated that the corridor width had increased since the last 2012 PIC and he felt that another PIC should have been held before the Notice of Project Completion was advertised. The Requester was advised that the final size of the corridor on his lands had nothing to do with the airport lands. The size increase was a result of pond modification to address the limited capacities of existing receiving watercourses, climate change considerations, etc. It was acknowledged that the corridor width changed, however, the alternative 6 concept of SWM corridors on private lands remained the same as presented at the 2012 PIC's. Accordingly, an additional PIC was not added to the project in 2017.

7. The Requester asked how his lands will be acquired, when his lands will be acquired and how much he will be paid for his lands? The Requester also advised that the Municipal Class EA Guidelines say that an EA document can include a section on the anticipated process for next steps regarding land acquisition. The Requester was advised that property acquisition and the related costs are not part of the EA process. The City advised that City Administration will be presenting a report to City Council requesting budget approval for the City to undertake a Growth Management Strategy Plan for the Lands transferred from the Town of Tecumseh (aka Sandwich South Employment Lands)

which includes the portion within the City of Windsor for the Upper Little River Master Plan Study Area. The purpose of this study will be to look at options for funding the infrastructure (including land) in the entire transferred lands. Approval to move forward with this study will be determined through the upcoming 2018 City budget deliberations.

8. The Requestor made reference to the EA Code of Practice and noted that "compensation" is mentioned within the Code. The Requester asked if a section could be included in the EA report that identified the anticipated process for land acquisition and compensation. The Requester also asked if the Ministry could advise if other EA's have included a section on compensation and if so, could references be provided.

9. The Planning Consultant for the Requester advised that the EA will be used to inform future land uses through Secondary Plans limiting the Requester's future options for his lands. The City confirmed that the findings of the EA do put constraints on the Requester's land. The ultimate constraint will not be known until functional design is complete. The Planning Consultant for the Requester ask if the corridor could be reduced through functional design. Stantec advised that this will ultimately depend on the future land uses within the related subcatchment. The City further advised that there is another subcatchment within the Upper Little River Master Plan Study Area (East Pelton) where the owners are just starting into the next steps of functional design to determine the actual size of the required SWM corridor.

10. The Requester advised that he had a recent inquiry to purchase his property but he advised the inquirer that he could not consider selling at this time because of the constraints created by the SWM corridor. The Requester expressed his concern that the proposed SWM corridor could put a hold on his lands for years. He then asked why the EA document cannot include language that says landowners will be appropriately compensated for their lands if their lands cannot be developed because of a SWM corridor that will be used to control stormwater from other properties. In response, the City advised that there are other processes that are used to acquire property such as the *Expropriation Act* if a mutually agreeable property value cannot be reached. To date, the City has never addressed property acquisition values in any of the many EA's they have completed. It is the City's intention that all property owners will be treated fairly and it is premature to determine how much or when property owners will be compensated.

11. The Requester asked why the airport lands where not being used for regional storage to reduce the storage requirements on privately owned lands. The City should give up their employment lands to allow privately owned lands to be developed as employment lands. Stantec advised that the use of large regional facilities was one of the alternatives considered in this EA. Based on the evaluation criteria, large regional facilities were not determined to be the preferred alternative. Some of the issues with large regional facilities on the airport lands include concerns with waterfowl and airport operations,

overland routing limitation for major storm event flows from distant sub-catchments, required depths of ponds to provide outlet for minor system storm sewers that would be required to travel significant distances to the pond, etc.

12. The Requester asked if the *Drainage Act* would be used for the proposed SWM corridors. The City advised that there are many municipal drains in the study area. Alteration to these drains, such as the creation of east/west cutoff drains required for development to proceed in some areas, will require *Drainage Act* processes to be implemented. It is not, however, the intention of the City to use the *Drainage Act* to create the SWM corridors.

13. The Requester advised he is concerned that the recommendations of the EA will not be followed and individual sites will be allowed to develop with their own on-site storage facilities and the SWM corridor on his lands will not be developed. If this occurs, his land will be constrained and deemed undevelopable while others have the ability to capitalize on development opportunities. He will miss his chance at development opportunities. The City advised that they are bound to follow the recommendations of the final approved EA. Proposed changes to the approved EA would require an EA amendment that involves another public process with opportunities for public comment/input. The City does not want to have numerous individual development SWM facilities in the study area.

14. The Requester provided meeting minutes from a 2012 Lauzon Parkway Project meeting where it was noted that the City is open to extending the employment land designation onto a portion of his land. He is concerned that this is now not the City's intention based on the proposed SWM corridor which eliminates the development opportunity for his land. The City advised they would look into this matter.

15. The Requester advised he is concerned he will not be appropriately compensated for his land if the process for future land acquisition is not included in the final approved EA. He understands that it may not be possible to provide the actual value of his land at this time but wants the process included. The City advised that no one can take his land without compensation. There are current laws which deal with land acquisition that must be followed. The City advised they would review his concern/request.

16. The Requester concluded the meeting by reiterating his following three main concerns:

    i. The Requester was previously advised that the City was open to extending the employment land designation onto a portion of his land. He still wants this to happen and wants the City to provide clarification on this matter.
    ii. The Requester wants the final EA report to include a section that identifies the process for future land acquisition.
    iii. The Requester thinks the airport lands should be used to construct a regional SWM facility to control stormwater runoff from adjacent privately owned lands. He believes this would reduce the size of the proposed SWM corridors and

	minimize impacts to privately owned lands.
This meeting summary has been prepared by John Henderson.	

TABLE A – PROPONENT RESPONSE TO PART II ORDER REQUESTS

PROPONENT:	**The City of Windsor, the Town of Tecumseh, and the Essex Region Conservation Authority**
PROJECT TITLE:	**Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan**
PROJECT LOCATION:	**City of Windsor and Town of Tecumseth**
PREPARED BY:	**Jayson Innes**
DATE SUBMITTED TO MOECC	**2018-02-02**
PHONE # and E-MAIL:	**519-585-7282 jayson.innes@stantec.com**

Issues and Concerns	Proponent Response	Status
	* specify response- either from EA report, separate consultation material, etc. Be clear about which sections of the EA address the concerns raised, or provide indication of work that will be done (e.g., commitments) to address the concerns. Along with the EA documentation section reference, provide a summary of the section to clearly indicate that the response/section addresses the concern. Ensure that any relevant information is included in the response. Please ensure only factual information is included in the response. Avoid statements with no supporting information. Where appropriate, outline consultations with other government agencies relevant to addressing the concern. Please provide records of this consultation as per the Table B.	* present status (ongoing meetings with requesters, etc.—DATES important)

Environmental Assessment Process		
Inadequate time for review of the Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan (Plan). This Plan consists of 625 pages to be reviewed, and only allows a response time of 30 calendar days or approximately 19 working days to respond with comments. Confusing consultation process as PIC meetings on this Plan, the Lauzon Parkway Class EA and the Sandwich South Secondary Plan were all held at the same date (October 22 2012) and place. Insufficient time to submit comments after this meeting.	The Environmental Study Report must be placed on the pubic record for a period of at least 30 days. Normally 30 days will be adequate but the proponent may choose to set a longer period under special circumstances (A.3.4.1 from Municipal Engineers Class Environmental Assessment Process (2000, as amended in 2007, 2011 & 2015). The EA process requirements have been met. Additional mediation occurred with the Part II Order requester following the mandatory 30 day period, during which time the requester had additional time to review the ESR and submit comments. PICs for Environmental Assessments with similar study areas are often held at the same time to increase turnout. Usually similar people attend PICs in a geographic area and having multiple PICs at the same time can also introduce the public to new studies. After each PIC a two week comment period was provided which is a typical response time. While most comments were received during the PICs or within the two week period immediately follow the PICs, all comment received during the EA process were considered.	
Stakeholder Consultation		
Details related to the study were last presented on October 22, 2012 with the next update released on September 22, 2017 (the final Plan). That is 5 years since any updated information was released. Through 2012 to 2017, the requester sent emails and correspondence letters to members of the Project team, but none were found in Appendix C of the Plan, nor the comment sheet that was submitted at the second public information centre in 2012.	While some design assumptions and the width of the required stormwater management (SWM) corridor were modified following PIC #2, the preferred alternative has not changed. The ESR 30 day review period following the publication of the Notice of Completion is intended to address any outstanding concerns. A letter received from Monteith Brown Planning Consultants on behalf of 386823 Ontario Limited (Bill and Theresa Balazs) dated 2013-10-29 is included in Appendix C of the ESR with personal information removed. All comments received at the PICs are included in Appendix B. The letter received from Salem, McCullough & Gibson on behalf of 386823 Ontario Limited (Balazs) dated 2017-04-21 (attached) will be added to the updated ESR" Correspondence submitted as part of the Lauzon Parkway EA, Sandwich South Secondary Plan, and other studies was not considered part of the Upper Little River EA.	

The reserved corridor size was not stated until the meeting held on November 28, 2012. At this time the reserved corridor size was described as less than 100-150 metres, and it was stated that this could be reduced subject to review of requirements and design with the size split to be 50/50. On September 22, 2017, the new confirmed size was to be 325 metres for the corridor and 200 metres at the tributaries. It was later stated in an October 10, 2017 meeting that it would not be a 50/50 metre split; it would be more like 225 metres on the requester's land and 100 metres on east side of Little River. The dramatic size change should have been communicated to or at a stakeholders meeting for land owners impacted by corridor size change before the final Plan was released to allow for comments and to address any issues. As a result of this meeting, the proponents did agree to designate some of the lands as future employment, but continue to reserve the space as a balance for open space. This change resulted from the fact that the proponents had no justification to designate these lands as open space.	As noted, the size of the corridor has increased since PIC #2. Assumptions for the allowable release rates, design storm duration, climate change, and external grading from the pond elevation to the surrounding ground have been modified, resulting in larger SWM facilities as described in Sections 4.3.6, 4.3.8 and 6.1 of the ESR. These changes were made based on comments received during the EA study and policy changes. The size of the corridor does not change the preferred alternative as any alternative providing flood control (Alternatives 3 to 6) will have similar land requirements. The ESR 30 day review period following the publication of the Notice of Completion is intended to address any outstanding concerns. The corridor is generally centered on the existing channel as shown in Drawing 3, but in some locations has been modified to accommodate external constraints such as roadways, railways, and municipal boundaries. Based on the City of Windsor Official Plan – Schedule D (Land Use) the subject lands are currently designated as open space. The lands were designated open space in the City's Official Plan by OPA 60. The lands are zoned agriculture in Tecumseh Zoning By-law 85-18. The reference to the potential to re-zone some of the lands from open space to employment lands relates to meeting minutes from the November 28, 2012 Stakeholder meeting for the Lauzon Parkway Project and the draft Sandwich South Secondary Plan. The Lauzon Parkway EA is now in effect, however, the Sandwich South Secondary Plan was discontinued. The lands are now part of the County Road 42 Secondary Plan process, which the Requester has participated in. The County Road 42 Secondary Plan process is ongoing and any comments about land use in that secondary plan should be provided as part of that process. Land designation and zoning are part of the County Road 42 Secondary Plan and not part of the Upper Little River Master Plan Study.	

The study does not reference the impact of the corridor size to land owners and the restriction of available lands for future development, as well as the amount that will be placed in a hold pattern, frozen in time until development size and needs have been designed. The Plan did not release any costs until recently and it did not include any property costs, compensation values or process considerations. Economic conditions that will affect land owners have not been addressed in this process, communicated clearly or allowed for input.	The total size of SWM facilities in the study area is similar between Alternatives 3 to 6. Alternative 6 recommends grouped SWM controls to minimize the total number of facilities. In some locations, this results in drainage from one property being stored on another property. The SWM corridors identified in the EA are required to provide stormwater management controls for development properties and are restricted until development size, type and needs are determined through next step processes such as Secondary Plans, Functional Servicing Studies, etc. An opinion of probable cost was included in the ESR (Section 6.3 and Appendix K) and includes an estimate of the relative cost between the alternatives which was one of the evaluation criteria used to select the preferred alternative. Property costs were not included as they were similar between alternatives and vary with location. Ultimate land use designations within the study area are not finalized during the EA process. The ESR 30 day review period following the publication of the Notice of Completion is intended to address any outstanding concerns. The City of Windsor will be undertaking a Growth Management Study to explore infrastructure implementation and financing tools for development of the Sandwich South Lands in the Upper Little River watershed. Budget for said study was approved by City Council on January 16, 2018.	

The public suggested including airport lands in the study area as there is a lot of potential in this area, approximately 467 hectares of available space, but this was dismissed by the project team. This has come across to the public that the proponents show no consideration or intent to involve the public, consider any input, to be transparent and act with a fair and just approach that was outlined in the environmental assessment process. Rather, it seems it is the proponents' intent to isolate the airport lands from the plan for another purpose. This will result in the development of these lands that will benefit the City of Windsor, while others will not be able to share in the benefits, or they will be delayed in development of their lands and unsure if any remaining lands will be considered for meaningful development.	The airport lands are included in the study area and any future airport development will have the same SWM requirements as the remainder of the study area as documented in Section 6.1 of the ESR. In the ESR the airport lands were assumed to provide SWM controls for the airport property. The preferred Alternative 6 (as discussed in Section 5.2.6 of the ESR) groups geographic areas together and identifies SWM facility locations allowing for phased development. Alternatives 3 and 4 (described in Sections 5.2.3 and 5.2.4 of the ESR) evaluated large communal SWM facilities but were not selected as the preferred alternative due to several factors as described in Table 15 including higher upfront capital costs, fish habitat losses, and increased attractiveness to birds (i.e. hazard to aviation). Most of the airport property is located at higher elevations with a portion of available low lying land located adjacent to Upper Little River (approximately 400 m of channel as shown on Drawing 3 from the ESR). Other low lying portions of the airport lands are occupied by a large solar farm project and woodlots that are designated as provincially significant wetlands (PSWs). The airport lands generally slope from west to east with approximate elevations of 190 metres near the western boundary, 182 metres near the southeast corner, and 181 metres near the northeast corner of the property. Significant parts of the low lying portions of the airport lands are encumbered by the solar farm in the northeast portion of the property and the PSW (woodlots) in the southeast portion of the property. These existing encumbrances limit the area available for a large facility in the low lying portions of the airport lands (as shown in Appendix G). The lower southeastern corner of the airport lands along Upper Little River is identified as a SWM corridor in the ESR, but this corridor must accommodate runoff from potential development areas along County Road 42 and setbacks from the PSWs.	

	Lands north of County Road 42 currently zoned as industrial and employment lands are geographically separated from Upper Little River and the other SWM corridors by PSWs and open space. Several existing SWM facilities located near the airport with large bodies of open water and extended green spaces are attracting avian species and can create the potential for increased collision hazards with aircraft (Section 7.1 of the ESR). Increasing SWM pond size has a strong correlation with attractiveness to avian use and the preferred alternative minimizes open water surfaces and fetch length. Diverting additional runoff to the airport lands will increase the potential hazards. It has been the City's experience that these hazards require extraordinary measures to overcome, and therefore this (along with the other noted reasons) is not considered a viable alternative. Treating stormwater runoff from external areas on the airport lands is not the preferred alternative base on the evaluation matrix shown in Table 16 of the ESR.	
Full Scope of Study Area		
The study report does not reference a study for the Hospital Lands under County Road 42 Secondary Plan, which is underway and the reserve corridor size clearly does impact said lands, restricts the amount of land available for development and places the status of a large amount of land in limbo.	The hospital lands are referenced in Section 3.6.5. and are expected to utilize the corridor for SWM controls as described in Section 6. The SWM corridor identified in the EA is required to provide stormwater management controls for development properties.	

The requester is concerned that this Plan will become the guiding document for stormwater management controls on the Upper Little River that will be applied to upcoming projects and any future developments (including Lauzon Parkway, County Road 42 and current hospital development).	The intent of the EA is to provide a guiding SWM strategy for the study area to reduce downstream flooding and minimize the number of SWM facilities as discussed in Section 2 of the ESR. A comprehensive study was undertaken to determine the preferred SWM strategy and flow requirements. The preferred alternative will provide a balanced and relevant natural, social, technical, and economical criteria to establish appropriate drainage and stormwater management requirements at a watershed level that meets the needs of the area stakeholders**.**	
The Codes of Practice define impact management measures as "measures which can lessen potential negative environmental effect or enhance positive environmental effect." These measures could include "mitigation, compensation, or community enhancement." Compensation has not been discussed in the Plan. The requester has not been informed nor been involved in any discussion on compensation. The EAA also defines environment to include the economic environment. This has not been discussed in the Plan.	The Code of Practice refers to compensation as a method to lessen potential negative environmental effects or enhance positive effects and includes any effect on the environment including air, land, water, plant and animal life, social, economic, culture, buildings, etc. The Code of Practice gives priority to the avoidance of impacts at source, followed by minimizing or mitigating impacts, and finally providing compensation for any negative environmental effects. With regard to economic impacts, the economic environment was incorporated in the evaluation of alternatives as shown in Table 15 and 16. The relative capital and maintenance costs were evaluated to determine the preferred alternative. The economic environment was evaluated based on the overall economic benefit to the study area as well the economic impact to individual properties. The infrastructure for the SWM corridor will be owned by the municipality and the required property will be acquired in accordance with the laws of the Province of Ontario. It is not a requirement of this EA process to repeat the long and well established processes of the Province. The City of Windsor will be undertaking a Growth Management Study to explore infrastructure implementation and financing tools for development of the Sandwich South Lands in the Upper Little River watershed.	

Environmental Concerns		
The Plan will impact the owner's lands and a significant number of neighbouring lands.	The preferred alternative is designed to minimize the number of stormwater management facilities, as well as associated operating and maintenance costs as discussed in Section 5 and 6 of the ESR. In some locations this results in drainage from one property being stored on another property with associated impacts. Based on the evaluation of alternatives in Tables 15 and 16 of the ESR, Alternative 6 is the preferred alternative for providing stormwater management controls for the study area. It provides the required stormwater management controls, minimizes the total number of facilities, provides staging flexibility, reduces the attractiveness of the facilities to avian species, and does not create any additional barriers to fish movement. Lands impacted by the SWM corridor will ultimately be owned by the Municipality. The Municipality will acquire the required property in accordance with the laws of the Province of Ontario.	

The avian management: report (CR191-2012) adopted by Windsor City Council on Aug 27, 2012 makes reference to the Upper Little River watershed. It states that the airport could utilize open space lands for a natural stormwater treatment and possible detention. The requester asked why the airport is now not being considered to help with stormwater management and was told this is because of avian management. Our lands are 40 metres directly south of the airport- so why do these avian management laws not apply on the requester's lands?	Avian management applies to all lands within the study area and will impact the proposed design of the SWM facilities as discussed in Section 7.1 of the ESR. The area around the provincially significant wetlands (PSW) and the McGill Drain were considered for stormwater management (SWM) early in the EA process (refer to PIC 1 boards in Appendix B). Concerns were raised with the approvability of SWM facilities near the PSW and maintenance of the PSW SWM facilities that were originally proposed (a non-standard forested wetland type facility). A large solar project on the airport lands has also removed the need for much of the SWM controls on the airport lands, as they generally maintain existing conditions. SWM control for the remaining developable parcels is proposed to occur along Upper Little River (refer to Section 6.1 and Drawing 3). The airport lands generally slope from west to east with an approximate elevation of 190 metres near the western boundary, 182 metres near the southeast corner, and 181 metres near the northeast corner of the property. Significant parts of the low lying portions of the airport lands are encumbered by the solar farm in the northeast portion of the property and the PSW (woodlots) in the southeast portion of the property. These existing encumbrances limit the area available for a large facility in the low lying portions of the airport lands (as shown in Appendix G). The lower southeastern corner of the airport lands along Upper Little River is identified as SWM corridor in the ESR, but this corridor must accommodate runoff from potential development areas along County Road 42 and setbacks from the PSWs. Several existing SWM facilities located near the airport with large bodies of open water and extended green spaces are attracting avian species and can create the potential for increased collision hazards with aircraft (Section 7.1 of the ESR). Increasing SWM pond size has a strong correlation with attractiveness to avian use and the preferred alternative minimizes open water surfaces and fetch length. Diverting additional runoff to the airport lands will increase the potential hazards.	

Climate change: proponents stated that climate change would continue to have a greater impact with an increase in storm frequency, and that this was a major factor in the Stormwater management facility size change. They also stated that they included a margin of safety to the increased corridor size to address climate change. Impacted parties were not informed of this beforehand.	Climate change was addressed in Section 7.6 of the ESR as required by the 2014 Provincial Policy Statement. Current local municipal standards do not include the impacts of climate change. The proposed SWM controls were evaluated by performing a sensitivity analysis on the system and applying a 20% increase to the 100-year, 24-hour Chicago design storm event, which is consistent with other studies in the area. When the design storm was increase by 20%, runoff volumes increased by approximately 20 to 30%, requiring larger stormwater management facilities, increasing the facility widths by 15 m. These changes did not modify the preferred alternative. The ESR 30 day review period following the publication of the Notice of Completion is intended to address any outstanding concerns.	

From December 5, 2017 meeting		
The Balazs property is currently zoned open space in the Official Plan and earlier documentation was presented suggesting that the City of Windsor was considering changing the zoning to Employment Lands**.** Mr. Balazs still wants this to happen and wants the City to provide clarification on this matter**.**	The lands were designated Open Space in the City's Official Plan by OPA 60. Lands are zoned Agriculture in Tecumseh Zoning By-law 85-18, which remains the current zoning by-law for the previously annexed area. The reference to the earlier documentation means the stakeholder November 28, 2012 meeting minutes for the Lauzon Parkway Project and the draft Sandwich South Secondary Plan. The Lauzon Parkway EA is now in effect, however, the Sandwich South Secondary Plan was discontinued. The lands are now part of the County Road 42 Secondary Plan process, which Mr. Balazs has participated in. That process is ongoing and any comments about land use in that secondary plan should be provided as part of that process. Land designation and zoning are part of the County Road 42 Secondary Plan and not part of the Upper Little River Master Plan Study.	
Additional documentation was requested in Section 8 of the ESR concerning property acquisition and compensation	The infrastructure for the SWM corridor will be owned by the municipality and the required property will be acquired in accordance with the laws of the Province of Ontario. As previously discussed, it is not a requirement of this EA process to determine acquisition and compensation processes. The City of Windsor will be undertaking a Growth Management Study to explore infrastructure implementation and financing tools for development of the Sandwich South Lands in the Upper Little River watershed. Budget for said study was approved by City Council on January 16, 2018.	

The Airport Lands were suggested as a potential location for stormwater management facilities for external areas thereby removing the SWM corridor from private property	The airport lands are included in the study area and any future airport development will have the same SWM requirements as the remainder of the study area as documented in Section 6.1 of the ESR. In the ESR the airport lands were assumed to provide SWM controls for the airport property. The preferred alternative 6 (as discussed in Section 5.2.6 of the ESR) groups geographic areas together and identifies SWM facility locations allowing for phased development. Alternatives 3 and 4 (described in Sections 5.2.3 and 5.2.4 of the ESR) evaluated large communal SWM facilities but were not selected as the preferred alternative due to several factors as described in Table 15 including higher upfront capital costs, fish habitat losses, and increased attractiveness to birds (i.e. hazard to aviation). Most of the airport property is located at higher elevations with a portion of available low lying land located adjacent to Upper Little River (approximately 400 m of channel as shown on Drawing 3 from the ESR). Other low lying portions of the airport lands are occupied by a large solar farm project and woodlots that are designated as provincially significant wetlands (PSWs). The airport lands generally slope from west to east with approximate elevations of 190 metres near the western boundary, 182 metres near the southeast corner, and 181 metres near the northeast corner of the property. Significant parts of the low lying portions of the airport lands are encumbered by the solar farm in the northeast portion of the property and the PSW (woodlots) in the southeast portion of the property. These existing encumbrances limit the area available for a large facility in the low lying portions of the airport lands (as shown in Appendix G). The lower southeastern corner of the airport lands along Upper Little River is identified as a SWM corridor in the ESR, but this corridor must accommodate runoff from potential development areas along County Road 42 and setbacks from the PSWs.	

	Lands north of County Road 42 currently zoned as industrial and employment lands are geographically separated from Upper Little River and the other SWM corridors by PSWs and open space. Several existing SWM facilities located near the airport with large bodies of open water and extended green spaces are attracting avian species and can create the potential for increased collision hazards with aircraft (Section 7.1 of the ESR). Increasing SWM pond size has a strong correlation with attractiveness to avian use and the preferred alternative minimizes open water surfaces and fetch length. Diverting additional runoff to the airport lands will increase the potential hazards. It has been the City's experience that these hazards require extraordinary measures to overcome, and therefore this (along with the other noted reasons) is not considered a viable alternative. Treating stormwater runoff from external areas on the airport lands is not the preferred alternative base on the evaluation matrix shown in Table 16 of the ESR.	

SALEM, McCULLOUGH & GIBSON
PROFESSIONAL CORPORATION
Barristers and Solicitors

William A. Salem, B.A., LL.B. *(Retired)*
Philip D. McCullough, B.A., LL.B.
Deborah-Lynn Gibson, LL.B.

2828 Howard Avenue
Windsor, Ontario N8X 3Y3
Telephone (519) 966-3633
Fax (519) 972-7788
Email: salmcc@netscape.net

21 April 2017

Sent by Email: kstuart@citywindsor.ca
And sent by Fax: 519-255-6868

Attention: Kelly Stuart
Council Services Department, Office of the City Clerk
Corporation of the City of Windsor
350 City Hall Square West, Rm 203
Windsor, ON N9A 6S1

Dear Madam:

RE: Upper Little River Master Plan Environmental Assessment – Filing the Notice of Study Completion (Ward 9)
Our Client: 386823 Ontario Limited
Property: Part Lot 18, Conc. 9 – Vacant land on Cty Rd 42

We are solicitors for 386823 Ontario Limited who are the registered owners of the property legally known as Part Lot 18, Conc 9, City of Windsor – PIN 75236-0066 (LT). These lands front onto County Rd 42 and are immediately adjacent on the eastern side of my client's lands with the Little River as shown on the attached map.

Our client's family have owned this property since 1965.

Even though their lands are immediately adjacent to the Little River there has never been a flooding issue of any kind and the land has been actively farmed for all of those years without any difficulty. My clients do not have any development plans underway but, do not, want to have anything done to their lands that would significantly restrict their development potential.

Mr. William Balazs, the president of the corporation, has been actively involved since 2007 on land use (Open Space) and with respect to this matter at PIC#1 and PIC#2 and the Stake Holders Meeting since approximately 2012. He has attempted to attend all of the meetings and listened to administration's proposal and presented our position and objections.

As well, he has attended meetings or reviewed matters reporting on the Extension of Lauzon Parkway, Reconstruction of County Road 42, Airport Property as it relates to (Land Use on the North Side of CTY 42, Solar Farm, additional land purchased on north of County 42) and the discussions of the Sandwich South Secondary Plan on Land Use.

The most disturbing thing that has come out from these discussions is the proposal to have a designated "Open Space" storm water management corridors that would be 250 meters wide along Little River. This 250 meter corridor would extend the entire depth of our client's lands. We have 28.3 acres and we have done a quick math, which means we will loss 13.6 acres of land to corridor. This corridor of 250m wide along Little River runs from the north of the future East-West Arterial Road to CP Railway.

Figure – 9 (3 pages)

Additionally, the proposal as we understand it, is that any tributaries of the Little River would have a storm water management corridor of 150 meters wide along any tributaries of the Little River. Finally it's has been stated the corridors' are (Reserved) until functional and detailed designs have confirmed the required width, following which surplus lands will be (Released).

We have some other questions with some items requiring explanation. We also want to check if our positions presented at these meetings have been addressed or what has been said is reflected in the final report. At the Stake Holders Meeting held in 2012 we were told the corridor could be less then 100m or 150m and they wish to use the Land Use description of Open Space to cover the possible requirements of the Little River Corridor, therefore providing reason to only give us a portion of said land changed to Future Employment and a large balance to remain Open Space. These are strong words –Open Space- to only reserve lands.

We understand that there is a full report forthcoming on the Upper Little River Master Pan Environmental Assessment-Filing the Notice of Study Completion, Ward 9. We have not yet received that Report nor has Council seen that Report.

As we understand this process, once the council gives direction to the Administration of the report it must go to 30-days Public Review with the above mentioned final report being available only at that time. We understand Council will only see the full report during the 30 day period. Members will also have the report available.

The public only have one way to have their objections heard through the Part II Order, which requires them to file any objection to the Minster of the Environment. The Minister will undertake a review and render a decision. We will have no further follow-up with the City or parties involved.

The effect of the storm water corridor that would be 250 meters wide will have a devastating effect on our client's use of their lands and would have a crippling effect on the value of their property. Further, we will be held in limbo until things are confirmed and miss any potential development. The key question, who is paying for the corridor lands/Open Space that will require the creation of low lands and rolling landscape with facilities, since we have no natural environment on existing lands.

It is our view that City Council should conclude the report is not complete or final and send it back to administration and insists that administration provides some credible evidence to support their demand for such an unfairly wide storm water management corridor, as well a clear break down of capital cost and who will pay for the corridor lands/Open Space. We would also request a change of the final report to a Draft, thereby allowing a public review of the report with feedback for all parties, since the last review was 2012.

We do not want council giving direction to this process based on a seven page summary with a 10 page attached appendix. In the past the City has clearly stated they are transparent, fair and will not be placed in a position that might later give rise to a private property owner claiming the city was unfairly restricting development rights or compensation.

We would like the opportunity to address Council regarding this matter and Mr. William Balazs and the undersigned will be in attendance as a delegate at the Council meeting on Monday, April 24th, 2017.

Yours truly,
SALEM, McCULLOUGH & GIBSON

Philip D. McCullough

PDM:at

Cc: 386823 Ontario Limited – Attention: William Balazs
Hilary Payne
Ted Halwa

TECHNICALLY PREFERRED PLAN
LKER ROAD TO CITY / COUNTY BOUNDARY

Table B- Proponent Information Requirements

PROPONENT:	**The City of Windsor, the Town of Tecumseh, and the Essex Region Conservation Authority**
PROJECT TITLE:	**Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan**
PROJECT LOCATION:	**City of Windsor and Town of Tecumseh**

Required Information	**Response or Attachments**
Consultation Record Please provide a brief summary of each type of consultation (e.g. PIC, stakeholder meetings, and notices) and the date it occurred for the following groups. • Public; • Agency; and • Indigenous community (Please indicate what communities were contacted and how you identified who to contact). If provided in the EA documentation, summarize here and provide exact reference location in the EA documentation.	PICs were held on May 29, 2012 and October 22, 2012 (Section 3.4.1 of the ESR) Project updates were presented at the open Environment, Transportation and Public Safety Standing Committee in the City of Windsor (March 22, 2017), and at open Council meetings in the City of Windsor (April 24, 2017) and the Town of Tecumseh (May 23, 2017). The Notice of Commencement was published in October 2011 (Appendix B) and the Notice of Completion was published in September 2017 (attached). Meetings with the City of Windsor and Town of Tecumseh were held throughout the study (Appendix D). An initial project overview meeting was held with the MOECC in 2011 and notices were sent to relevant agencies at study commencement and study completion including the Ministry of Environment and Climate Change, Ministry of Natural Resources and Forestry, Ministry of Transportation, Ministry of Agriculture, Food and Rural Affairs, Ministry of Aboriginal Affairs, Ministry of Municipal Affairs and Housing, Ministry of Tourism, Culture and Sport, Department of Fisheries and Oceans, City of Windsor, Town of Tecumseh, County of Essex, and the Essex Region Conservation Authority. Indigenous communities were contacted during study commencement, study completion and following the PICs as documented Section 3.4.2 of the ESR and in the attached Consultation Log.

Required Information	Response or Attachments
Source Protection Information to support how proponent has considered source water protection including: • Source Protection Area; • Potential drinking water threats, • If the project(s) are located in an Intake Protection Zone (IPZs) or Well Head Protection Areas (WHPA); • Comments from the conservation authority (Please attach a copy of these comments or provide the exact location reference within the EA documentation) and;	Portions of the study area are located in source water protection vulnerable areas for both surface water and groundwater. The Essex Region Source Protection Area – Approved Source Protection Plan (SPP) (2015) and the Essex Region Source Protection Area – Updated Assessment Report (AR) (2015) identify most of the municipal drains and Upper Little River within the study area as Intake Protection Zone (IPZ)-3. Figures showing vulnerable areas are attached for reference. The ESR will be updated to include a Source Water Protection Section. The EA proposes stormwater management facilities which will provide water quality and water quantity control for residential, commercial, and industrial lands. The SWM facilities are all located in IPZ-3, outside of the more vulnerable IPZ-1 and IPZ-2. SWM facilities can be managed through Environmental Compliance Approvals (previously Certificate of Approval) which generally address criteria for operation and performance of the stormwater management facility, requirements for monitoring and recording of specific indicators of the environmental impact of the works (water quality, not quantity), reporting on incidents, and provision of contingencies to prevent and deal with accidental spills. Significant groundwater recharge areas are located along the western study limits in an already developed area and have a low vulnerability. No municipal drinking water systems are supplied by groundwater although groundwater is used occasionally for domestic consumption, mainly in rural areas. Discussions with the Project Manager for Drinking Water Source Protection for Essex Region (Katie Stammler) identified policies and vulnerable areas within the study limits (refer to attached emails). While the project does not involve installing or altering a municipal drinking water intake, modifications to the drainage network are proposed. This will require an update to the IPZ-3 and Event Based Area. Some portions of these vulnerable areas may be removed through a s.51 amendment to the SPP and AR if drains are removed. If new drains are installed or are relocated, the vulnerable areas will need to be extended, which will require either a s.34 amendment to the SPP and AR or would be included in the Essex Region SPA s.36 work plan. A map showing final changes to

Required Information	Response or Attachments
	the drainage network was requested by the Project Manager for Drinking Water Source Protection for Essex Region so that updates to vulnerable areas can be made. Event based area policies that apply to the study area include Policies 31 and 32 from the Source Protection Plan. These apply to the existing and future threat of above grade handling and storage of liquid fuels, in quantities where modelling reported in the Assessment Report has demonstrated that this activity is a significant threat. Any existing storage of fuel above the threshold limit (15,000 L) should have a Risk Management Plan and inform ERCA of the installation of any future fuel storage that exceeds these limits. There are no event based area policies for groundwater. Through the events based approach, an activity is a significant drinking water threat in an IPZ-1, IPZ-2, or IPZ-3 if modeling demonstrates that a release of a contaminant from the activity would result in a deterioration of the source of drinking water quality. The Essex Region Source Protection Committee has accepted the Ontario drinking water quality standard (ODWQS) as the benchmark to indicate the deterioration of raw water quality at the intake. Modelling of hypothetical spills of large volumes of liquid fuel at various locations demonstrated exceedances of the ODWQS for benzene, at one or more of the intakes in Lake St. Clair, the Detroit River and Lake Erie. These results were used to identify existing significant threats and establish potential significant threats criteria for the handling and storage of liquid fuel. The Ontario Ministry of Environment and Climate Change (MOECC) shall review Municipal Drinking Water Licenses and Permits issued under the Safe Drinking Water Act, in the vulnerable areas where there is an existing or future significant drinking water threat of handling and storage of liquid fuels. The MOECC shall ensure that the permits refer to the requirements of the Technical Standards and Safety Act (TSSA), liquid fuel handling code. This may include, but is not limited to, details concerning installation, operation and regular inspection of fuel storage tanks, how fuel is contained, the location of fuel, and how fuel is stored. The Ministry of Natural Resources and Forestry (MNRF) shall review

Required Information	Response or Attachments
	instruments under the Aggregate Resources Act (including Aggregate Licenses, Wayside Permits, and Aggregate Permits and Site Plans) with respect to the handling and storage of liquid fuel at aggregate operation sites. The MNRF shall ensure that the permits refer to the requirements of the Technical Standards and Safety Act (TSSA), liquid fuel handling code. This may include, but is not limited to, details concerning installation and operation of fuel storage tanks, how fuel is contained, the location of fuel, and how fuel is stored. The Source Protection Plan only includes policies for municipal intakes and does not include private sources of drinking water in the area. There are no highly vulnerable aquifers within the study limits but there are significant groundwater recharge areas along the currently developed western study limits. No municipal drinking water systems are supplied by groundwater although groundwater is used occasionally for domestic consumption, mainly in rural areas.
<u>Climate Change</u> Information summarizing how mitigation or resiliency measures for the effects of climate change (example: frequent or severe weather events (e.g., IDF curves), greenhouse gases (modeling for greenhouse gases), air quality components) on or from the projects/plan were considered. If assessed in the EA documentation, summarize here and provide exact location reference in the EA documentation.	Climate change was addressed in Section 7.6 of the ESR. Current municipal standards do no include the impacts of climate change. The Essex Region Conservation Authority and the Toronto and Region Conservation Authority completed a study related to updating IDF curves in 2016 titled “A Comparison of Future IDF Curves for Southern Ontario”. The aim of the study was to understand the limitations and applicability of different techniques for updating IDF statistics in light of climate change for the Windsor-Essex Region and the Greater Toronto area. The results of this study showed significant variability and uncertainty between the different updating methods analysed. Based on the permutations analyses, no single method best approach for developing future IDF curves was determined for the study areas. In the absence of a reliable updated IDF curve, climate change was assessed for the proposed SWM controls by performing a sensitivity analysis on the system and applying a 20% increase to the 100-year, 24-hour Chicago design storm event, which is consistent with other studies in the area. When the design storm was increase by 20%, runoff volumes increased by approximately 20 to 30%, requiring larger stormwater

Required Information	Response or Attachments
	management facilities and increasing the facility widths by 15 m (refer to Figures 21 to 24 from the ESR). The SWM Facilities in the ESR can accommodate a 20% increase in precipitation volumes.
<u>Species at Risk</u> Species in a project area subject to *Endangered Species Act*, O. Reg. 242/08 and any applicable permits required. Any proposed mitigation measures or compensation should be described along with consultation (if any) with the Ministry of Natural Resources and Forestry. • Please provide all relevant correspondence between MNRF (If this is found within the EA documentation please specify the reference location).	There is potential habitat for several endangered species in the Study Area. Consultation with the various agencies will be required to confirm the presence of provincially rare species and significant natural heritage features as part of the development design. Species at Risk were addressed in Section 4 and Appendix E of the ESR. Mitigation measures are discussed in Section 6.2. Applicable Permits are discussed in Section 8.1. Appendix E contains a Table of Potential Species at Risk and Potential Rare Species in the Study Area based on the Natural Heritage Information Centre database, site visits, and previous work completed by Ecoplans Ltd. and Gerry Waldron Consulting Ecologists.
<u>Cumulative Effects</u> Information summarizing how the project considered cumulative effects. Description of how current and future policy/planning/environmental assessment works in the area were considered by the proponent as part of the assessment of the proposed plan/projects. If assessed in the EA documentation, summarize here and provide exact location in the EA documentation.	Current and future policy/planning/environment assessment works in the area were consulted to determine land use and future infrastructure locations. Significant policy/planning/environment assessment are documented in Sections 3.5 and 3.6 of the ESR Cumulative environmental effects of the proposed stormwater management facilities on Upper Little River were considered by evaluating flows and water levels along the channel. The historic Little River 1:100 year mapped flood elevations, that are used for regulatory flood elevations, were used as the maximum allowable flood elevations for the Upper Little River channel for the future post development condition. Flows from individual facilities are over controlled to compensate for the additive effects or superpositioning of hydrographs from multiple sources to maintain target flow rates and water elevations downstream of the study area. This approach is documented in Section 6.1. In addition, the study impacts were considered across the entire watershed area and evaluated with consideration of other than just local direct effects. The cumulative effects of distributed versus more

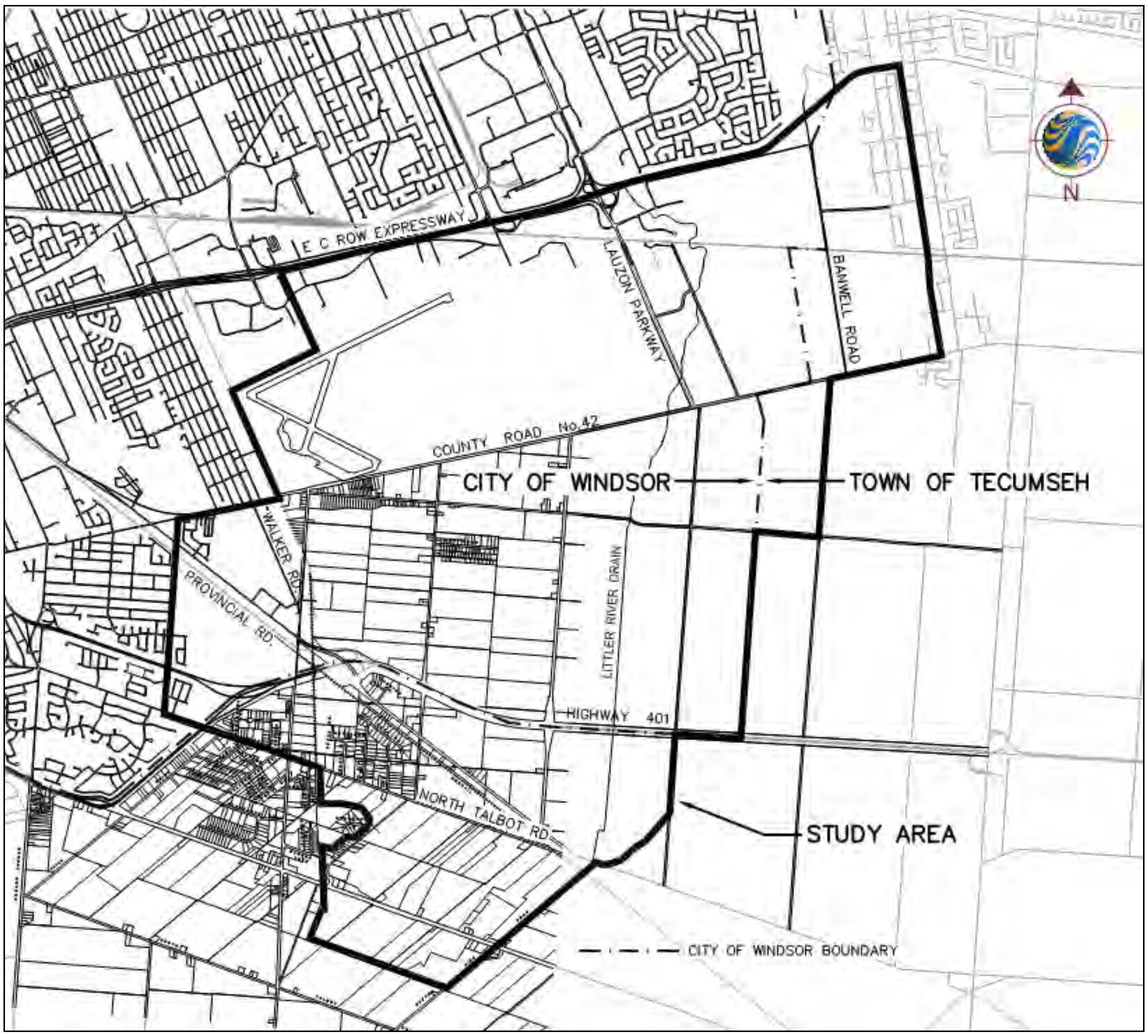
Required Information	Response or Attachments
	centralized or grouped SWM Facilities on the attractiveness of ponds to bird species and their impacts on airport operation was considered in the selection of the preferred alternative as discussed in Table 15 and Section 7.1. Erosion analysis along Upper Little River consider the cumulative flows from the upstream drainage area as discussed in Sections 4.5.6 and 6.1.
<u>Archaeological Assessment</u> Archaeological Assessment work is required to demonstrate no impacts on archaeological resources and/or cultural heritage resources, built heritage resources and other related issues that may be identified in the requests. Please outline whether a stage 1 and/or stage 2 Archaeological Assessment was conducted as part of the plan, whether anything was found, and whether it was submitted and accepted by Ministry of Tourism, Culture and Sport • Were the Ministry of Tourism, Culture and Sport consulted as part of the Plan? • Please provide any relevant correspondence.	A Stage 1 Archaeological Assessment was conducted as part of the plan (Section 7.5 of the ESR). The Stage 1 Archaeological Assessment can be found in Appendix J of the ESR. An examination of the Ontario Archaeological Sites Database showed that there are three archaeological sites registered within a one-kilometer radius of the study area. The majority of the study area (80%) consists of active and inactive agricultural land accessible for ploughing. The Stage 1 archaeological assessment resulted in the determination that portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological refocuses and a Stage 2 Archaeological assessment is required for most of the study area. The Ministry of Tourism, Culture and Sport (MTCS) were consulted as part of the Plan and provided comments regarding the draft ESR (attached for reference). Additional work is required to address concerns for Built Heritage Resources and Cultural Heritage Landscapes including the MTCS screening checklist “Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes” and/or a Cultural Heritage Assessment Report. This work is currently underway. The ESR will be updated to include a Cultural Heritage Resources Section.
<u>Class EA Process</u> Please provide the following information: • Was the MOECC regional office contacted? • What points/stages during the Class EA process were they contacted (please provide dates)? • Please provide any correspondence or comments received.	The MOECC Regional Office was contacted during the study commencement (October 2011), PIC’s (May 2012 and October 2012) and study completion (September 2017) portions of the EA. A project description was sent to the MOECC in 2011 and a teleconference was held to update the MOECC on the current status of the project and to give an overview of the project and where it is headed.

Required Information	Response or Attachments
	A notice of receipt during the study commencement, the project description sent to the MOECC in 2011, and comments on the draft ESR are attached for reference.
<u>Timing Considerations</u> Please provide the following information: • The total cost of the proposed Plan/projects? • Budget allocation? • Construction timing widow? • Will construction be a phased approach? • When is construction anticipated to be completed? • External funding? Any deadlines that need to be met for this funding?	An opinion of Probably Costs is provided in Section 6.3 of the ESR with a value of $72,500,00 for the preferred alternative. The City of Windsor will be undertaking a Growth Management Study to explore infrastructure implementation and financing tools for development of the Sandwich South Lands in the Upper Little River Watershed. Budget for said study was approved by City Council on January 16, 2018. Funding for the implementation of the EA recommendations will be the subject of said study. Lands impacted by the SWM corridor will ultimately be owned by the Municipality. The Municipality will acquire the required property in accordance with the laws of the Province of Ontario. Construction timing is dependant on the timing of future development works as the stormwater management facilities are required for development to proceed and will be constructed as needed. Current development timelines within the study limits vary from immediate to several decades. In-water work is only permitted during applicable fisheries timing windows. Construction of the individual stormwater management facilities will be phased to meet the demands of future development. The preferred alternatives allow for an area to develop independent of other areas.

ESSEX REGION CONSERVATION AUTHGORITY
NOTICE OF STUDY COMMENCEMENT

UPPER LITTLE RIVER WATERSHED MASTER DRAINAGE PLAN & STORMWATER MANAGEMENT PLAN

The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh has initiated a Master Plan Study in accordance with Phases 1 & 2 of the Municipal Class Environmental Assessment (EA) process. This Study will determine the stormwater management infrastructure requirements for the Upper Little River Watershed area to service existing and future development.



If you have any questions or wish to be added to the study mailing list, please contact:

Jeremy Wychreschuk, M.A.Sc., P. Eng.
Director of Watershed Engineering
Essex Region Conservation Authority
360 Fairview Avenue West
Essex, Ontario, N8M 1Y8
Tel: (519) 776-5209
Fax: (519) 776-8688
jwychreschuk@erca.org

Jayson Innes, M.A.Sc., P. Eng.
Project Manager
Stantec Consulting Ltd.
49 Frederick Street
Kitchener, Ontario, N2H 6M7
Tel: (519) 585-7282
Fax: (519) 579-8664
jayson.innes@stantec.com

Essex Region Conservation Authority
sustaining the place for life

THE CITY OF WINDSOR ONTARIO, CANADA

TOWN OF Tecumseh ONTARIO · CANADA

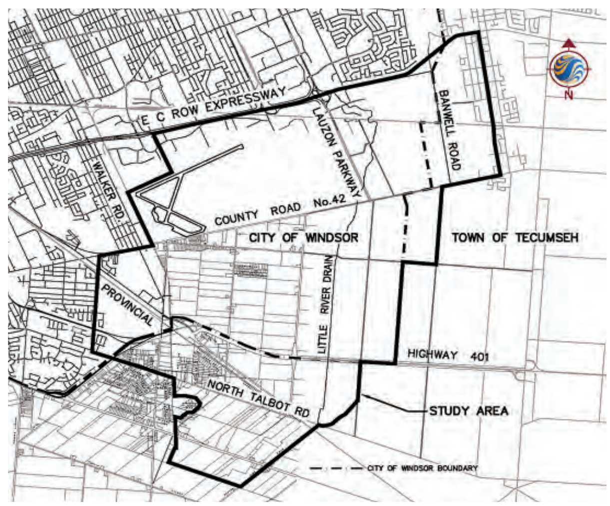
ESSEX REGION CONSERVATION AUTHORITY
NOTICE OF STUDY COMPLETION

UPPER LITTLE RIVER WATERSHED MASTER DRAINAGE PLAN AND STORMWATER MANAGEMENT PLAN

The Study

The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh has completed a Master Plan Study in accordance with Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process. The preferred alternative includes stormwater management facilities that provide controls for more than one property and are located near other facilities along corridors.

Public Consultation



This study was completed in accordance with the planning and design process of the *Municipal Class Environmental Assessment* (June 2000, as amended in 2007, 2011, and 2015) under the *Ontario Environmental Assessment Act.* The Class EA process includes public and review agency consultation, an evaluation of alternatives, an assessment of the impacts of the proposed alternative, and identification of a preferred solution. Based on input received from the public as well as from technical agencies and other stakeholders, the Project Team has prepared the Environmental Study Report (ESR) for this study. The ESR is being placed on the public record for a 30-day review period at www.citywindsor.ca, www.tecumseh.ca, or by visiting the following locations during normal business hours.

City of Windsor Office of the City Clerk 350 City Hall Square West, Suite 203 Windsor, ON, N9A 6S1	Town of Tecumseh Clerk's Office 917 Lesperance Road Tecumseh, ON, N8N 1W9

Interested persons should provide written comments related to this proposed undertaking by **October 30, 2017 (Note: The 30-day review period has been extended from the original end date of October 24, 2017 to the new end date of October 30, 2017.)**. Comments should be directed to the following individuals.

John Henderson, P. Eng.
Water Resources Engineer
Essex Region Conservation Authority
360 Fairview Avenue West – Suite 311
Essex, Ontario, N8M 1Y6
Tel: (519) 776-5209
Fax: (519) 776-8688
jhenderson@erca.org

Jayson Innes, M.A.Sc., P. Eng.
Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, Ontario, N2L 0A4
Tel: (519) 585-7282
Fax: (519) 579-6733
jayson.innes@stantec.com

If concerns regarding this project cannot be resolved, a person or party may request that the Ministry of the Environment and Climate Change make an order for the project to comply with Part II of the Environmental Assessment Act which address individual environmental assessments. Requests for a Part II Order must be received by the Minister of the Ministry of the Environment and Climate Change at 77 Wellesley Street West, 11th Floor, Ferguson Block, Toronto, Ontario, M7A 2T5 no later than **October 30, 2017,** including a copy submitted to the project team members listed above. If no request is received, the Design Study will become the guiding document for stormwater management controls on Upper Little River.

Contact Information	Date/Method of Communication	Comment/Concern	Response/Commitment to Carry Forward
Aamjiwnaang First Nation Chief Joanna Rogers 978 Tashmoo Avenue, Sarnia, ON N7T 7H5 519-336-8410 cplain@aamjiwnaang.ca	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012		
	Notice of PIC#2 via Canada Post – October 17, 2012 Letter Discussing the results from PIC #2 including display boards sent via Canada Post - December 18, 2012	Letter response dated April 15, 2013 noted that the information package would be forwarded to their Chief and Council for review and upon further direction from their council, we will be contacted to inform us of the next step.	No additional information was received
	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call October 26, 2017 Follow up Phone Call December 8, 2017		Follow up phone call – left message with Sharilyn Johnston to confirm receipt of project information and identify any concerns.
Caldwell First Nation Chief Louise Hillier P.O.Box 388 Leamington, ON N8H 3W3 cfnchief@live.com	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012		
	Notice of PIC#2 via Canada Post – October 17, 2012 Letter Discussing the results from PIC #2 including display boards sent via Canada Post - December 18, 2012	Letter Response dated November 27, 2012 requesting further consultation	A meeting was held with Caldwell First Nations on January 7, 2013 to discuss the project. During the meeting the project overview and history was presented. Outcomes of the meeting included a request for black willow and milkweed plantings within the study area and access to the black willow branches for harvesting. Caldwell First Nations also requested a copy of the Final Report for review.
	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call December 8, 2017		Follow up phone call – spoke with Mr. Delearly. Mr. Deleary indicated that they received the information and are dealing with political and organization issues with band council at the moment. Would review files and respond back shortly if there are any concerns.
Chippewas of Kettle and Stony Point First Nation Chief Tom Bressette 6247 Indian Lane Forest ON N0N 1J0 Thomas.bressette@kettlepoint.org	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call November 22, 2017 Follow up Phone Call December 8, 2017		Not noted in November 23, 2011 letter from Ministry of Aboriginal Affairs Notice of Completion sent along with a USB stick containing the full ESR. Follow-up phone call message left with Valerie George to confirm receipt of the project information and inquire if Chippewas of Kettle and Stoney Point First Nation had any concerns. Follow-up phone call message left with Valerie George to confirm receipt of the project information and inquire if Chippewas of Kettle and Stoney Point First Nation had any concerns.
Chippewa of the Thames First Nation Fallon Burch Consultation Coordinator Kelly Riley, Lands and Environment Rochelle Smith, (acting) Consultation Coordinator	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call November 22, 2017. Follow up Phone Call December 8, 2017.		Not noted in November 23, 2011 letter from Ministry of Aboriginal Affairs. Notice of Completion sent along with a USB stick containing the full ESR.

Contact Information	Date/Method of Communication	Comment/Concern	Response/Commitment to Carry Forward
			Follow up phone calls: Attempted to leave message with Kelly Riley (voicemail was full). Follow up phone call: left message with Richelle Smith – made reference to notice of completion and USB stick dated October 16, following up to discuss project and ensure COTTFN didn't have any concerns with the project.
Delaware Nation (Moravian of the Thames) Chief Greg Peters Justin Logan 14760 School House Line RR3 Thamesville ON N0P 2K0 gpeters@mnsi.net loganju@xplornet.ca	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012	Letter Response dated June 13, 2012 stating that the project was evaluated and it was recognized that this project will not require further consultation	
Munsee-Delaware Nation Chief Roger Thomas, Glen Forrest 279 Jubilee Road Muncey ON N0L 1Y0 Chief.thomas@munsee-delaware.org	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call Dec 8, 2017		Not noted in November 23, 2011 letter from Ministry of Aboriginal Affairs Follow up phone call – spoke with executive assistant Carol Antone. Noted that the Chief has a long list of projects to review, and requested that the letter be emailed. Emailed the letter on Dec. 8, 2017. carol@munsee.ca.
Oneida of the Thames First Nation Chief Randall Philips Holly Elijah 2212 Elm Ave Southwold, ON N0L 2G0 sheri.doxtator@oneida.on.ca	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012		
	Notice of PIC#2 via Canada Post – October 17, 2012 Letter Discussing the results from PIC #2 including display boards sent via Canada Post - December 18, 2012		
	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call October 26, 2107 Follow up Phone Call November 23, 2017 Follow up Phone Call December 8, 2017		Follow up phone call – left message with Public Works assistant. Follow up phone call – was referred to Janelle in the Political Office. Left voicemail message with Janelle to confirm receipt of project information and to identify any concerns with the project.
Bkejwanong Territory (Walpole Island) Chief Dan Miskokomon Jared Macbeth Dr. Dean Jacobs Janet.macbeth@wifn.org Wallaceburg, ON N8A 4K9	Notice of Commencement via Canada Post - October 12, 2011		
	Notice of PIC#1 via Canada Post – May 22, 2012 Letter Discussing the results from PIC #1 including display boards via Canada Post - June 1, 2012		
	Notice of PIC#2 via Canada Post – October 17, 2012 Letter Discussing the results from PIC #2 including display boards sent via Canada Post - December 18, 2012		
	Notice of Completion via Canada Post - October 16, 2017 Follow up Phone Call November 23, 2017 Follow-up Phone Call December 8, 2017		Follow up phone call – left message with Janet Macbeth. Follow up phone call – left message with Janet Macbeth to confirm receipt of project information and to identify any concerns with the project.

ERCA Vulnerable Areas

Essex Region Conservation Authority

Public Interactive Mapping

Legend

Surface Water Intake Protection Zone

- 1
- 2
- 3

Significant Groundwater Recharge Ar

- 2
- 4
- 6

Location

ERCA Geomatics **THIS MAP HAS BEEN PRODUCED BY THE GENERAL PUBLIC AND NOT BY QUALIFIED ERCA STAFF.**

Data herein is provided on an 'as is' basis. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable, and are for visual reference only. It is the responsibility of the end user to determine if this material is suitable for their use. Map not to be used for navigation or plan of survey.

Notes

0 1,666.88 3,333.8

Meters

1: 75,000

12/11/2017

ERCA Event Based Areas

Essex Region Conservation Authority

Public Interactive Mapping

Legend

Event Based Area (EBA)

Location

0 | 1,666.88 | 3,333.8

Meters

1: 75,000

12/11/2017

ERCA Geomatics

THIS MAP HAS BEEN PRODUCED BY THE GENERAL PUBLIC AND NOT BY QUALIFIED ERCA STAFF.

Notes

A. H. Weeks (Windsor) Water Treatment Plant East Intake IPZ 1, 2 and 3

Drinking Water Source Protection – Act for Clean Water

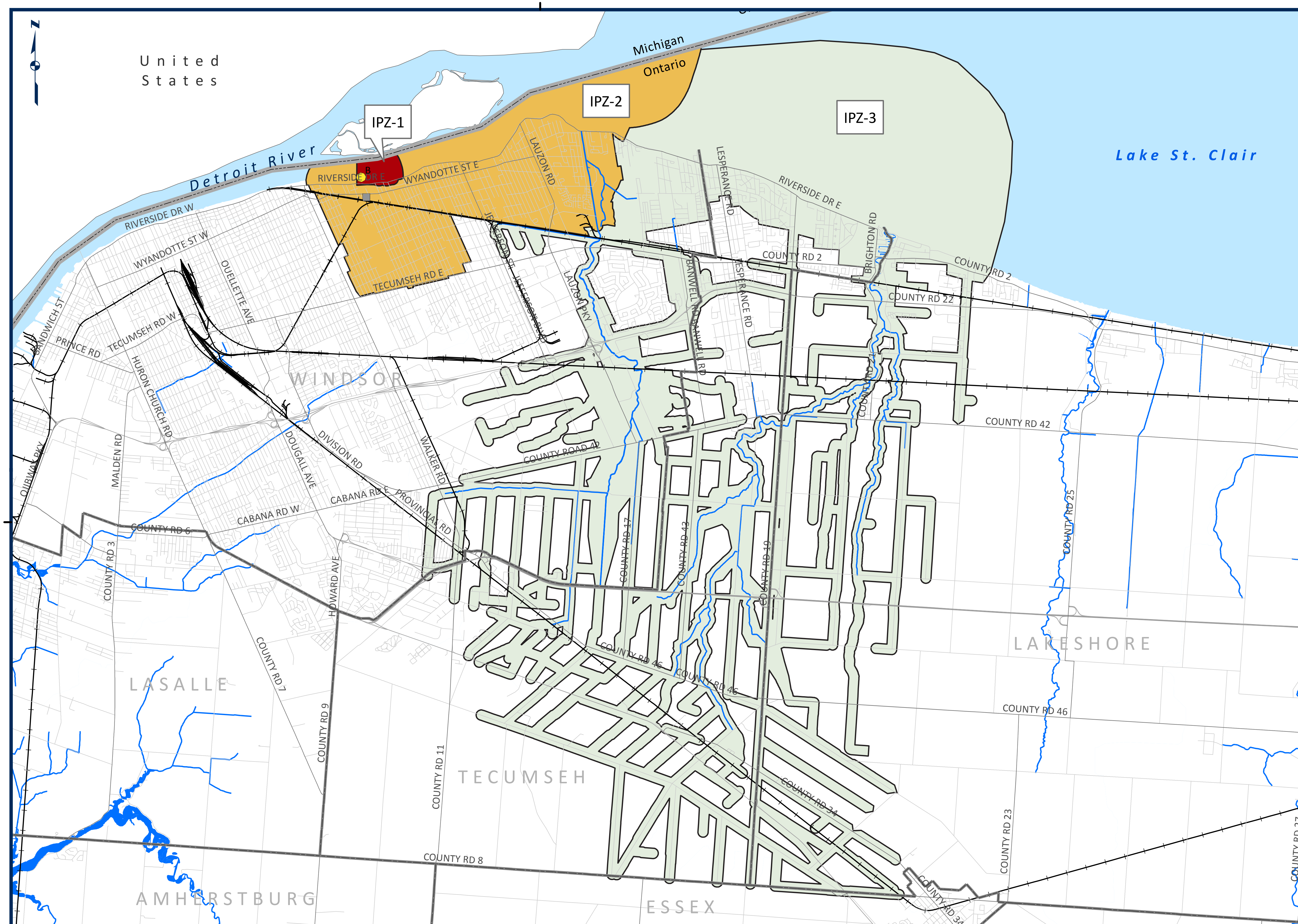
Essex Region Conservation Authority

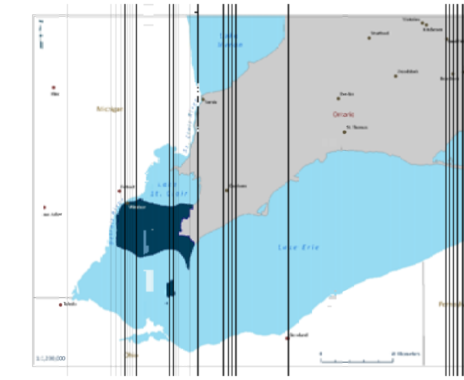
1:90,000

0 – 3 Kilometers

Made possible by the Government of Ontario

Ontario





Essex Region Source Protection Area Assessment Report Map 4.24b

Legend

- Intake - Type B
- Drinking Water System
- Municipal, Lower Tier
- International Boundary
- Road
- Railway
- Water and Drainage
- Water Body

Intake Protection Zones

- IPZ-1
- IPZ-2
- IPZ-3

This publication was produced by:

Essex Region Conservation Authority
360 Fairview Avenue West
Essex, ON N8M 1Y6

Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, Stantec Consultants, StatsCanada

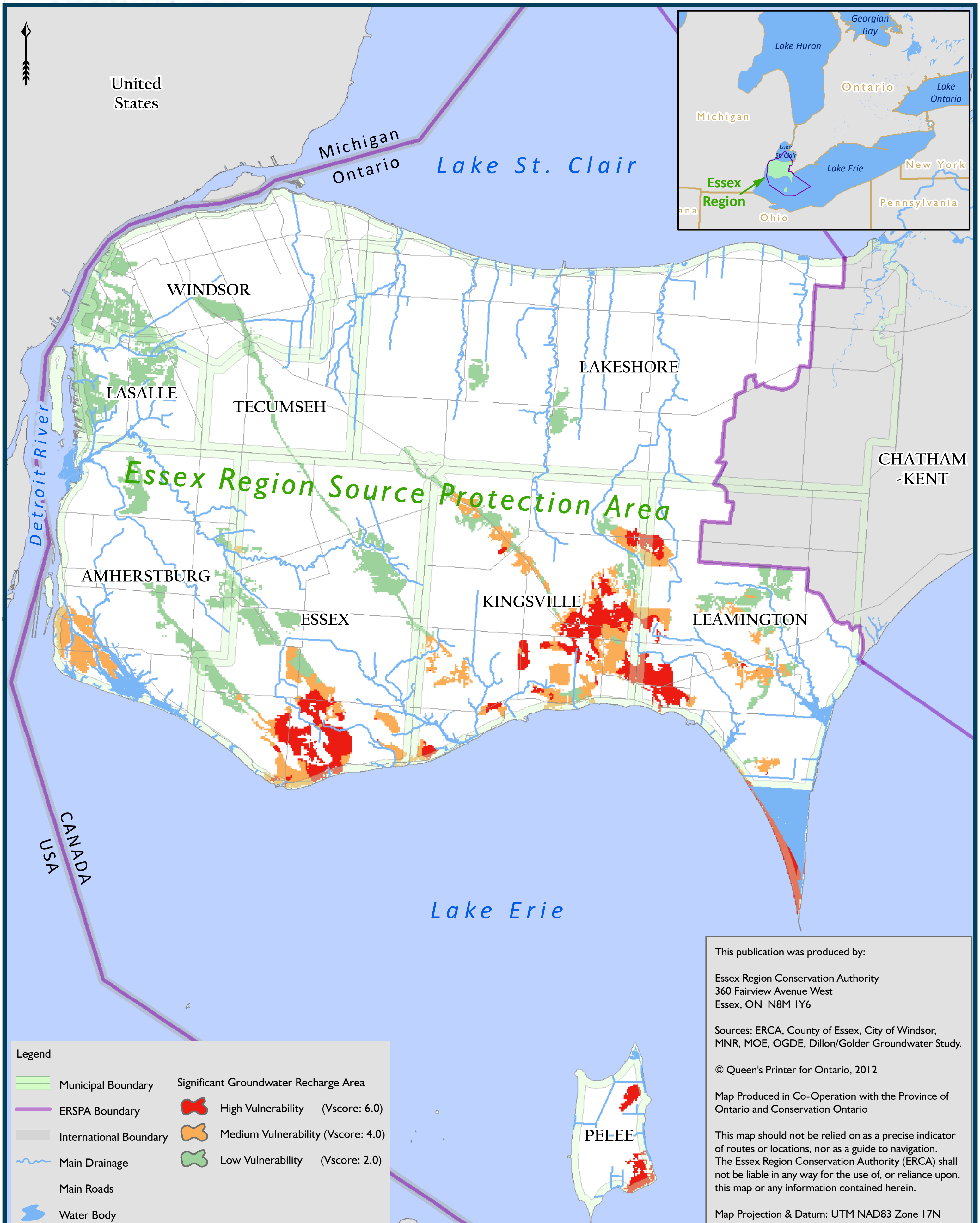
Map Produced in Co-Operation with the Province of Ontario and Conservation Ontario

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Essex Region Conservation Authority (ERCA) shall not be liable in any way for the use of, or reliance upon, this map or any information contained herein.

Map Projection & Datum: UTM NAD83 Zone 17N

Map 5: Significant Groundwater Recharge Areas

Made possible by the Government of Ontario



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Essex, ON N8M 1Y6

Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, OGDE, Dillon/Golder Groundwater Study.

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Map Projection & Datum: UTM NAD83 Zone 17N

1:320,000

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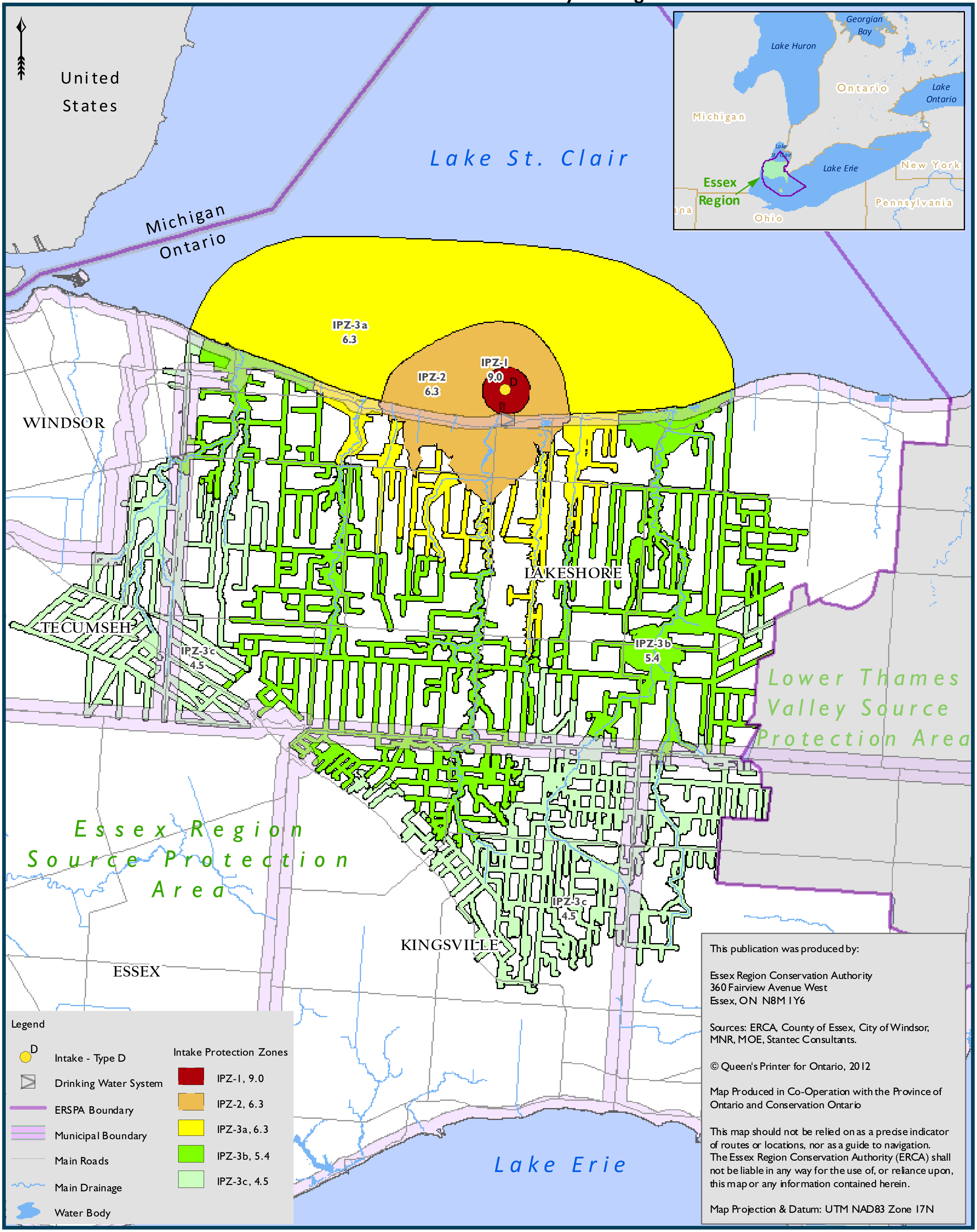
Map 7: Lakeshore (Belle River) Water Treatment Plant IPZs and Vulnerability Scoring

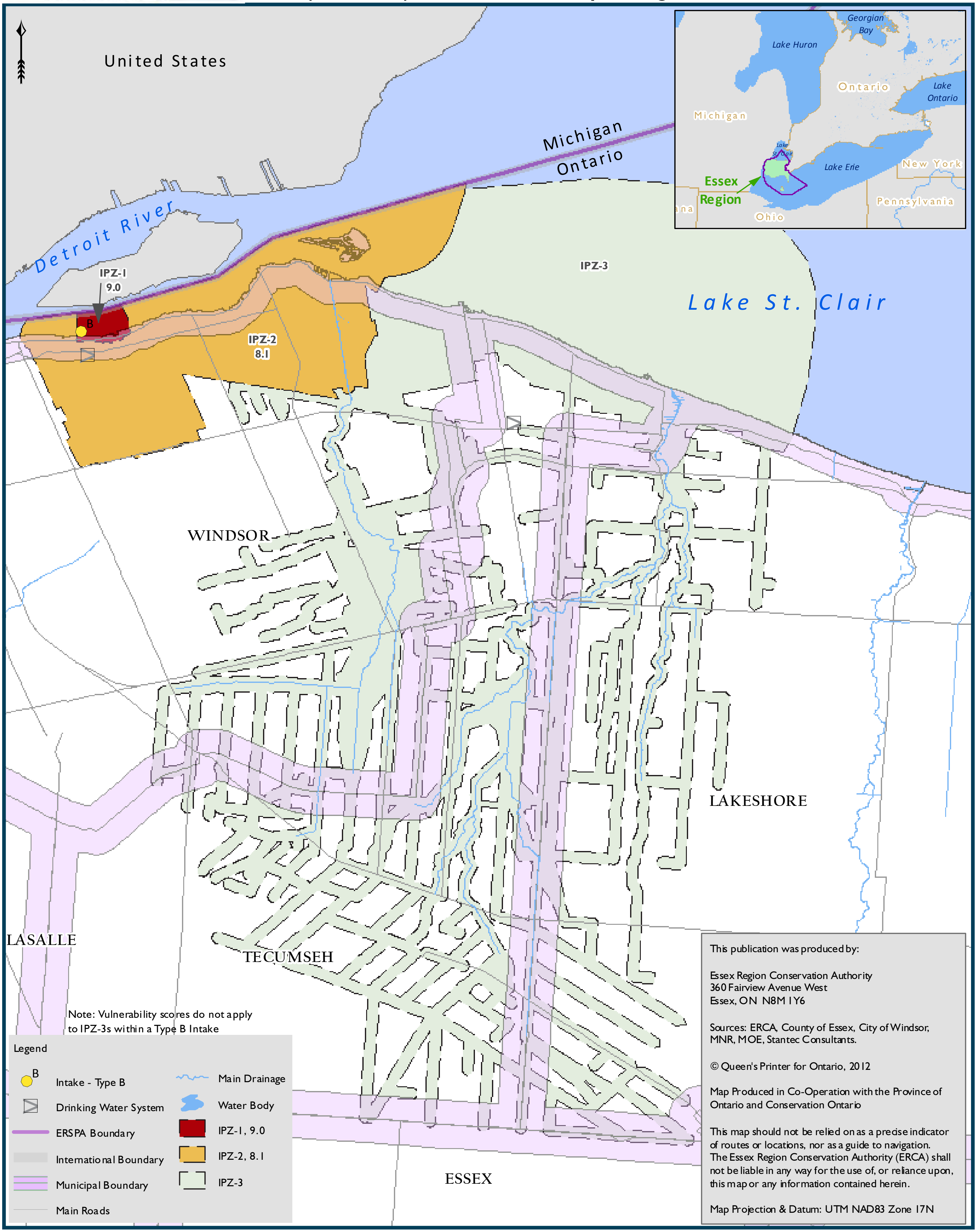


1:200,000

0 5
Kilometers

Map 8: A. H. Weeks (Windsor) Water Treatment Plant (East Intake) IPZs and Vulnerability Scoring

Made possible through funding support from the Government of Ontario



1:100,000

0 Kilometers 5

DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

Essex Region Conservation Authority

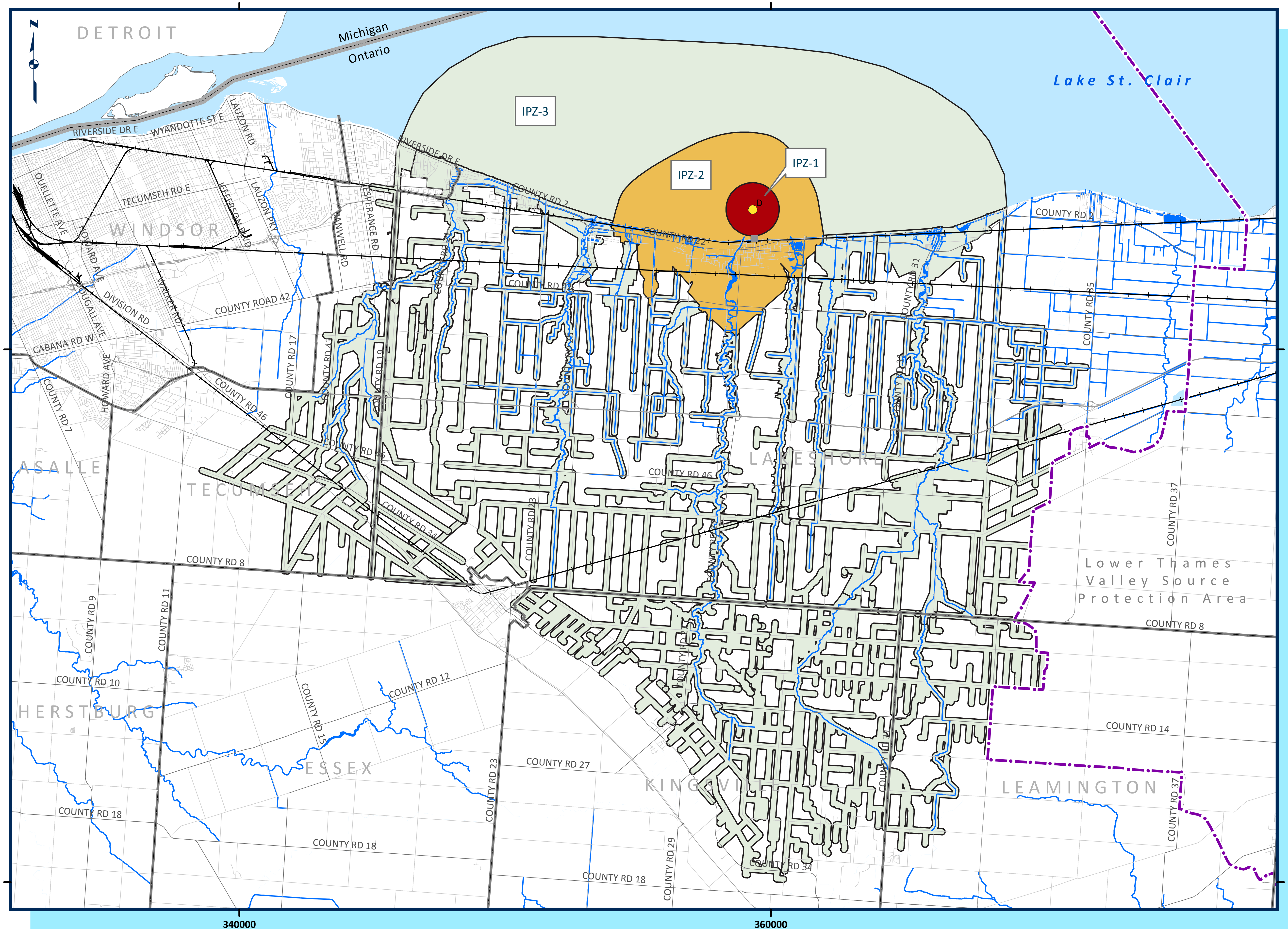
Lakeshore (Belle River) Water Treatment Plant Intake Protection Zones 1, 2 and 3

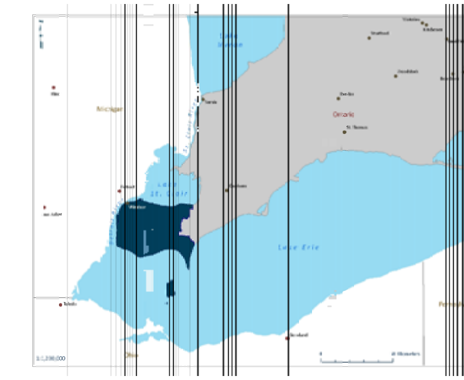
1:140,000

0 5 Kilometers

Made possible by the Government of Ontario

Ontario





Essex Region Source Protection Area Assessment Report Map 4.18b

Legend

- Intake - Type D
- Drinking Water System
- Source Protection Area Boundary
- Municipal, Lower Tier
- International Boundary
- Road
- Railway
- Water and Drainage
- Water Body

Intake Protection Zones

- IPZ-1
- IPZ-2
- IPZ-3

This publication was produced by:

Essex Region Conservation Authority
360 Fairview Avenue West
Essex, ON N8M 1Y6

Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, Stantec Consultants, StatsCanada

Map Produced in Co-Operation with the Province of Ontario and Conservation Ontario

Map Projection & Datum: UTM NAD83 Zone 17N

From:	Katie Stammler <KStammler@erca.org>
Sent:	2017-12-07 5:06 PM
To:	Innes, Jayson
Cc:	John Henderson
Subject:	RE: Source water protection in Essex Region
Attachments:	A Guide to Using the ERCA Online Interactive Mapping Tool.pdf

Hi Jason,
Thanks for your call. I've attached a document that our Risk Management Official prepared to help with the use of our online mapping tool. Please feel free to share it with your colleagues. Our Source Water Protection Plan can be accessed here: http://essexregionsourcewater.org/resources/source_water_protection.cfm and the two policies that apply to the area in question are policy 31 and 32 – these are the policies that apply to the Event Based Area that the MOECC specifically asked about. You would address these policies by ensuring that any existing storage of fuel above the threshold limit (15,000L) has a Risk Management Plan and that ERCA is informed of the installation of any future fuel storage that exceeds these limits.

I noticed that their letter also asks that your EA consider other sources of drinking water that aren't covered by the Source Protection Plan. Our SPP only includes policies for municipal intakes, so this would be referring to any private source of drinking water in the area, which would be well water. I believe this could be addressed with the mapping of the Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas that I showed you. While we have no policies that apply to these areas, you may need to show that you are at least aware of whether your study area is within these boundaries.

Provided that your project does not include installing or altering a municipal drinking water intake, no new technical work nor amendments to the SPP will be required.

Katie

Essex Region Conservation Authority
sustaining the place for life

KATIE STAMMLER, PHD
Water Quality Scientist/Source Water Protection Project Manager
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 • Essex, Ontario • N8M 1Y6
P. 519-776-5209 x 342 • F. 519-776-8688
kstammler@erca.org www.essexregionconservation.ca

Follow us on Twitter: @essexregionca

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Thursday, December 7, 2017 4:42 PM
To: Katie Stammler <KStammler@erca.org>
Cc: John Henderson <JHenderson@erca.org>
Subject: Source water protection in Essex Region

As a follow up to our phone call I have included a map of the study area and the letter from the MOECC discussing source water protection.

I will use the web sites you directed me to show that the site is in IPZ-3

The 3rd paragraph on page 3 of the MOECC letter says
For assistance in determining whether the proposed project will require new technical work and potentially require amendments to the source protection plan for this area please contact the Project Manager for Drinking Water Source

Protection at the local source protection authority which coincidently in this case, is the Essex Region Conservation Authority itself.

Can you please confirm that no new technical work or potential amendments to the source water protection plan are required from this study. I can provide additional project details if required.

Thanks

Jayson Innes, M.A.Sc., P.Eng.
Senior Water Resources Engineer
Direct: (519) 585-7282
Mobile: (519) 569-0518

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4 CA

From: John Henderson <JHenderson@erca.org>
Sent: 2017-12-19 4:09 PM
To: Katie Stammler; Innes, Jayson
Subject: ULR - Source Protection

Thanks Katie.

Jayson – Please include the additional information included in Katie's e-mail below regarding the need to update the IPZ-3 and Event Based Area when drains are altered in the future. If you have any questions, please provide them directly to Katie with a copy to me.

Thank you,

Essex Region Conservation Authority
sustaining the place for life

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Katie Stammler
Sent: Tuesday, December 19, 2017 4:03 PM
To: John Henderson <JHenderson@erca.org>
Subject: RE: ULR - Next Steps

Hi John,
Just got a chance to read this over. Given the statement below, I would like to add some additional information via email for their records. Sorry for the jargon, but the references should make sense to any ministry reviewer focussed on Source Water. Please let me know if you require anything further.

"Discussions with the Project Manager for Drinking Water Source Protection for Essex Region identified policies and vulnerable areas within the study limits (refer to attached email from Katie Stammler). Since the project does not include installing or altering a municipal drinking water intake no new technical work nor amendments to the source protection plan are required."

Upon further discussion with John Henderson, it has come to my attention that the proposal includes changes to the drainage network. This will eventually lead to the need for an update to the IPZ-3 and Event Based Area. Some portions of these vulnerable areas may be removed through a s.51 amendment to the SPP and AR if drains are removed. If new drains are installed or are relocated, the vulnerable areas will need to be extended, which will require either a s.34 amendment to the SPP and AR or would be included in the Essex Region SPA s.36 work plan. We would ask that the proponent provide mapping of the final changes to the drainage network to ERCA so that the changes to vulnerable areas can be made appropriately.

KATIE STAMMLER, PHD
Water Quality Scientist/Source Water Protection Project Manager
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 • Essex, Ontario • N8M 1Y6
P. 519-776-5209 x 342 • F. 519-776-8688
kstammler@erca.org www.essexregionconservation.ca

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From: John Henderson
Sent: Friday, December 15, 2017 11:28 AM
To: Katie Stammler <KStammler@erca.org>
Subject: FW: ULR - Next Steps

Hi Katie,

Please look at Jayson response to the Source Protection section in attached Table B and provide your comments.

Thank you,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Thursday, December 14, 2017 9:32 AM
To: John Henderson <JHenderson@erca.org>
Cc: Godo, Anna <agodo@citywindsor.ca>; Phil Bartnik <pbartnik@tecumseh.ca>; Vendrasco, Wira H.D. <wvendrasco@citywindsor.ca>; Winterton, Mark <mwinterton@citywindsor.ca>; Richard Wyma <RWyma@erca.org>; Tim Byrne <TByrne@erca.org>
Subject: RE: ULR - Next Steps

Attached is a draft version of MOECC Table B for internal review.

Ministry of Tourism, Culture and Sport

Heritage Program Unit
Programs and Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Tel: 416 314 5424
Fax: 416 212 1802

Ministère du Tourisme, de la Culture et du Sport

Unité des programmes patrimoine
Direction des programmes et des services
401, rue Bay, Bureau 1700
Toronto ON M7A 0A7
Tél: 416 314 5424
Téléc: 416 212 1802

Ontario

October 30, 2017 (EMAIL ONLY)

John Henderson, P. Eng.
Essex Region Conservation Authority
360 Fairview Avenue West – Suite 311
Essex, ON N8M 1Y6
jehnderson@erca.org

RE: MTCS file #: 37EA036
Proponent: Essex Region Conservation Authority
Subject: Notice of Completion
Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan
Location: City of Windsor/Town of Tecumseh, Ontario

Dear John Henderson,

Thank you for providing the Ministry of Tourism, Culture and Sport (MTCS) with the Notice of Completion for the above project. Please note that MTCS Culture Division was not circulated on the previous notices. MTCS's interest in this Environmental Assessment (EA) project relates to its mandate of conserving Ontario's cultural heritage, which includes:

- Archaeological resources, including land-based and marine;
- Built heritage resources, including bridges and monuments; and,
- Cultural heritage landscapes.

Proposal

The Essex Region Conservation Authority, in conjunction with the City of Windsor and the Town of Tecumseh, has completed a Master Plan Study in accordance with Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process. The preferred alternative includes stormwater management facilities that provide controls for more than one property and are located near other facilities along corridors.

Comments

Under the Municipal Class Environmental Assessment (EA) process, the proponent is required to determine a project's potential impact on cultural heritage resources. Developing and reviewing inventories of known and potential cultural heritage resources within the study area can identify specific resources that may play a significant role in guiding the evaluation of alternatives for subsequent project-driven EAs. While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation.

MTCS has reviewed the ESR report and has concerns that the proposed project does not adequately address the cultural environment – with respect to identification, evaluation, as well as impact assessment/proposed mitigation - and have the following observations and recommendations to help support your project under the Municipal Class EA process:

- Under the EAA and Municipal Class EA, the proponent is required to describe all components of the environment (natural, social, economic, cultural, built) that may be affected or reasonably expected to be affected, directly or indirectly, by the alternatives and the undertaking. Cultural heritage resources are important components of the environment and the way to describe them is through technical cultural heritage studies (i.e. archaeological assessment and cultural heritage evaluation reports).

- Section 4 – Existing Conditions
  MTCS notes that a Stage 1 archaeological assessment (PIF #: P389-0040-2014) has been undertaken but it is not described under Existing Conditions (Section 4.0). Further, it is unclear whether there are known or potential cultural heritage resources within the study area i.e. cultural heritage landscapes and/or built heritage resources. The MTCS *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* should be completed to help determine whether your Master Plan project may impact (known or potential) built heritage resources and cultural heritage landscapes and the findings be incorporated in the EA document, as appropriate.

- Section 5 – Alternatives and Evaluation
  MTCS notes that all of the alternatives evaluated in Table 16 have received the same scoring for cultural heritage/archaeology. It is not clear how cultural heritage resources have factored into the decision criteria or have influenced the selection of the preferred alternative. Without understanding whether or not there are cultural heritage resources present, it is not possible to assess impacts to cultural heritage resources as a result of the proposed undertaking.

  It would be helpful to further clarify whether the stage 1 AA was restricted to the Alternative 6 area as opposed to the area of the entire study. The initial Stage 1 archaeological assessment (AA) has identified areas of high archaeological potential requiring that a Stage 2 AA be undertaken. The ESR must include clear and detailed commitments articulating when the Stage 2 AA will take place. All archaeological assessments should be completed and reports submitted MTCS for review prior to the completion of detailed design and well in advance of any ground disturbing activities.

All technical heritage studies and their recommendations are to be addressed and incorporated into EA projects. If your screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please provide rationale/methodology and include the completed checklists and supporting documentation in the ESR report or file.

MTCS has included detailed comments on the ESR below to assist in addressing the cultural environment component.

Thank you for consulting MTCS on this project. If you have any questions about MTCS comments, please do not hesitate to contact me or Karla Barboza at karla.barboza@ontario.ca

Sincerely,

Daniel de Moissac
Heritage Planner (Acting)
daniel.demoissac@ontario.ca

Copied to: Jayson Innex, Stantec
Karla Barboza, MTCS

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. MTCS makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MTCS be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Please notify MTCS if archaeological resources are impacted by EA project work. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the Ontario Heritage Act and the Standards and Guidelines for Consultant Archaeologists.

If human remains are encountered, all activities must cease immediately and the local police as well as the Cemeteries Regulation Unit of the Ministry of Government and Consumer Services must be contacted. In situations where human remains are associated with archaeological resources, MTCS should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.

MTCS Comments on the Environmental Study Report dated September 2017

	REFERENCE	TEXT IN THE ESR	MTCS COMMENTS/RECOMMENDATIONS ON DRAFT
1.	3.5.1 Provincial Policy Statement Pages 3.8-3.9	The wise use and management of the natural environment is recognized as a crucial component of ensuring Ontario's long-term prosperity, environmental health and social wellbeing. Accordingly, the Provincial Policy Statement (PPS) provides direction for the long-term protection, restoration and improvement of the diversity and connectivity of natural features, the ecological function and biodiversity of natural systems, and the quality and quantity of water at a watershed scale.	Although the ESR acknowledges that the selection and implementation of the preferred alternative should consider the direction provided by the policies in the PPS, the report solely focuses the natural heritage policies. Section 2.0 of the PPS, Wise Use and Management of Resources, includes both Natural Heritage (Section 2.1) and Cultural Heritage and Archaeology (Section 2.6). The ESR should state that the PPS provides policy direction on matters of provincial interest (including cultural heritage) to land use planning and development.
2.	4.0 Existing Conditions Pages 4.1-4.62		MTCS recommends that a section be included to discuss the Existing Conditions related to Cultural Heritage. There should be 2 sub-sections: • Built Heritage Resources and Cultural Heritage Landscapes (BHR/CHL), and • Archaeology The above is consistent with the Municipal Class EA guide section C.3.1 Description of the Environment. Under the BHR/CHL, the report should summarize whether there are any known and/or potential resources based on the MTCS screening checklist *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* and/or a Cultural Heritage Assessment Report. The ESR should also include a statement describing the report(s) undertaken/completed and reference to appended documents/reports. Under the Archaeology sub-section, it should include specific information based on the findings in the archaeological assessment (AA) report(s). The Executive Summary of each AA report provides a brief summary of the work completed and recommendations for next steps, whether for further archaeological assessment, in which case the report will include a map that identifies those areas, or for no further assessment. Example – information to be included on the ESR: "A Stage 1 AA (*PIF #: P389-0040-2014*) was undertaken on April 8, 2015 by Stantec Consulting for the Upper Little River Watershed Master Plan and Stormwater Management Plan for the [insert study area]. A Stage 1 AA consists of a review of geographic land use and historical information for the property and the relevant surrounding area, a property visit to inspect its current condition, and contacting MTCS to find out whether or not there are any known archaeological sites on or near the property. Its purpose is to identify areas of archaeological potential and further archaeological

	REFERENCE	TEXT IN THE ESR	MTCS COMMENTS/RECOMMENDATIONS ON DRAFT
			assessment (e.g. Stage 2-4) as necessary. MTCS has reviewed the report and is satisfied that the fieldwork and reporting for the archaeological assessment are consistent with the ministry's 2011 Standards and Guidelines for Consultant Archaeologists and the terms and conditions for archaeological licences. The report has been entered into the Ontario Public Register of Archaeological Reports. The Stage 1 AA is included in Appendix J." MTCS recommends including the outcomes and recommendations of the report, as in Executive Summary. For example: "Stantec was retained by the City of Windsor to complete a Stage 1 archaeological assessment for a study area, measuring approximately 225 hectares in size, located on various Lots and Concessions, Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario (Figure 1). The Stage 1 archaeological assessment, involving background research and a property inspection, resulted in the determination that portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological resources. As such, a Stage 2 archaeological assessment will be required for portions of the study area (Figure 4). The Stage 2 archaeological assessment will include the systematic walking of open ploughed fields at five metre intervals as outlined in Section 2.1.1 of the MTCS; 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The MTCS standards further require that all agricultural land, both active and inactive, be recently ploughed and sufficiently weathered to improve the visibility of archaeological resources. Ploughing must be deep enough to provide total topsoil exposure, but not deeper than previous ploughing, and must be able to ensure at least 80% ground surface visibility. Moreover, the Stage 2 archaeological assessment will include a test pit survey at five metre intervals in areas inaccessible for ploughing as outlined in Section 2.1.2 of the MTCS; 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The MTCS standards require that each test pit be approximately 30 centimetres in diameter, excavated to at least five centimetres in to subsoil, and have all soil screened through six millimetre hardware cloth to facilitate the recovery of any cultural material that may be present. Prior to backfilling, each test pit will be examined for stratigraphy, cultural features, or evidence of fill. Should any areas of disturbance or features indicating that archaeological potential have been removed, including permanently wet areas, not previously identified during the Stage 1 property inspection be encountered during the Stage 2 archaeological assessment, they will be documented as outlined in Section 2.1.8 of the MTCS; 2011 Standards and Guidelines for Consultant Archaeologists (Government

	REFERENCE	TEXT IN THE ESR	MTCS COMMENTS/RECOMMENDATIONS ON DRAFT
			of Ontario 2011). Additional archaeological assessment is required; hence the study area remains subject to Section 48(1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license."
3.	5.3.1 General (Evaluation of Alternatives) Pages 5.4-5.5	The evaluation criteria used to assess the various alternatives were grouped into four major categories as outlined below: (…) • Social/Cultural Environment o Aesthetics o Health and Safety o Recreational Opportunities o Cultural Heritage/Archaeology	MTCS is pleased that Cultural Heritage/Archaeology is identified as part of the evaluation criteria to assess the various alternatives. However, it is not clear what the specific existing conditions are and how it has influenced the evaluation of alternatives.
4.	Table 15: Evaluation Criteria Pages 5.6-5.9	Evaluation Criteria: Cultural Heritage/ Archaeology Description: The ability of the alternative to protect potential archaeological resources within the study area. Alternatives that avoid or protect potential locations are preferred. Measure: • Proximity of stormwater management areas to existing archaeological finds • Nature of potential disturbance Design Alternatives: Alternative 1: No stormwater construction is proposed. Impacts to potential archaeological resources are expected to be minimal. Alternatives 2, 5 and 6: Some stormwater construction is proposed. Impacts to potential archaeological resources are possible. Alternative 4: Stormwater construction is concentrated in several locations. Impacts to potential archaeological resources are possible.	MTCS recommends that the existing text be replaced with the following: Evaluation Criteria: Cultural Heritage Resources Description: The ability of the alternative to conserve (known and potential) cultural heritage resources within the study area. Alternatives that avoid or preserve cultural heritage resources *in-situ* are preferred. Measure: • Proximity of stormwater management areas to archaeological resources, areas of archaeological potential, built heritage resources and cultural heritage landscapes • Nature of potential disturbance. Example of effect: o Disturbance or destruction of archaeological resources o Displacement of built heritage resources and/or cultural heritage landscape by removal and/or demolition and/or disruption by isolation o Impacts to registered and unregistered cemeteries which have been identified and documented o Disruption of resources by the introduction of physical, visual, audible or atmospheric elements that are not in keeping with the character and setting of the cultural heritage resources Design Alternatives Alternative 1: No stormwater construction is proposed. Impacts to potential ~~archaeological~~ cultural heritage resources are expected to be minimal. Alternatives 2, 5 and 6: Some stormwater construction is proposed. Impacts to potential ~~archaeological~~ cultural heritage resources are possible. *See areas of archaeological potential identified in the AA.* Alternative 4:

	REFERENCE	TEXT IN THE ESR	MTCS COMMENTS/RECOMMENDATIONS ON DRAFT
			Stormwater construction is concentrated in several locations. Impacts to potential ~~archaeological~~ cultural heritage resources are possible. See areas of archaeological potential identified in the Figure 4.
5.	5.3.3 Summary of Assessment page 5.10		The Report should include a bullet summarizing the potential impacts on the cultural heritage component (BH/CHL and Archaeology).
6.	Table 16: Evaluation Summary Page 5.11	Cultural Heritage/Archaeology	MTCS recommends that the field 'Cultural Heritage/Archaeology' be replaced with 'Cultural Heritage Resources. It is not clear how cultural heritage resources have factored into the decision criteria or have influenced the selection of the preferred alternative Any project that may affect a built heritage resource, cultural heritage landscape, an archaeological site, or an area of archaeological potential may require further technical heritage studies by qualified persons and/or consultation with interested persons.
7.	6.2 Impact Assessment and Mitigation for the Preferred Alternative pages	Based on the assessment of the natural, social and economic impacts of the various alternatives, Alternative 6 was selected as the preferred alternative. The proposed development plan is presented in Drawing 3. The proposed development plan includes stormwater management, open space, residential, commercial, industrial land uses.	Although the evaluation criteria used to assess the various alternatives were grouped into four major categories (see page 5.4 and 5.5) this impact assessment section didn't include the social/cultural environment. Therefore, MTCS recommends that the text be revised to be consistent with section 5.3.1, as such: Natural Environment o Terrestrial Resources, Vegetation, and Wildlife Implications o Fisheries Resources and Aquatic Habitat Implications o Groundwater and Baseflow Implication o Surface Water Quality Economic Environment o Total Capital Cost o Total Maintenance Cost Technical Environment o Ability to Provide Required Flood Protection o Ease of Construction/ Implementation o Ability to Meet Agency Requirements Social/Cultural Environment o Aesthetics o Health and Safety o Recreational Opportunities o Cultural Heritage/Archaeology
8.	6.2.1 Review of Potential Impacts Pages 6.12-6.14		A section on Cultural Heritage should be included to articulate the potential impacts to cultural heritage (archaeological resources, built heritage and cultural heritage landscapes). Construction impacts have the potential to negatively affect cultural heritage resources, including vibration. Use comments above to address potential impacts (effects) on cultural heritage resources
9.	6.2.2 Mitigation for the Preferred Alternative		MTCS recommends that the table be expanded to discuss and address the potential impact and recommended mitigation measures to cultural heritage

	REFERENCE	TEXT IN THE ESR	MTCS COMMENTS/RECOMMENDATIONS ON DRAFT
	And Table 22: Potential Impact and Mitigation Measures		resources. The suggested language below would need to be coordinated with the findings/recommendations of the AA and any other heritage studies. As mentioned previously, it is not clear whether there are any known (or potential) BH/CHL in the area and whether or not they could be impacted Cultural Heritage Resources Potential Impact: Disturbance or destruction of archaeological resources Recommended Mitigation and Enhancement Measures: (Planning stage) • Undertake archaeological assessment to determine presence of cultural heritage resources • Avoidance, through alternative selection (Preliminary Design and Detail Design Stage) • Completion of archaeological assessment where it was not undertaken in the Planning stage. At a minimum, a Stage 2, and if recommended a Stage 3, should be undertaken for the areas of archaeological potential identified in the Stage 1 AA (Figure 4). • "Avoidance and protection" should be the preferred alternative. If the preferred alternative is not possible, a consultant archaeologist licensed under the Ontario Heritage Act should undertake archaeological excavation. Potential Impact: Displacement of built heritage resources and/or cultural heritage landscape by removal and/or demolition and/or disruption by isolation. Recommended Mitigation and Enhancement Measures: • Best efforts shall be applied to conserve significant cultural heritage resources found in real property • Communities, groups and individuals with associations to a significant cultural heritage resource that may be affected shall be provided with opportunities to participate in understanding and articulating the property's cultural heritage value and in making decisions about its future • All other alternatives having been considered, removal or demolition of a significant cultural heritage resource shall be considered as a last resort, subject to heritage impact assessment and public engagement. Best efforts shall be applied to mitigate loss of cultural heritage value. Potential Impact: Disruption of cultural heritage resources by the introduction of physical, visual, audible or atmospheric elements that are not in keeping with the character and setting of those resources Recommended Mitigation and Enhancement Measures: • Minimize impact through horizontal/vertical alignments, and grading design to permit maximum retention of existing features • Utilize landscape planting plan to provide mitigation, screening and enhancement • Retain and maintain the visual settings and other physical relationships that contribute to culture

	REFERENCE	TEXT IN THE ESR	MTCS COMMENTS/RECOMMENDATIONS ON DRAFT
			heritage value. • Ensure that new physical, visual, audible or atmospheric elements do not adversely affect heritage attributes of the cultural heritage landscape or visual setting • Explore alternative alignments that retain and maintain the visual settings and physical relationships • Every effort should be made to retain a landscape's key characteristics Potential Impact: (Construction Stage) Disturbance, destruction or other effects on cultural heritage resources (cultural heritage landscapes, built heritage and/or archaeological resources) Recommended Mitigation and Enhancement Measures: • Include provisions in contract to stop construction in areas where archaeological resources are discovered during construction • Protect sites by restricting access, reducing noise/vibration and controlling dust. • Mitigation options can range from preservation/retention in-situ to relocation and adaptive re-use to demolition with documentation and salvage • All other alternatives having been considered, removal or demolition of a significant cultural heritage resource shall be considered as a last resort, subject to heritage impact assessment and public engagement. Best efforts shall be applied to mitigate loss of cultural heritage value. • Mitigate effects through enforcement of retention / protection measures, exercise careful work habits, and implementation of landscape plan • Retain and maintain the visual settings and other physical relationships that contribute to cultural heritage value. Ensure that new construction, visual intrusions, or other interventions do not adversely affect the heritage attributes of the property.
10	7.5 Archaeology (Design Considerations) Pages 7.8-7.10		Most of the information in this section appears better suited for the Existing Conditions section of the ESR. See also comments above – row 2 (regarding Section 4 of the report). It is not clear if this section on design considerations is to discuss further about potential impact and recommended mitigation measures. The comments in the above row 2 may be of assistance. The ESR shall include clear commitments and a timeline for undertaking and completing the recommended AA. As further AA is required for this project, MTCS recommends that further AA be completed as early as possible in the planning/design phase. MTCS also recommends that the title section be replaced with "Cultural Heritage Resources" in order to include all types of Cultural Heritage Resources.
11	8.1.1 Additional Studies	Development led projects (typically related to the construction of new residential, commercial, or industrial lands) will	Include AA and potential Heritage Impact Assessment, dependent on AA findings. The ESR shall include clear commitments and a timeline for undertaking and completing the recommended AA.

	REFERENCE	TEXT IN THE ESR	MTCS COMMENTS/RECOMMENDATIONS ON DRAFT
		continue to be required to follow the current municipal stormwater guidelines, criteria, and watershed recommendations as required. This report is not sufficient to support land use changes under a Planning Act process and additional environmental studies will be required to support future Planning Act approvals/processes.	As further AA is required for this project, MTCS recommends that further AA be completed as early as possible in the planning/design phase. All archaeological assessments should be completed and reports submitted MTCS for review prior to the completion of detailed design and well in advance of any ground disturbing activities. As it is not clear whether there are any BH/CHLs in the study area, this section may need to articulate further whether any other technical cultural heritage studies will be undertaken.
12	8.1.2 Permits and Approval Requirements Pages 8.2-8.3	Archaeological Resources – Prior to the construction of the stormwater management features, a qualified archaeological resource specialist should prepare an archaeological assessment of the existing construction sites to determine if archaeological resources are present and if mitigation measures are required. Areas with moderate to high archaeological potential (as shown on Figure 25) require a Stage 2 assessment	Please note that MTCS is not an approval authority in this process. Many approval authorities rely on our review of archaeological assessment reports when deciding whether or not concerns for archaeological sites have been addressed by a development proponent. As mentioned before, the ESR must include clear commitments and a timeline for further assessments. MTCS recommends the text be revised as follows: A Stage 2 archaeological assessment will be required for portions of the study area (Figure 25 of ESR). A stage 2 AA, and if recommended further stages, will be undertaken by a licensed archaeologist prior to the completion of detail design phase and well in advance of any ground disturbance activities - as per the recommendations in the Stage 1 AA [include when this AA will take place].
13	8.2.2 Design Considerations Page 8.4	It is recommended that the following design considerations be included in the functional design: • Geotechnical assessment and recommendations • Landscaping plans • (…) • Water management plan during construction of in-stream works, dewatering, etc. • Archaeological investigation	The ESR shall include clear commitments and a timeline for undertaking and completing the recommended AA. As further AA is required for this project, MTCS recommends that further AA be completed as early as possible in the planning/design phase on the preferred alternative and prior to the completion of detail design. All archaeological assessments should be completed and reports submitted to MTCS for review prior to the completion of detailed design and well in advance of any ground disturbing activities. The ‘Archaeological Investigation’ bullet should be revised to ‘Archaeological Assessment’.
14	Figure No. 2 Existing Environmental Features		This Figure should also depict the areas of archaeological potential identified in the Stage 1 AA/Figure 4, as well as any potential or known BH/CHL (as per MTCS screening checklist and/or CHAR). See Figure 25

Ministry of the Environment

733 Exeter Road
London ON N6E 1L3
Tel.: 519 873-5000
Fax: 519 873-5020

Ministère de l'Environnement

733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Téléc.: 519 873-5020

Ontario

October 19th, 2011

Stantec Consulting Ltd.
140 Quellette Place
Suite 100
Windsor, Ontario
N8X 1L9

Attention: Mr. Phil Bartnik, Project Engineer, P. Eng.

Re: <u>ERCA Upper Little River Watershed Master Drainage Plan & SWM Plan</u>

Phil:

I am writing you today to acknowledge this ministry's receipt of the Notice of Commencement for the above noted project.

The preparation of Master Plans are an approach to planning that this ministry supports and is willing to provide assistance to. In that regard, in addition to keeping this office abreast of future notices and information regarding this study, if at all possible, this ministry office would appreciate being afforded an opportunity to review and comment on a Draft Watershed Master Drainage Plan & SWM Report, prior to and addition to circulation and commenting on the Final Report.

Yours truly,

Craig Newton
Regional Environmental Planner / EA
Ministry of the Environment
Southwestern Region
(519) 873-5014

Cc – Mr. D. McDougall, Supervisor, MOE Windsor Area Office
- Mr. S. Abernethy, Surface Water Group Leader, Water Resources, MOE SWR

Project Description sent to MOECC (2011)

UPPER LITTLE RIVER WATERSHED MASTER DRAINAGE PLAN & STORMWATER MANAGEMENT PLAN

The Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh has initiated a Master Plan Study in accordance with Phases 1 & 2 of the Municipal Class Environmental Assessment (EA) process. This Study will determine the stormwater management infrastructure requirements for the Upper Little River Watershed area to service existing and future development as shown in Figure 1.

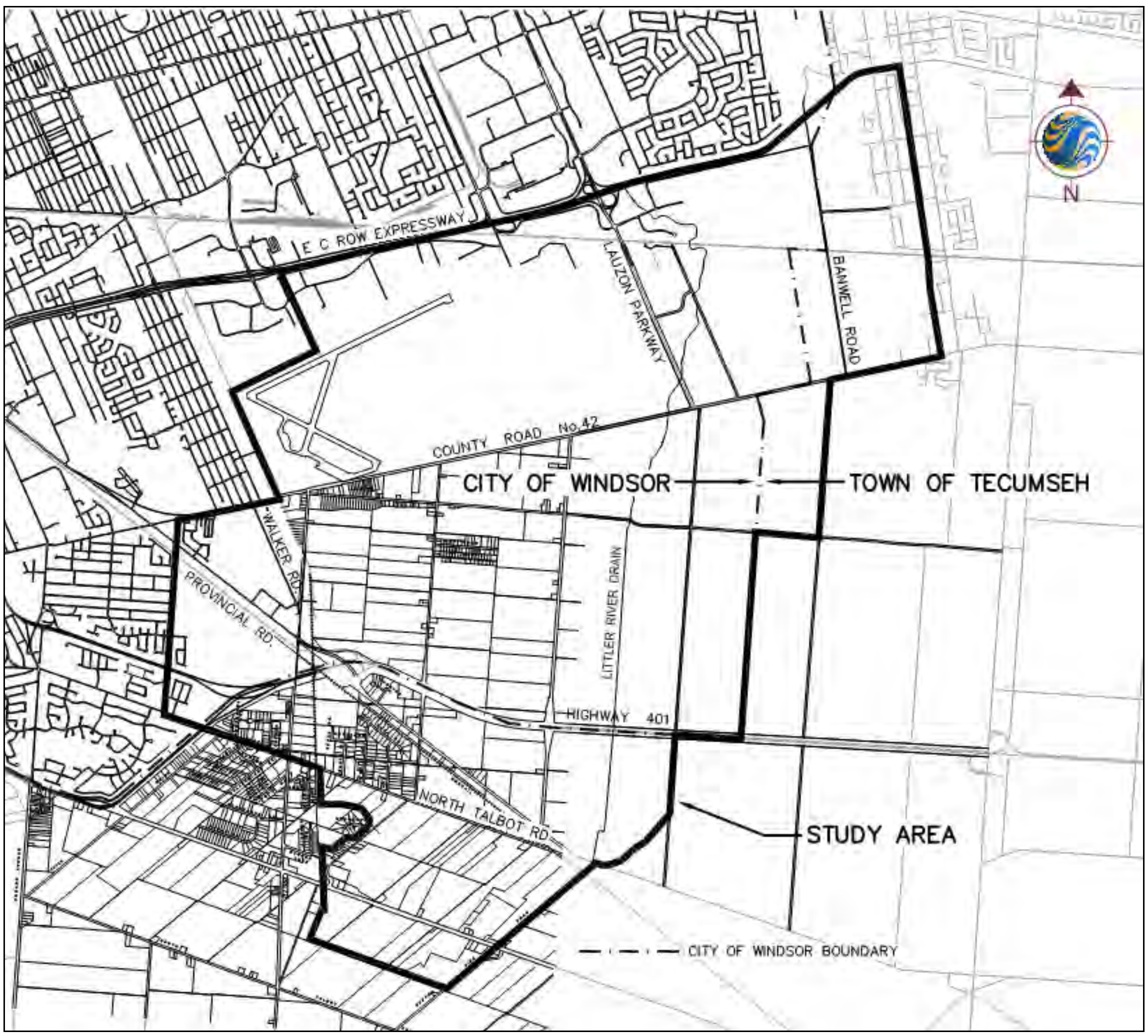

Figure 1 – Site Location

A Master Drainage and Stormwater Management Plan is required for the Upper Little River Watershed including both the City of Windsor Sandwich South Employment Lands and additional Town of Tecumseh lands to coordinate and guide future development in this area. The preferred alternative will provide a balance of relevant natural, social, technical and economic criteria to establish appropriate drainage and stormwater management requirements at a watershed level that meets the needs of area stakeholders

The objective of the study is to ensure that urbanization of the watershed can occur in a fashion that would not lead to negative impacts on the receiving systems including increased flood risk, the impairment of natural watercourse features, and would allow for future enhancement of the watercourse, stream margins and wetlands.

The following five alternatives have been generated for evaluation within the EA process, as outlined subsequently:

1. The Do-Nothing Alternative - In this alternative, the Little River subwatershed area remains under existing land use conditions, with no new development. The evaluation of this alternative is required by the EA process; however, it does not meet the approved Land Use Plan and will not be considered in detail through the study

2. Water Quality and Erosion Control Only - In this alternative, the approved land use changes will have only water quality treatment and erosion control, no water quantity or flooding controls. The impacts on flows will be evaluated qualitatively to determine the likelihood of downstream flooding and other concerns. Floodplain mapping available from the Essex Region Conservation Authority will be used to determine if flow increases are possible

3. Communal Online Stormwater Facilities - This alternative analyzes the potential to minimize the number of SWM Facilities required to serve the study area by consolidating all water quality, erosion and water quantity controls at a few locations throughout the watershed

4. Online Quantity Control with Local Quality and Erosion Controls - This alternative analyzes the scenario where a few online water quantity or flood control facilities are located throughout the study area (similar locations to Alternative #3), but water quality and erosion controls are distributed throughout the area

5. Offline or Distributed SWM Controls - This alternative considers the potential for stormwater management controls to be distributed throughout the study area, and each facility would be required to provide water quality, erosion and water quantity controls

Following evaluation of the five alternatives and discussions with the City of Windsor, the Town of Tecumseh, the Essex Region Conservation Authority, and the Windsor International Airport Alternative 4 was selected as the initial preferred alternative, which would consist of an off-line water quality control portion with a permanent water surface and an on-line water quantity control portion.

Alternative 4 includes end-of-pipe stormwater management facilities which are designed to provide water quality, water quantity, and erosion controls for all events up to the 5-year rainfall event. The outflow from these facilities drains into a channel system which ultimately drains to Upper Little River. During larger rainfall events the water will overflow the end of pipe facilities into the channel system where water quantity controls would be provided at several on-line flow control locations, most of which will be coincident with road crossings. This method is similar to that utilized for the Twin Oaks Business Park located near the Little River and the E.C. Row Expressway and constructed approximately 10 years ago.

The stormwater areas are proposed to be congregated into stormwater management corridors which can be combined with trail systems and used as amenity areas for the surrounding developments. The stormwater management corridor will take the appearance of a wide watercourse channel with periodic ponds adjacent to the channel. Heavy vegetation adjacent to all water bodies along with less open water and fetches will also be implemented in order to make water features less attractive to bird species, a specific request form the Windsor Airport. As part of this work, several of the existing municipal drains are proposed to be abandoned and several new channels will be created that align with the proposed land use plan for the area.

Ministry of the Environment and Climate Change

733 Exeter Road
London ON N6E 1L3
Tel': 519 873-5000
Fax: 519 873-5020

Ministère de l'Environnement et de l'Action en matière de changement climatique

733, rue Exeter
London ON N6E 1L3
Tél.: 519 873-5000
Fax: 519 873-5020

Ontario

October 24th, 2017

Essex Region Conservation Authority
360 Fairview Avenue West
Suite 311
Essex, Ontario
N8M 1Y6

Attention: Mr. John Henderson, P. Eng.
Water Resource Engineer

Re: Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan, Dated September 2017

Dear Mr. Henderson:

This letter acknowledges this ministry's receipt, with thanks, of the Notice of Completion for the Upper Little River Watershed Master Drainage and Stormwater Management Plan.

As you know, the Essex Region Conservation Authority in conjunction with the City of Windsor and the Town of Tecumseh completed the above noted Master Plan in accordance with Phases 1 and 2 of the Municipal Class EA process. The preferred alternative includes stormwater management facilities that provide controls for more than one property and are located near other facilities along corridors.

This ministry has completed its review of the above noted Master Drainage Plan and Stormwater Management Plan, and offers the following comments for due consideration and response by the Essex Region Conservation Authority and/or its consultant, Stantec Consulting Engineers Ltd.:

Surface Water:

From a surface water perspective, generally speaking the above noted September 2017 report is satisfactory to this ministry, except for two specific points that follow below.

A "normal" level of water quality protection would be provided by off-line multi-function storm water control facilities congregated into SWM corridors. The report focuses on the restoration and enhancement of the physical conditions along watercourses and their riparian areas. This is a logical approach since water quality protection cannot be achieved until physical conditions are improved in and around the channelized, artificial watercourses that predominate in the study area.

This ministry's two specific points are as follows:

1. The report notes that since development will likely proceed on a landowner-by-landowner basis it is expected that the coordinated storm water strategy proposed in the master plan may change. Page 6.2 of the report recommends a minimum drainage area of 20 hectares as a design criterion for a Storm Water Management Facility. If this recommendation is maintained as a requirement then this would alleviate this ministry's concern about potential significant deviations from the master plan due to piecemeal land development. Please respond.

2. Page 8.4 of the report recommends a monitoring program including environmental indicators and watershed targets before, during and after construction. This is a mandatory requirement of the Class Environmental Assessment process so it is more than a recommendation. The report notes that details of the monitoring program would be confirmed with ERCA and the municipality. MOECC's regional office should also be involved in reviewing the proposed monitoring program for those aspects that relate to this ministry's statutory authority, i.e. stream water quality and aquatic ecosystem health. Please respond.

Source Protection:

Per the recent amendments to the Municipal Engineers Association (MEA) Class EA parent document approved October 2015, proponents undertaking a Municipal Class EA project must identify early in the process whether a project is occurring within a source water protection vulnerable area. This must be clearly documented in a project file report or environmental study report.

The one reference to Source Protection that MOECC located in the above noted report was found in "Section 4.1.2 Methodology for Data Collection and Analysis", on page 4.1, wherein it is noted that the Essex Region Source Protection Area: Watershed Characterization (ERCA, 2011) was consulted during the preparation of the report. What the actual outcome of consulting that report was, does not appear to be presented in the report.

Given the above noted MEA Class EA requirement, the proponent should include a section in the project file or environmental study report on source water protection. Specifically, it should discuss whether or not the project is located in any vulnerable area or has the potential to change or creates new vulnerable areas, and provide applicable details about the area.

MEA Class EA projects may also include activities that, if located in a vulnerable area, may be considered a threat to sources of drinking water (i.e. have the potential to adversely affect the quality or quantity of drinking water sources) and could be subject to policies in a source protection plan. Where an activity poses a risk to drinking water, policies in the local source protection plan may impact how or where that activity is undertaken. Policies may prohibit certain activities, or they may require risk management measures for these activities. Municipal Official Plans, planning decisions, Municipal Class EA projects (where a project includes a drinking water risk) and prescribed instruments must conform with policies that address significant risks to drinking water and must have regard for policies that address moderate or low risks.

In addition to ensuring that EA projects do not impact sources of municipal drinking water addressed in the source protection plans, EAs should also consider and mitigate potential impacts to other sources of drinking water not explicitly addressed in source protection plans, such as private systems – individual or clusters, and designated facilities within the meaning of O. Reg. 170/03 under the Safe Drinking Water Act – i.e., camps, schools, health care facilities, seasonal users, etc. HVAs are sensitive hydrologic features that, when protected, can also protect other users who draw water from HVAs.

Are there any Event Based Area Policies applicable to the subject property? If so, how will they be addressed?

For assistance in determining whether the proposed project will require new technical work and potentially require amendments to the source protection plan for this area please contact the Project Manager for Drinking Water Source Protection at the local source protection authority which coincidently in this case, is the Essex Region Conservation Authority itself.

Indigenous Consultation:

In an e-mail dated October 2nd, 2017, the MOECC provided Stantec with a list of Indigenous Communities that need to be consulted with respect to this Class EA. On October 5th, 2017, Stantec advised MOECC by e-mail of the additional Indigenous Communities they were consulting with as a consequence of MOECC's aforementioned e-mail.

Please advise this ministry of any concerns / issues raised by any of the Indigenous communities consulted, and how those issues / concerns have or will be addressed.

Yours truly,

Craig Newton

Craig Newton
Regional Environmental Planner / EA Coordinator
Ministry of the Environment & Climate Change
Southwestern Region
(519) 873-5014

Cc – Mr. Scott Abernethy, Group Leader – Surface Water, MOECC SWR
Ms. Cara Salustro, Drinking Water Inspector, Safe Drinking Water, MOECC Windsor
Mr. Jayson Innes, P. Eng., Project Manager, Stantec Consulting Ltd., Waterloo

Ministry of the Environment, Conservation and Parks

Environmental Assessment and Permissions Branch

135 St. Clair Avenue West
1st Floor
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax: 416 314-8452

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations et des permissions environnementales

135, avenue St. Clair Ouest
Rez-de-chaussée
Toronto ON M4V 1P5
Tél : 416 314-8001
Téléc. : 416 314-8452

Ontario

July 9, 2018

Mr. William Balazs
President
386823 Ontario Limited
By email

Dear Mr. Balazs:

Thank you for your interest in the Upper Little River Master Drainage Plan and Stormwater Management Plan (Master Plan) as proposed by the City of Windsor, Town of Tecumseth and Essex Region Conservation Authority (Proponents).

On October 27, 2017, you requested that the Proponents be required to prepare an individual environmental assessment (EA) for the Master Plan. On December 5, 2017, you met with the Proponents to discuss your concerns, and on February 2, 2018, these discussions were deemed complete and the Ministry of the Environment, Conservation and Parks (ministry) was in receipt of the Master Plan documentation for review.

The Proponents issued the Notice of Completion for the Master Plan for a 30-day public review period ending on October 30, 2017. Upon review, the ministry has determined that the Proponents have not met the requirements of the class EA. The Proponent's Notice of Completion and Master Plan documentation did not include sufficient detail, or a list describing the specific Schedule B projects.

As such, your request for Part II Order will not be considered at this time.

The ministry asked the Proponents to issue a new Notice of Completion once the deficiencies are addressed, and the Master Plan and the projects within it will be subject to another 30-day public review period. When the new Notice of Completion is issued, you may request a Part II Order on specific projects if you continue to have unresolved concerns. Your Part II Order must be in the context of these specific projects, and not for the Master Plan in general.

It is the ministry's expectation that once the revised documentation is complete and the Notice of Completion is reissued, you will be notified directly by the Proponent.

Thank you for taking the time to share your concerns with this Master Plan.

If you have additional questions regarding the Part II Order process, please contact Mr. Stephen Deneault, Project Evaluator at 416-212-3693 or at Stephen.Deneault@ontario.ca.

Sincerely,

Kristina Rudzki

Kristina Rudzki
Supervisor, Project Review Unit
Environmental Assessment and Permissions Branch

Attachment

c: Craig Newton, EA Coordinator, Ministry of the Environment, Conservation and Parks
Anneleis Eckert, EA Coordinator, Ministry of the Environment, Conservation and Parks
Karla Barboza, Team Lead (A), Ministry of Tourism, Culture and Sport

EA File No. 17088
Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan

Ministry of the Environment, Conservation and Parks

Environmental Assessment and Permissions Branch

135 St. Clair Avenue West
1st Floor
Toronto ON M4V 1P5
Tel.: 416 314-8001
Fax: 416 314-8452

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations et des permissions environnementales

135, avenue St. Clair Ouest
Rez-de-chaussée
Toronto ON M4V 1P5
Tél : 416 314-8001
Téléc. : 416 314-8452

Ontario

July 9, 2018

John Henderson, P. Eng.
Water Resources Engineer
Essex Region Conservation Authority
360 Fairview Avenue West – Suite 311
Essex, ON N8M 1Y6

Jayson Innes, M.A.Sc., P. Eng.
Project Manager
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4

Dear Mr. Henderson and Mr. Innes:

On October 27, 2017, the Minister of the Environment, Conservation and Parks (Minister) received one Part II Order request asking that the City of Windsor, Town of Tecumseth and Essex Region Conservation Authority (Proponents) be required to prepare an individual environmental assessment for the proposed Upper Little River Master Drainage Plan and Stormwater Management Plan (Master Plan).

The Notice of Completion for this Master Plan was issued in September 2017. Staff at the Ministry of the Environment, Conservation and Parks (ministry) reviewed the Master Plan Environmental Study Report (Report) and determined that the Master Plan was not planned in accordance with the requirements of the class environmental assessment (class EA). Please see attached October 24, 2017 letter outlining the ministry's concerns.

Under Section 13 of the Environmental Assessment Act (act), a proponent of an undertaking subject to a class EA shall not proceed with the undertaking unless the proponent does so in accordance with the class EA.

Ministry staff determined that the requirements of the class EA have not been fulfilled for the Master Plan for the reasons identified below:

Approach #2 – Master Plan Requirements

You indicated that Approach #2 of the Municipal Engineers Association's Municipal Class EA was followed, but as discussed at our meeting of July 6, 2018, you failed to meet the requirements under the class EA for Approach #2.

All master plans, at a minimum, must address at least the first two phases of the class EA process (identifying a problem or opportunity and identifying alternative solutions to address the problem or opportunity). The master planning process under Approach #1 is completed at a broad level of assessment, requiring more detailed investigations at the project-specific level in order to fulfill class EA requirements. The master plan in Approach #1 becomes the basis for specific Schedule B and C projects that are required to undergo a class EA in future.

Like Approach #1, Approach #2 must also satisfy Phases 1 and 2 of the class EA. However, this approach involves a level of investigation, consultation and documentation sufficient to fulfill the requirements for Schedule B projects. The Notice of Completion for this approach should identify/list specific Schedule B projects.

Your project documentation does not include a list describing the specific Schedule B projects that have completed the class EA process. In addition, without identifying the specific projects, the ministry cannot determine whether the appropriate level of detail has been applied.

A Part II Order request must be made on a specific project within the Master Plan.

Surface Water

On October 24, 2017, the ministry requested the Proponents respond to surface water comments (attached). Ministry staff requested that the Proponents consider drainage area design for stormwater management facilities and the requirement to implement a monitoring program, including environmental indicators and watershed targets before, during and after construction.

Source Protection

On October 24, 2017, the ministry requested that the Proponents respond to source protection comments (attached).

The ministry supports the completion of a Source Water Protection section to incorporate its findings into decision-making and reporting metrics. To date, the ministry has not received an update on the ministry's recommendation to include this section in the Master Plan Report; including potential impacts to vulnerable areas and any Event Based Area policies that would be applicable.

Indigenous Consultation

On October 24, 2017, the ministry requested an update on the additional consultation efforts that were undertaken by the Proponents, including any issues/concerns identified by any of the Indigenous communities and how they will be addressed.

Cultural Heritage Assessment

The Ministry of Tourism, Culture and Sport (MTCS) advised that there are outstanding concerns with the evaluation of potential and/or known impacts on cultural heritage resources within the study area (attached).

MTCS indicated that a Cultural Heritage Assessment should be completed by qualified person(s) as part of the class EA. The ministry supports the completion of a Cultural Heritage Assessment to incorporate its findings into decision-making and reporting metrics.

In summary, given that the requirements of the class EA have not been met for the reasons listed above, the ministry requests that the Proponents re-issue the Notice of Completion once these deficiencies are addressed, and place the Master Plan under public review for another 30 days.

As the class EA is not complete, the ministry is unable to consider the Part II Order request at this time. The Part II Order requester will be notified in writing that their request will not be considered, and that the Proponents will be undertaking additional work at the request of the ministry.

It is the ministry's expectation that once the revised documentation is complete and the Notice of Completion is reissued, the requester will be notified directly by the Proponents.

If you have additional questions regarding the Part II Order process, please contact Mr. Stephen Deneault, Project Evaluator at 416-212-3693 or at Stephen.Deneault@ontario.ca.

For questions about the class EA requirements, please contact Ms. Anneleis Eckert, EA Coordinator at 519-873-5115 or at Anneleis.Eckert@ontario.ca.

Sincerely,

A. Cross

Annamaria Cross
Environmental Assessment and Permissions Branch

Attachments

c: Craig Newton, EA Coordinator, Ministry of the Environment, Conservation and Parks
Anneleis Eckert, EA Coordinator, Ministry of the Environment, Conservation and Parks
Karla Barboza, Team Lead (A), Ministry of Tourism, Culture and Sport

EA File No. 17088
Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan

THE CITY OF WINDSOR ONTARIO, CANADA

Office of the City Engineer

January 23, 2019

Stephen Deneault
Project Evaluator, Environmental Assessment Services
Environmental Assessment and Permissions Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5
Stephen.Deneault@ontario.ca

Dear Mr. Deneault:

Re: EA File No. 17088
Upper Little River Watershed Master Drainage Plan and Stormwater Management Plan

---

Thank you for your prompt response confirming that the project has not been withdrawn.

The City of Windsor is working diligently with its partners, Essex Region Conservation Authority and the Town of Tecumseh, and our consultant, Stantec Consulting Ltd., to complete additional work requested to address concerns raised and update the Upper Little River Watershed Master Drainage and Stormwater Management Plan Environmental Assessment Environmental Study Report.

With regards,

Mark Winterton
City Engineer

AMG/mb

cc: Eckert, Anneleis (MECP) Anneleis.Eckert@ontario.ca
Lafrance, Crystal (MECP) Crystal.Lafrance@ontario.ca
Rudzki, Kristina (MECP) Kristina.Rudzki@ontario.ca
James Bryant (ERCA) JBryant@erca.org
Jayson Innes (Stantec) jayson.innes@stantec.com

City of Windsor | 350 City Hall Square West | Windsor, ON | N9A 6S1
www.citywindsor.ca

APPENDIX F

Ecology

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Appendix D.1: 163302160 Potential Species at Risk and Provincially Rare Species in the Study Area

Common Name	Scientific Name	S-Rank	COSSARO	COSEWIC	Source	Species confirmed in the Study Area?	Suitable habitat present in the Study Area?
Birds							
Acadian Flycatcher	*Empidonax virescens*	S2S3B	END	END	Cadman et al, 2007	No	No
Bald Eagle	*Haliaeetus leucocephalus*	S4B	SC	NAR	Cadman et al, 2007	No	No
Bank Swallow	*Riparia riparia*	S4B	THR	THR-NS	Cadman et al, 2007	No	No
Barn Swallow	*Hirundo rustica*	S4B	THR	THR-NS	Cadman et al, 2007	No	Yes
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR-NS	Cadman et al, 2007	Yes	Yes
Chimney Swift	*Chaetura pelagica*	S4B, S4N	THR	THR	Cadman et al, 2007	Yes	Yes
Common Nighthawk	*Chordeiles minor*	S4B	SC	SC	Cadman et al, 2007	Yes	Yes
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR-NS	Cadman et al, 2007	Yes	Yes
Eastern Wood-Pewee	*Contopus virens*	S5B	SC	SC-NS	Cadman et al, 2007 TNHI, 2011	No	Yes
Least Bittern	*Ixobrychus exilis*	S4B	THR	THR	Cadman et al, 2007	No	No
Peregrine Falcon	*Falco peregrinus*	S3B	SC	SC	Cadman et al, 2007	No	No
Red-Headed Woodpecker	*Melanerpes erythrocephalus*	S4B	SC	THR	Cadman et al, 2007	No	Yes
Short-eared Owl	*Asio flammeus*	S2N, S4B	SC	SC	Cadman et al, 2007	No	Yes
Wood Thrush	*Hylocichla*	S4B	SC	THR-NS	Cadman et al, 2007	Yes	Yes

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Appendix D.1: 163302160 Potential Species at Risk and Provincially Rare Species in the Study Area

Common Name	Scientific Name	S-Rank	COSSARO	COSEWIC	Source	Species confirmed in the Study Area?	Suitable habitat present in the Study Area?
	mustelina				TNHI, 2011		
Yellow-breasted Chat	*Icteria virens*	S2B	END	SC (END)	Cadman et al, 2007	No	No
Reptiles							
Blanding's Turtle	*Emydoidea blandingi*	S3	THR	THR	Ontario Nature, 2016	No	Yes
Butler's Gartersnake	*Thamnophis butleri*	S2	END	THR	Ontario Nature, 2016 Waldron, 2009	Yes	Yes
Common Five-lined Skink (Carolinian)	*Eumeces fasciatus*	S2	END	END	Ontario Nature, 2016	No	No
Common Snapping turtle	*Chelydra serpentina*	S3	SC	SC	Ontario Nature, 2016 Waldron, 2009	Yes	Yes
Eastern Foxsnake (Carolinian)	*Pantherophis gloydi*	S3	END	END	Ontario Nature, 2016	Yes	Yes
Eastern Milksnake	*Lampropeltis triangulum*	S3	NAR	SC	Ontario Nature, 2016	No	Yes
Massasauga	*Sistrurus catenatus*	S3	THR	END	Ontario Nature, 2016	No	No
Northern Map Turtle	*Graptemys geographica*	S3	SC	SC	Ontario Nature, 2016	Yes	Yes
Queensnake	*Regina septemvittata*	S2	END	END	Ontario Nature, 2016	No	Yes

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Appendix D.1: 163302160 Potential Species at Risk and Provincially Rare Species in the Study Area							
Common Name	**Scientific Name**	**S-Rank**	**COSSARO**	**COSEWIC**	**Source**	**Species confirmed in the Study Area?**	**Suitable habitat present in the Study Area?**
Spiny Soft-shell	*Apalone spinifera spinifera*	S3	THR	THR	Ontario Nature, 2016	No	Yes - limited
Mammals							
Little Brown Myotis	*Myotis lucifuga*	S4	END	END	Dobbyn, 1994	No	Yes
Eastern Mole	*Scalopus aquaticus*	S2	SC	SC	Dobbyn, 1994	No	Yes
Odonata							
Double-stripped Bluet	Enallagma basidens	S3			Ecoplans Field Observation 2011	Yes	Yes
Unicorn Clubtail	Arigomphus villosipes	S2-S3			Ecoplans Field Observation 2011	Yes	Yes
Blue-tipped Dancer	Argia tibialis	S3			Ecoplans Field Observation 2011	Yes	Yes
Mottled Darner	Aeshna clepsydra	S3			Ecoplans Field Observation 2011	Yes	Yes
River Bluet	Enallagma anna	S2			Ecoplans Field Observation 2011	Yes	Yes
Butterflies							

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Appendix D.1: 163302160 Potential Species at Risk and Provincially Rare Species in the Study Area

Common Name	Scientific Name	S-Rank	COSSARO	COSEWIC	Source	Species confirmed in the Study Area?	Suitable habitat present in the Study Area?
Common Sooty Wing	Pholisora catullus	S3			Ecoplans Field Observation 2011	Yes	Yes
Giant Swallowtail	Papilio cresphontes	S3			Ecoplans Field Observation 2011	Yes	Yes
Monarch	Danaus plexippus	S4B-S2N			Ecoplans Field Observation 2011	Yes	Yes
Hickory Hairstreak	Satyrium caryaevorum	S3			Ecoplans Field Observation 2011	Yes	Yes
Duke's Skipper	Euphyes dukesi	S2			Ecoplans Field Observation 2011	Yes	Yes
Dion Skipper	Euphyes dion	S3			Ecoplans Field Observation 2011	Yes	Yes
Monarch	*Danaus plexippus*	S4B	SC	SC	Ontario Butterfly Atlas, 2016	No	Yes
Vascular Plants							
American Chestnut	*Castanea dentata*	S2	END	END	SARO Website	No	Yes
Biennial Gaura	*Oenothera gaura*	S3			NHIC, 2015	No	Yes
Burning Bush	*Euonymus atropurpurea*	S3			TNHI, 2011	Yes	Yes
Butternut	*Juglans cinerea*	S3	END	END	SARO Website	No	Yes
Climbing Prairie Rose	*Rosa setigera*	S3	SC	SC	NHIC, 2015 Waldron, 2009 CNHS, 2008	Yes	Yes

Appendix D.1: 163302160 Potential Species at Risk and Provincially Rare Species in the Study Area

Common Name	Scientific Name	S-Rank	COSSARO	COSEWIC	Source	Species confirmed in the Study Area?	Suitable habitat present in the Study Area?
					TNHI, 2011		
Culver's Root	*Veronicastrum virginicum*	S2			NHIC, 2015	No	Yes
Cup Plant	*Silphium perfoliatum var. perfoliatum*	S2			NHIC, 2015	No	Yes
Dense Blazing Star	*Liatris spicata*	S2	THR	THR	SARO Website	No	Yes
Eastern Flowering Dogwood	*Cornus florida*	S2?	END	END	SARO Website	No	Yes
Eastern Prairie Fringed-orchid	*Platanthera leucophaea*	S2	END	END	SARO Website	No	Potential
Eastern Stiff-leaved Goldenrod	*Solidago rigida*	S3			NHIC, 2015 Waldron, 2009	Yes	Yes
Giant Ironweed	*Vernonia gigantea*	S1?			NHIC, 2015 Waldron, 2009 CNHS, 2008	Yes	Yes
Gray-headed Prairie Coneflower	*Ratibida pinnata*	S3			NHIC, 2015	No	Yes
Great Plains Ladies'-tresses	*Spiranthes magnicamporum*	S3?			NHIC, 2015	No	Yes
Hazel Dodder	*Cuscuta coryli*	SH			NHIC, 2015	No	Yes
Hoary Tick-trefoil	*Desmodium canescens*	S2			NHIC, 2015	No	Yes
Honey Locust	*Gleditsia triacanthos*	S2			Waldron, 2009 TNHI, 2011	Yes	Yes
Illinois Greenbriar	*Smilax illinoensis*	S2?			TNHI, 2011	Yes	Yes
Kentucky Coffee-tree	*Gymnocladus dioicus*	S2	THR	THR	NHIC, 2015 Waldron, 2009	Yes	Yes

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Appendix D.1: 163302160 Potential Species at Risk and Provincially Rare Species in the Study Area

Common Name	Scientific Name	S-Rank	COSSARO	COSEWIC	Source	Species confirmed in the Study Area?	Suitable habitat present in the Study Area?
Large Yellow Pond-lily	*Nuphar advena*	S3			NHIC, 2015	No	Yes
Lowland Brittle Fern	*Cystopteris protrusa*	S2			NHIC, 2015	No	Yes
Many-fruited Seedbox	*Ludwigia polycarpa*	S2S3			NHIC, 2015 TNHI, 2011	Yes	Yes
Missouri Ironweed	*Vernonia missurica*	S3?			Waldron, 2009 TNHI, 2011	Yes	Yes
Muskingum Sedge	*Carex muskingumensis*	S3			NHIC, 2015 TNHI, 2011	Yes	Yes
Narrowleaf Sedge	*Carex amphibola*	S2			TNHI, 2011	Yes	Yes
Pin Oak	*Quercus palustris*	S3			Waldron, 2009 CNHS, 2008	Yes	Yes
Plum-leaved Hawthorn	*Crataegus persimilis*	S1			NHIC, 2015 CNHS, 2008 TNHI, 2011	Yes	Yes
Prairie Milkweed	*Asclepias sullivantii*	S3			NHIC, 2015 TNHI, 2011	Yes	Yes
Prairie Rosinweed	*Silphium terebinthinaceum*	S1			NHIC, 2015	No	Yes
Prairie Straw Sedge	*Carex suberecta*	S2			NHIC, 2015	No	Yes
Pumpkin Ash	*Fraxinus profunda*	S2			CNHS, 2008 TNHI, 2011	Yes	Yes
Purple Twayblade	*Liparis liliifolia*	S2	THR	THR	SARO Website	No	Yes
Rough Dropseed	*Sporobolus asper*	S3			Waldron, 2009	Yes	Yes
Shellbark Hickory	*Carya laciniosa*	S3			NHIC, 2015 Waldron, 2009 CNHS, 2008	Yes	Yes

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Appendix D.1: 163302160 Potential Species at Risk and Provincially Rare Species in the Study Area

Common Name	Scientific Name	S-Rank	COSSARO	COSEWIC	Source	Species confirmed in the Study Area?	Suitable habitat present in the Study Area?
					TNHI, 2011		
Shumard Oak	*Quercus shumardii*	S3	SC	SC	NHIC, 2015 Waldron, 2009 CNHS, 2008 TNHI, 2011	Yes	Yes
Stiff Cowbane	*Oxypolis rigidior*	S2			NHIC, 2015	No	Yes
Swamp Agrimony	*Agrimonia aprviflora*	S3, S4			Waldron, 2009 CNHS, 2008	Yes	Yes
Tall Boneset	*Eupatorium altissimum*	S1			CNHS, 2008 TNHI, 2011	Yes, although likely planted	Yes
Tall Tickseed	*Coreopsis tripteris*	S2			NHIC, 2015	No	Yes
Upright Greenbriar	*Smilax ecirrhata*	S3?			TNHI, 2011	Yes	Yes
Willowleaf Aster	*Symphyotrichum praealtum*	S2	THR	THR	NHIC, 2015	No	Yes
Winged Loosestrife	*Lythrum alatum*	S3			NHIC, 2015 TNHI, 2011	Yes	Yes

Appendix D.2: 160311265 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Seasonal Concentration Areas			
Waterfowl Stopover and Staging Area (Terrestrial)	Fields with sheet water or utilized by tundra swans during spring (mid-March to May), or annual spring melt water flooding found in any of the following Community Types: Meadow (CUM1), Thicket (CUT1). Agricultural fields with waste grains are commonly used by waterfowl, and these are not considered SWH unless used by Tundra swans in the Long Point, Rondeau, Lake St. Clair, Grand Bend and Point Pelee Areas.	ELC surveys were used to assess features within the Study Area that may support waterfowl stopover and staging areas (terrestrial).	**Large expanses of agricultural communities were identified within the Study Area which is in close proximity to Lake St. Clair.** **Candidate habitat for waterfowl stopover and staging areas (Terrestrial) may occur in the Study Area.**
Waterfowl Stopover and Staging Area (Aquatic)	The following Community Types: Meadow Marsh (MAM), Shallow Marsh (MAS), Shallow Aquatic (SA), Deciduous Swamp (SWD). Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. The combined area of the ELC ecosites and a 100 m radius area is the SWH. Sewage treatment ponds and storm water ponds do not qualif y as a SWH; however, a reservoir managed as a large wetland or pond/lake does qualify.	ELC surveys were used to assess features within the Study Area that may support waterfowl stopover and staging areas (aquatic).	No large open aquatic features were present within the Study Area, to accommodate large aggregations of waterfowl. No candidate habitat for waterfowl stopover and staging (aquatic) occurs in the Study Area.
Shorebird Migratory Stopover Area	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of amour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a significant wildlife habitat. The following community types: Meadow Marsh (MAM), Beach/Bar (BB), or Sand Dune (SD)	ELC surveys were used to assess features within the Study Area that may support migratory shorebirds.	No meadow marshes, beach/bars or sand dunes were identified within the Study Area. No candidate habitat for shorebird stopover areas occurs in the Study Area.

Appendix D.2: 160311265 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Raptor Wintering Area	At least one of the following Forest Community Types: Deciduous Forest (FOD), Mixed Forest (FOM) or Coniferous Forest (FOC), in combination with one of the following Upland Community Types: Meadow (CUM), Thicket (CUT), Savannah (CUS), Woodland (CUW) (<60% cover) Combined area must be >20 ha and provides roosting, foraging and resting habitats for wintering raptors. Upland habitat (CUM, CUT, CUS, CUW), must represent at least 15 ha of the 20 ha minimum size with limited snow accumulation, and limited disturbance.	ELC surveys were used to assess features within the Study Area that may support wintering raptors.	All upland areas adjacent to woodlands in the Study Area are comprised of large expanses of agricultural lands. No candidate habitat for raptor wintering areas occurred in the Study Area.
Bat Hibernacula	Hibernacula may be found in caves, mine shafts, underground foundations and karsts. May be found in these Community Types: Crevice (CCR), Cave (CCA).	ELC surveys were used to assess features within the Study Area that may support bat hibernacula.	No crevices, caves or abandoned mines are located in the Study Area. No candidate habitat for bat hibernacula occurred in the Study Area.
Bat Maternity Colonies	Maternity colonies considered significant wildlife habitat are found in forested ecosites. Either of the following Community Types: Deciduous Forest (FOD), Mixed Forest (FOM), Deciduous Swamp (SWD) and Mixed Swamp (SWM) that have>10/ha wildlife trees >25cm diameter at breast height (dbh). Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.	ELC surveys were used to assess features within the Study Area that may support bat maternity colonies.	**Candidate habitat for bat maternity colonies may be present in each of the woodland communities.**
Turtle Wintering Areas	Snapping and Midland Painted turtles utilize ELC community classes: Swamp (SW), Marsh (MA) and Open Water (OA). Shallow water (SA), Open Fen (FEO) and Open Bog (BOO).	ELC surveys were used to assess features within the Study Area that may support areas of permanent standing water but not deep enough	**Any open aquatic areas that are deep enough not to freeze over the winter may provide potential candidate turtle overwintering habitat.**

Appendix D.2: 160311265 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	Water has to be deep enough not to freeze and have soft mud substrate. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate dissolved oxygen. Man-made ponds such as sewage lagoons or stormwater management ponds should not be considered significant.	to freeze.	
Snake Hibernacula	Hibernation occurs in sites located below frost lines in burrows, rock crevices, broken and fissured rock and other natural features. Human-made constructed rock piles, old stone fences and crumbling foundations qualify as candidate SWH. Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. Any ecosite in southern Ontario other than very wet ones may provide habitat. The following Community Types may be directly related to snake hibernacula: Talus (TA), Rock Barren (RB), Crevice (CCR), Cave (CCA), and Alvar (RBOA1, RBSA1, RBTA1).	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support snake hibernacula.	**Old foundations may provide candidate habitat for snake hibernacula in the Study Area.**
Colonial-Nesting Bird Breeding Habitat (Bank and Cliff)	Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, or barns found in any of the following Community Types: Meadow (CUM), Thicket (CUT), Bluff (BL), Cliff (CL). Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation.	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support colonial bird breeding habitat.	Due to the flat topography typical of the Windsor area, natural eroding banks, sandy hills, borrow pits, steep slopes and sand piles are not likely to be present within the Study Area. No candidate habitat for bank or cliff colonial nesting birds occurs within the Study Area.
Colonial-Nesting Bird Breeding Habitat	Identification of stick nests in any of the following Community Types: Mixed Swamp (SWM),	ELC surveys and wildlife habitat assessments were used to assess	No colonial nesting birds were identified during field investigations, or during the background

Appendix D.2: 160311265 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
(Tree/Shrubs)	Deciduous Swamp (SWD), Treed Fen (FET). The edge of the colony and a minimum 300 m area of habitat or extent of the Forest Ecosite containing the colony or any island <15 ha with a colony is the SWH. Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.	features within the Study Area that may support colonial bird breeding habitat (Trees/Shrubs).	review. No candidate habitat for tree/shrub colonial nesting birds occurs in the Study Area.
Colonial-Nesting Bird Breeding Habitat (Ground)	Any rocky island or peninsula within a lake or large river. For Brewer's Blackbird close proximity to watercourses in open fields or pastures with scattered trees or shrubs found in any of the following Community Types: Meadow Marsh (MAM1-6), Shallow Marsh (MAS1-3), Meadow (CUM), Thicket (CUT), Savannah (CUS).	ELC surveys were used to assess features within the Study Area that may support colonial bird breeding habitat (Ground).	No rocky islands or peninsulas are present within the Study Area. In southern Ontario, Brewer's Blackbird known occurrences are primarily restricted to the Bruce Peninsula; none are known to occur in the Study Area region and it is considered a" very rare irregular spring and autumn transient" (Cadman et al., 2007; Weir, 2008) No candidate habitat for ground colonial nesting birds occurred within the Study Area.
Migratory Butterfly Stopover Areas	Located within 5 km of Lake Ontario A combination of ELC communities, one from each land class is required: Field (CUM, CUT, CUS) and Forest (FOC, FOM, FOD, CUP) Minimum of 10 ha in size with a combination of field and forest habitat present	ELC surveys and GIS analysis were used to assess features within the Study Area that may support migratory butterfly stopover areas.	The Study Area is not within 5 km of Lake Ontario. No Candidate Significant Wildlife Habitat for migratory butterfly stopover areas occurs within the Study Area.
Landbird Migratory Stopover Areas	The following community types: Forest (FOD, FOM, FOC) or Swamp (SWC, SWM, SWD) Woodlots must be >5 ha in size and within 5 km of Lake Ontario; 2-5ha can be considered if rare in an area of shoreline; woodlands within 2 km of Lake Ontario are more significant; largest sites are more significant.	ELC surveys and GIS analysis were used to assess features within the Study Area that may support landbird migratory stopover areas.	The Study Area is not within 5 km of Lake Ontario. No candidate habitat for migratory landbird stopover areas occurs within the Study Area.
Deer Winter Congregation Areas	Woodlots typically > 100 ha in size unless determined by the MNR as significant. (If large woodlots are rare in a planning area >50ha)	ELC surveys were used to assess features within the Study Area that would qualify as deer congregation	No woodlands >100 ha in size occurred in the Study Area. No candidate habitat for deer winter

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	All forested ecosites within Community Series: FOC, FOM, FOD, SWC, SWM, SWD Conifer plantations much smaller than 50 ha may also be used	areas.	congregation areas occurs within the Study Area.
Rare Vegetation Communities			
Cliffs and Talus Slopes	A Cliff is vertical to near vertical bedrock >3 m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris Any ELC Ecosite within Community Series: TAO, TAS, TAT, CLO, CLS, CLT Most cliff and talus slopes occur along the Niagara Escarpment	ELC surveys were used to assess features within the Study Area that would be considered cliffs or talus slopes.	No cliffs or talus slopes were identified within the Study Area. No candidate wildlife habitat for cliffs or talus slopes occurs within the Study Area.
Sand Barrens	Sand barrens typically are exposed sand, generally sparsely vegetated and cause by lack of moisture, periodic fires and erosion. Vegetation can vary from patchy and barren to tree covered but less than 60%. Any of the following Community Types: SBO1 (Open Sand Barren Ecosite), SBS1 (Shrub Sand Barren Ecosite), SBT1 (Treed Sand Barren Ecosite).	ELC surveys were used to assess features within the Study Area that would be considered to be sand barrens.	No sand barrens were identified within the Study Area. No candidate wildlife habitat for sand barrens occurs within the Study Area.
Alvars	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. Any of the following Community Types: ALO1(Open Alvar Rock Barren Ecosite), ALS1 (Alvar Shrub Rock Barren Ecosite), ALT1 (Treed Alvar Rock Barren Ecosite), FOC1 (Dry-Fresh Pine Coniferous Forest), FOC2 (Dry-Fresh Cedar Coniferous Forest), CUM2 (Bedrock Cultural Meadow), CUS2 (Bedrock Cultural Savannah), CUT2-1 (Common Juniper Cultural Alvar Thicket), or CUW2 (Bedrock Cultural Woodland) An Alvar site > 0.5 ha in size	ELC surveys were used to assess features within the Study Area that would be considered to be alvar communities.	No alvars were identified within the Study Area. No candidate wildlife habitat for alvars occurs within the Study Area.
Old-growth Forest	Old-growth forests tend to be relatively	ELC surveys were used to assess	No old growth forests were identified within the

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	undisturbed, structurally complex, and contain a wide variety of trees and shrubs in various age classes. These habitats usually support a high diversity of wildlife species. No minimum size criteria t in any of the following Community Types: FOD (Deciduous Forest), FOM (Mixed Forest), FOC (Coniferous Forest) Forests greater than 120 years old and with no historical forestry management was the main criteria when surveying for old-growth forests.	features within the Study Area that would be considered to be old-growth forest communities.	Study Area. No candidate wildlife habitat for old growth forests occurs within the Study Area.
Savannahs	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). Any of the following Community Types: TPS1 (Dry-Fresh Tallgrass Mixed Savannah Ecosite), TPS2 (Fresh-Moist Tallgrass Deciduous Savannah Ecosite), TPW1 (Dry-Fresh Black Oak Tallgrass Deciduous Woodland Ecosite), TPW2 (Fresh-Moist Tallgrass Deciduous Woodland Ecosite), CUS2 (Bedrock Cultural Savannah Ecosite).	ELC surveys were used to assess features within the Study Area that would be considered to be savannah communities.	No savannahs were identified within the Study Area. No candidate wildlife habitat for savannahs occurs within the Study Area.
Tall-grass Prairies	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario). Any of the following Community Types: TPO1 (Dry Tallgrass Prairie Ecosite), TPO2 (Fresh-Moist Tallgrass Prairie Ecosite).	ELC surveys were used to assess features within the Study Area that would be considered to be tall-grass communities.	No tall grass prairies were identified within the Study Area. No candidate wildlife habitat for tall grass prairies occurs within the Study Area.
Other Rare Vegetation Communities	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the	ELC surveys were used to assess features within the Study Area that would be considered to be other rare	No rare vegetation communities were identified within the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
	SWHTG	vegetation communities.	No candidate wildlife habitat for rare vegetation communities occurs within the Study Area.
Specialized Habitat for Wildlife			
Waterfowl Nesting Area	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4 Note: includes adjacency to Provincially Significant Wetlands	ELC surveys were used to assess features within the Study Area that may support nesting waterfowl.	No marsh or swamp ELC ecosites were identified within the Study Area. No candidate wildlife habitat for waterfowl nesting areas occurs in the Study Area.
Bald Eagle and Osprey nesting, Foraging, and Perching Habitat	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	ELC surveys and wildlife habitat assessments were used to assess features within the Study Area that may support nesting, foraging and perching habitat for large raptors.	No large stick nests were identified within the Study Area. No candidate wildlife habitat for Osprey or Bald Eagle habitat occurs in the Study Area.
Woodland Raptor Nesting Habitat	All natural or conifer plantation woodland/forest stands combined >30 ha and with >4 ha of interior habitat. Interior habitat determined with a 200 m buffer. Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3	ELC surveys, wildlife habitat assessments and GIS analysis were used to assess features within the Study Area that may support nesting habitat for woodland raptors.	There is no interior habitat within the Study Area. No candidate wildlife habitat for woodland raptor nesting occurs within the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Turtle Nesting Areas	Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC Ecosites: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, BOO1, FEO1 Best nesting habitat for turtles is close to water, away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	ELC surveys were used to assess features within the Study Area that may support turtle nesting areas.	**Candidate wildlife habitat for turtle nesting areas may occur adjacent to turtle wintering areas in the Study Area.**
Seeps and Springs	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs. Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system	ELC surveys were used to assess features within the Study Area that may support seeps and springs.	**Roadside surveys did not allow for the assessment of seeps/springs within forested habitats.** **Candidate habitat for seeps and springs may occur in the Study Area within forested habitats.**
Amphibian Breeding Habitat (Woodland)	All Ecosites associated with these ELC Community Series; FOC, FOM, FOD, SWC, SWM, SWD Presence of a wetland, lake, or pond within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat	ELC surveys and GIS analysis were used to assess features within the Study Area that may support woodland breeding amphibians.	**Candidate amphibian breeding habitat (woodland) may occur in the Study Area in or within 120m from forested habitats.**

Appendix D.2: 160311265 Significant Wildlife Habitat Assessment

Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Amphibian Breeding Habitat (Wetland)	ELC Community Classes SW, MA, FE, BO, OA and SA. Wetland areas >120 m from woodland habitats. Wetlands and pools (including vernal pools) >500 m^2 (about 25 m diameter) supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats. Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. Bullfrogs require permanent water bodies with abundant emergent vegetation.	ELC surveys and GIS analysis were used to assess features within the Study Area that may support wetland breeding amphibians.	**Open aquatic ponds >120m from woodland habitats occur within the Study Area.** **Candidate habitat for wetland amphibian breeding may occur in open aquatic ponds or shallow marshes >120m from forested habitats in the Study Area.**
Species of Conservation Concern			
Marsh Bird Breeding Habitat	All wetland habitats with shallow water and emergent aquatic vegetation. May include any of the following Community Types: Meadow Marsh (MAM), Shallow Aquatic (SA), Open Bog (BOO), Open Fen (FEO), or for Green Heron: Swamp (SW), Marsh (MA) and Meadow (CUM1) Community Types.	ELC surveys were used to identify marshes with shallow water and emergent vegetation that may support marsh breeding birds.	No large marshes or aquatic habitats with shallow water and emergent aquatic vegetation were observed within the Study Area. No candidate habitat for marsh breeding birds therefore occurs in the Study Area.
Woodland Area-sensitive Bird Breeding Habitat	Habitats >30ha where interior forest is present (at least 200 m from the forest edge); typically >60 years old. These include any of the following Community Types: Forest (FO), Treed Swamp (SW)	ELC surveys and GIS analysis were used to determine whether woodlots that occurred within the Study Area that were >30 ha with interior habitat present (>200 m from edge).	No woodlots exceeded 30 ha in size with interior forest habitat within the Study Area. No candidate wildlife habitat for woodland area-sensitive breeding bird habitat occurs in the Study Area.
Open Country Bird Breeding Habitat	Grassland areas > 30 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or hay or livestock pasturing in the last 5 years, in the following Community Type: Meadow (CUM).	ELC surveys and GIS analysis were used to identify grassland communities within the Study Area that may support area-sensitive breeding birds.	No non-agricultural grassland communities >30 ha were identified in the Study Area. No candidate wildlife habitat for open country breeding bird habitat occurs in the Study Area.

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Candidate Wildlife Habitat	Criteria	Methods	Habitat Assessment of Features Found Within the Study Area
Shrub/Early Successional Bird Breeding Habitat	Oldfield areas succeeding to shrub and thicket habitats >10 ha, not Class 1 or Class 2 agricultural lands, with no row-cropping or intensive hay or livestock pasturing in the last 5 years, in the following Community Types: Thickets (CUT), Savannahs (CUS), or Woodlands (CUW).	ELC surveys and GIS analysis were used to identify large CUT, CUS or CUW communities that may support shrub/early successional breeding birds.	No large successional communities were identified in the Study Area. No candidate wildlife habitat for shrub/early successional breeding bird habitat occurs in the Study Area.
Terrestrial Crayfish	Meadow marshes and edges of shallow marshes (no minimum size). Vegetation communities include MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3. Construct burrows in marshes, mudflats, meadows Can be found far from water	ELC surveys were used to identify shallow marsh and meadow marsh communities that occurred within the Study Area.	**Candidate significant wildlife habitat for Terrestrial Crayfish may occur in the Study Area associated with the drains and watercourses.**
Amphibian Movement Corridor			
Amphibian Movement Corridor	Corridors may be found in all ecosites associated with water. Determined based on identifying significant amphibian breeding habitat (wetland).	Identified after Amphibian Breeding Habitat - Wetland is confirmed.	**Candidate habitat for amphibian movement corridors may occur in the Study Area only if candidate amphibian breeding habitat (wetland) is identified in the Study Area.**

Memo

Stantec

To:	Shari Muscat Guelph	From:	Natalie Leava Guelph
File:	160311265	Date:	November 7, 2011

Reference: Roadside ELC & Fall Botanical Inventory
Windsor Annexed Lands

This memo has been prepared to provide a summary of the field investigations conducted on September 28 and 29, 2011 on the Windsor Annexed Lands, Caledon, Ontario. These investigations were undertaken by N. Leava and M. Oxlade.

Field investigations for this project were conducted to confirm and assess the character of existing conditions. The work included roadside Ecological Land Classification (ELC) of vegetation communities and a floristic inventory of the subject lands and immediate vicinity. Drainage ditches along all roadsides in the Study Area were also surveyed for depth and width, as well as vegetative species composition. Vegetation communities were delineated on aerial photographs and checked in the field; community characterizations were then based on the ELC system (Lee et al., 1998). English colloquial names and scientific binominals of plant species generally follow Newmaster et al. (1998).

Natural heritage information collected from the subject lands was evaluated to confirm potential significance. Provincial significance of vegetation communities was based on the draft rankings assigned by the Natural Heritage Information Centre (Bakowsky, 1996). The provincial status of all plant species is based on Newmaster et. al (1998), with updates from the database of the Natural Heritage Information Centre (NHIC, 2001). Identification of potentially sensitive plant species is based on assignment of a coefficient of conservatism value (CC) to each native species in southern Ontario (Oldham et al., 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

Vegetation Communities

The vegetation communities, based on the ELC system for Southern Ontario, are shown on Figure 1 of the EA Report.

The majority of the study lands are under agricultural cultivation, with small wetland features associated with site drainage.

The vegetation community types are succinctly described in **Table 1** below.

Table 1 Ecological Land Classification (ELC) Vegetation Types

ELC TYPE	Community Description
Forest (FO)	
Deciduous Forest (FOD)	
FODa Deciduous Forest	Due to limited accessibility, this FOD community was observed approximately 250 metres from the roadside. Although this forest was within the Study Area, it could not be classified any further due to unknown species composition.
FODb Deciduous Forest	Due to limited accessibility, this FOD community was observed approximately 400 metres from the roadside. Although this forest was within the Study Area, it could not be classified any further due to unknown species composition.
FODc Deciduous Forest	Due to limited accessibility, this FOD community was observed approximately 100 metres from the roadside. Although this forest was within the Study Area, it could not be classified any further due to unknown species composition.
FODd Deciduous Forest	Due to limited accessibility, this FOD community was observed approximately 150 metres from the roadside. Although this forest was within the Study Area, it could not be classified any further due to unknown species composition.
FODe Deciduous Forest	Due to limited accessibility, this FOD community was observed approximately 200 metres from the roadside. Although this forest was within the Study Area, it could not be classified any further due to unknown species composition.
FOD2-4 Dry-Fresh Oak – Hardwood Deciduous Forest Type	This community had an abundance of bur oak, with sugar maple, American elm, and cottonwood associates within the canopy cover. The subcanopy consisted of equal presence of sugar maple, cottonwood and bur oak. The understory had an abundance of sugar maple and white ash. The ground layer was difficult to observe due to only roadside access.
FOD7-1a Fresh-Moist White Elm Lowland Deciduous Forest Type	This community was assessed from a pathway due to limited property access. Canopy cover consisted of American elm and sugar maple, with sugar maple and American basswood associates. Similar species composition was observed within the sub canopy, along with bur oak. Understory and ground layer species composition was not observed due to limited visibility along pathway. A small stream was found running along the side and throughout the forest.
FOD7-1b Fresh-Moist White Elm Lowland Deciduous Forest Type	This community was located along a residential property. A small stream ran through the community. Due to limited property access, the full extent of this community's area coverage was difficult to delineate. American elm was dominant throughout this community, with bur oak and cottonwood associates. Riverbank grape was frequently observed within this community as well.
Cultural (CU)	
Cultural Meadow (CUM)	
CUM1a Mineral Cultural Meadow Ecosite	Dominated by barnyard grass, this community also contained foxtail, various aster species, wild carrot and goldenrods. This cultural meadow covered a small area, and was located between two residential properties, as well as adjacent to the rail tracks bordered by a hedgerow.
CUM1b Mineral Cultural Meadow Ecosite	This community is highly disturbed, with large areas of open bare ground and gravel scattered throughout. A high dirt mound located at the north east section of this community is dominated by thistles. Other species found throughout this community include grasses, common ragweed, garlic mustard, teasel and

Reference: Roadside ELC and Fall Botanical Inventory Windsor Annexed Lands

Table 1 Ecological Land Classification (ELC) Vegetation Types

ELC Type	Community Description
	riverbank grape.
CUM1c Mineral Cultural Meadow Ecosite	This community is located adjacent to agricultural fields and industrial properties. It was disturbed, dominated by goldenrods and occasionally aster species. Phragmities, bird's-foot-trefoil, grasses and milkweed were observed throughout. A small area of tree cover along the south portion of this community occurred, consisting of cottonwood, trembling aspen, willow species and sumac.
CUM1-1a Dry-Moist Old Field Meadow Type	This community is bordered by *Phragmities*, and was adjacent to commercial and residential properties. Wild carrot, tall white aster, new England aster, and goldenrods were found throughout this community.
CUM1-1b Dry-Moist Old Field Meadow Type	This community was dominated by green amaranth. Other species such as Canada thistle, foxtail, dock and asters were found throughout. A small section just north of the residential area was absent of amaranth, and was dominated by goldenrods and aster species.

*ELC code not included in the First Approximation of ELC for Southern Ontario

None of the vegetation communities listed above are considered rare in the province.

Drainage Ditch Composition

Drainage areas surveyed along with the roadside ELC survey were recorded and photographed. Characteristics such as width, water depth, vegetation composition and cover were noted. These characteristics are described in **Table 2** below. Each surveyed area was numbered, and can be found in the attached field notes.

Table 2 Drainage Ditch Characteristics

Drainage Ditch #	Tile Number	Characteristics of Feature	Photo Number
1	4	- *Phragmities* dominant along drainage ditch - Culvert running in and under road - Willow shrubs, silver maple, Freeman's maple, sugar maple and riverbank grape throughout	965-966 967-968
2	4	- Small creek/stream with 60% tree cover and 90% forb cover - 0.5-1 metre deep, standing and slow moving water - Culvert running through under road East - Standing water in drainage ditch West - Dug out ditch - 50-60% vegetation cover; horsetail, hawkweed and foxtail	979-982 983-985
3	5	East - Tree and shrub cover approximately 70% - Goldenrods, asters and grasses West - 90% narrow-leaved cattail cover - Standing water approximately 0.3 metres deep - Goldenrods, asters and foxtails bordering the roadside	988 986-987
4	5	- Rocky drainage ditch with approximately 5-10% forb cover of goldenrods and asters	989-991

**Reference: Roadside ELC and Fall Botanical Inventory
Windsor Annexed Lands**

Table 2 Drainage Ditch Characteristics

		- Small rocks, 3 culverts, standing water of 0.2 – 0.4 m deep (storm water drain)	
5	5	East - Standing water approximately 0.2 metres deep - Small rocks around culvert - South side of ditch (photos 995-6) - North side of ditch (photo 994) borders cornfield along Shields Avenue with a CUM1 habitat approximately 20 metres into cornfield; asters, wild carrot, teasel, foxtail, prickly lettuce, *Phragmities*, white aster and calico aster West - 90% *Phragmities* cover - Standing water approximately 0.1 metres deep - Old barn along soy field*	994-996 992-993, 997
6	5	- *Phragmities* dominant - No standing or pooling water - Culverts open, little standing water around culvert openings	1007-1010
8	5	- Shallow, algae growth on standing water - Small culverts feeing into drainage ditch - Little vegetation cover, approximately 20% grass composition	1016-1017
9	5	- Dry, with small areas of pooling water - Awenless brome dominant	1018
10	5	East - *Phragmities* dominant of approximately 80% cover - Standing water of 0.2 metres West - *Phragmities* and cattails present - Standing water, approximately 0.3 metres deep - Vegetation cover 80%	1019-1020
11	5	- 100% vegetation cover, dominated by *Phragmities* - Appears dry (too thick to see into ditch) - Cedars bordering soy field and drainage ditch, with occasional Freeman's Maple	
12	1	- Riparian cover over drainage ditch; white cedar, silver maple, *Phragmities*, riverbank grape, Canada goldenrod, reed canary grass and asters seen throughout - Approximately 70% vegetation cover, standing water present - Culverts present	1023-1024
13	1	- Open ditch, approximately 2 metres wide, 0.7 metres deep with 60% vegetation cover along sides, predominantly *Phragmities* - **Chimney swift** observed (approximately 10 birds)	1026-1028
14	1	- Ditch running along railway tracks - 100% *Phragmities* cover; too dense to observe dimensions or standing water present	1029-1030
15	1	- Approximately 40% forb cover; New England aster, tall white aster, foxtail, riverbank grape - Water 0.3 metres deep, slow moving, large culverts	1037-1038
16	1	- Follows along concession 8 - 100% *Phragmities* cover; too dense to observe dimensions or standing water present	
17	2	- No visible standing water - Shoulder gravel moving in towards ditch - Willows and *Phragmities* dominant along edges	1039-1040

Table 2 Drainage Ditch Characteristics

18	2	- Flowing water, approximately 0.5 metres deep - Hedgerow bordering stream/ ditch; small stones along edge	1043-1044
19A	2	- Water crossing: goes through soy crop, connected to stream 18	1045-1047
19B	2	- Flowing water course - 80% vegetation cover, with sugar maple, goldenrods, *Phragmities*, asters and grasses	1060-1062
19C	2	- Flowing water course - Shrubby cover, dominated by dogwood, goldenrods and *Phragmities* - 50% vegetation cover - 90% vegetation cover along stream/ditch banks	1063-1064
20	2	- Scrubby, with high amounts of *Phragmities* - Filled in with no open culverts - Recently scooped out	
21	2	- Open stream with a hedgerow bordering along train tracks - Recently cut, with little vegetation cover remaining; *Phragmities*, goldenrods and asters	1048-1051
22	2	- Water course/ditch recently cut - *Phragmities* dominant, with 65% vegetation cover - Adjacent to Green Amaranth dominated mineral cultural meadow (CUM1-1)	1052-1053 1054-1055
23	3	East - Adjacent to corn field - Standing water present, with 80% vegetation cover West - Dominated by *Phragmities* with some cattails present - Adjacent to CUT/CUM habitat in residential area - Standing water with 70-90% vegetation cover	1069-1070 1067-1068
24	3	- Drainage ditch all foxtail with some reed canary present - No water present, some small sections of pooling - Approximately 1 metre wide **Note:** wood piles located on other side of road (not in study area)	1071 1072

Vascular Plant Species

Fifty-three species of vascular plants were recorded from the subject lands during the inventories. Of that number, 31 species or 58% were native, and 22 species or 42% were exotic; 97% of the native species observed are ranked S5 (Secure in Ontario), while the remainder are ranked S4 (Apparently secure).

None of the species observed had a CC of 9 or 10.

No nationally or provincially rare, threatened or endangered species were found.

Incidental observations include monarch butterfly, mourning dove, blue jay, turkey vulture and chimney swift.

**Reference: Roadside ELC and Fall Botanical Inventory
Windsor Annexed Lands**

STANTEC CONSULTING LTD.

Natalie Leava, M.Sc.
Terrestrial Ecologist
natalie.leava@stantec.com

Attachments: Figure 1: Ecological Land Classification
Plant Species List
Field Notes

REFERENCES

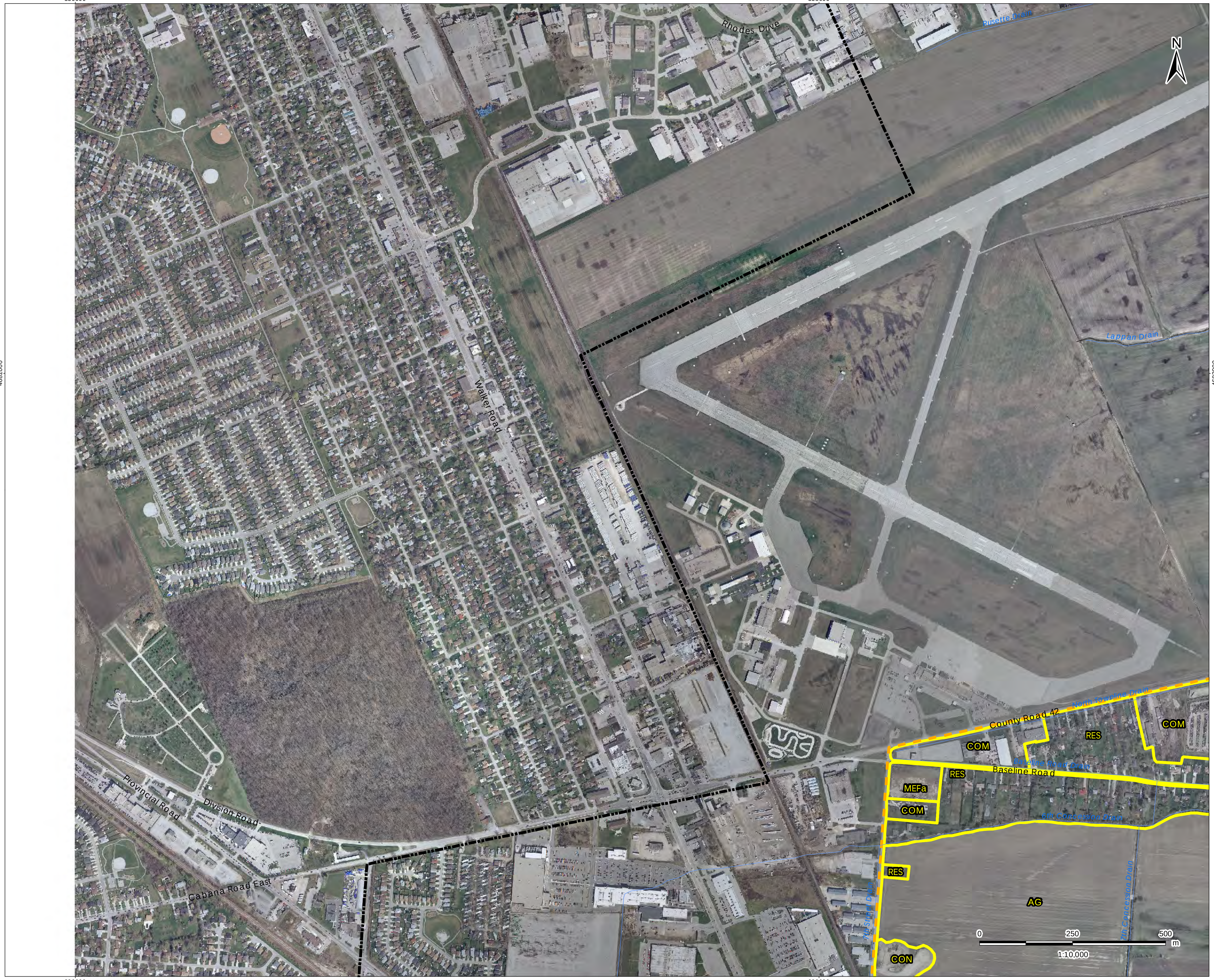
Bakowsky, W.D. 1996 (draft). Natural heritage resources in Ontario: S-ranks for communities in Site Regions 6 and 7. Natural Heritage Information Centre, Ontario MInistry of Natural Resources, Peterborough. 11 pp.

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological land classification for Southwestern Ontario: first approximation and its application. Ontario Ministry of Natural Resources, South Central Region, Science Development and Transfer Branch. Technical Manual ELC-005.

Natural Heritage Information Centre (NHIC). 2001. Provincial status of plants, wildlife and vegetation communities database. http://www.mnr.gov.on.ca/MNR/nhic/nhic.html. OMNR, Peterborough.

Newmaster, S.G., A. Lehela, P.W.C Uhlig, S. McMurray and M.J. Oldham. 1998. Ontario plant list. Ontario Ministry of Natural Resources, Ontario Forest Research Institute, Sault Ste. Marie, ON, Forest Research Information Paper No. 123. 550 pp. + appendices.

Oldham, M.J., W.D. Bakowsky and D.A. Sutherland. 1995. Floristic quality assessment for southern Ontario. OMNR, Natural Heritage Information Centre, Peterborough. 68 pp.



Stantec

Legend

- Study Area
- Watercourse
- ELC Fieldwork Extent
- ELC Boundary
- Municipal Boundary

ELC Communities

Meadow

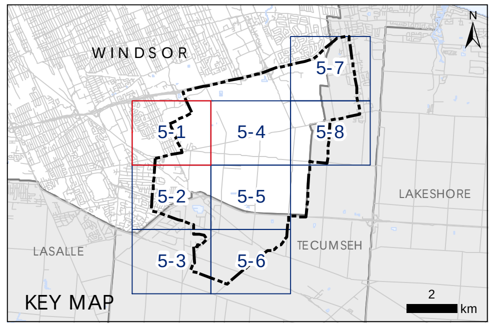
ME	Meadow
MEF	Forb Meadow
MEFM1-1	Goldenrod Forb Meadow
MEG	Graminoid Meadow

Forest

FOD	Deciduous Forest
FODM2-4	Dry-Fresh Oak Hardwood Deciduous Forest
FODM7-1	Fresh-Moist White Elm Lowland Deciduous Forest

Other

AG	Agriculture
BUS	Business
CEM	Cemetary
COM	Commercial
CON	Construction
IND	Industrial
INS	Institutional
OA	Open Aquatic
OS	Open Soil
PAS	Pasture
RES	Residential



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160311625

Client/Project

City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.

5-1

Title

Roadside Ecological Land Classification

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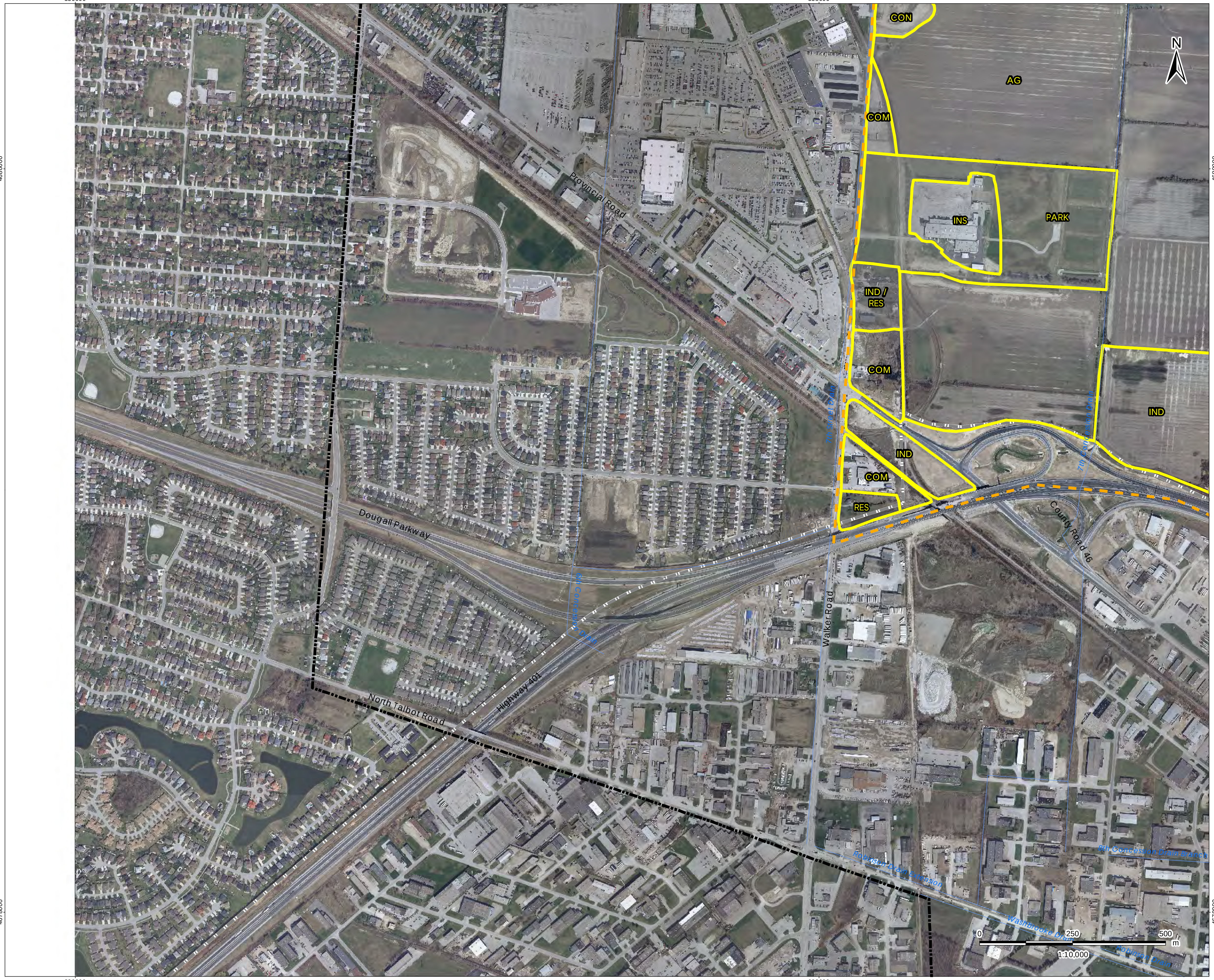

Stantec

Legend

- Study Area
- Watercourse
- ELC Fieldwork Extent
- ELC Boundary
- Municipal Boundary

ELC Communities

Meadow

ME	Meadow
MEF	Forb Meadow
MEFM1-1	Goldenrod Forb Meadow
MEG	Graminoid Meadow

Forest

FOD	Deciduous Forest
FODM2-4	Dry-Fresh Oak Hardwood Deciduous Forest
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Other

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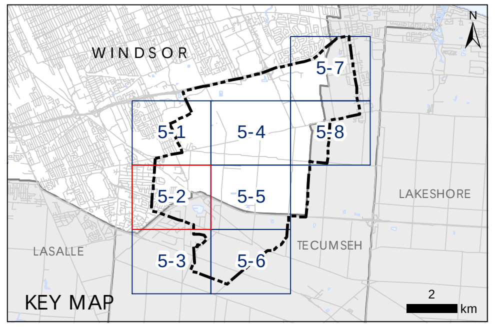

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Client/Project

City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.

5-2

Title

Roadside Ecological Land Classification

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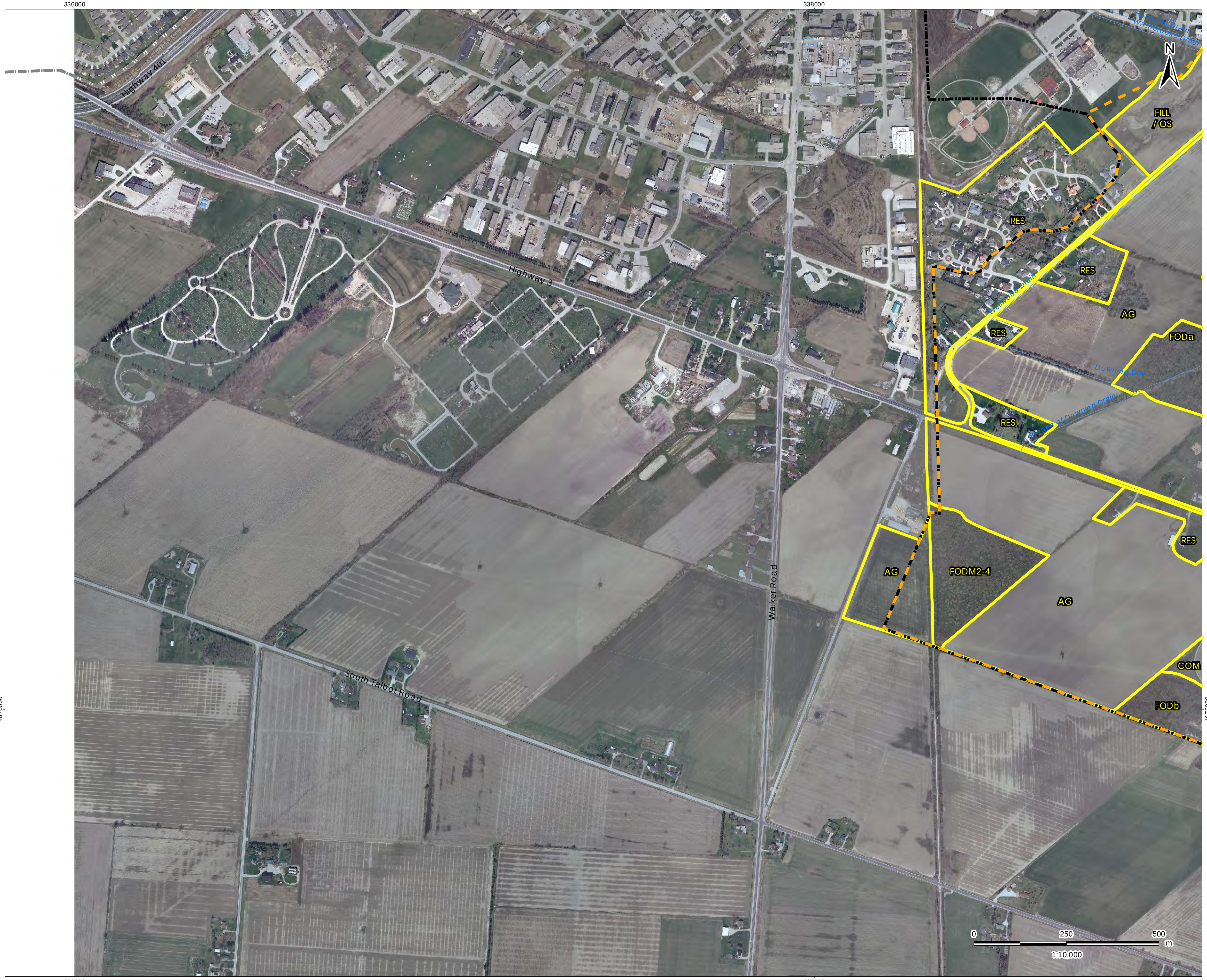

Stantec

Legend
- Study Area
- Watercourse
- ELC Fieldwork Extent
- ELC Boundary
- Municipal Boundary

ELC Communities

Meadow

ME	Meadow
MEF	Forb Meadow
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MEG	Graminoid Meadow

Forest

FOD	Deciduous Forest
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FODM7-1	Fresh-Moist White Elm Lowland Deciduous Forest

Other

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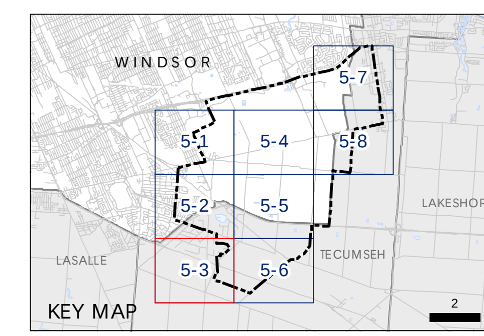

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Client/Project

City of Windsor
Upper Little River Stormwater
and Drainage Master Plan

Figure No.
5-3

Title
Roadside Ecological Land Classification

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Revised: 2017-01-25 By: kbuchanan

Stantec

Legend

- Study Area
- Watercourse
- ELC Fieldwork Extent
- ELC Boundary
- Municipal Boundary

ELC Communities

Meadow

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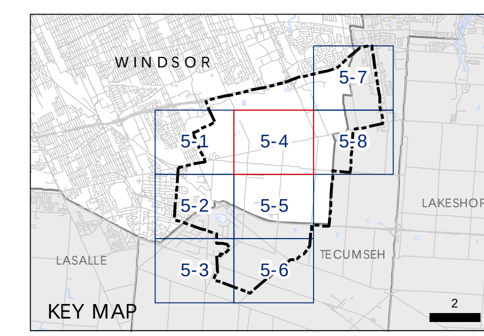

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Client/Project

City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.

5-4

Title

Roadside Ecological Land Classification

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Revised: 2017-01-25 By: kbuchanan

Stantec

Legend

- Study Area
- Watercourse
- ELC Fieldwork Extent
- ELC Boundary
- Municipal Boundary

ELC Communities

Meadow

ME	Meadow
MEF	Forb Meadow
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Forest

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Other

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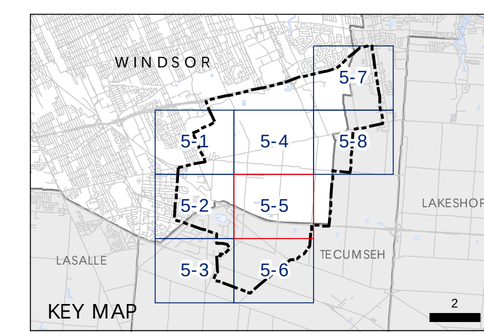

KEY MAP

Notes

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Client/Project

City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.
5-5

Title
Roadside Ecological Land Classification

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Revised: 2017-01-25 By: kbuchanan

Stantec

Legend

- Study Area
- Watercourse
- ELC Fieldwork Extent
- ELC Boundary
- Municipal Boundary

ELC Communities

Meadow

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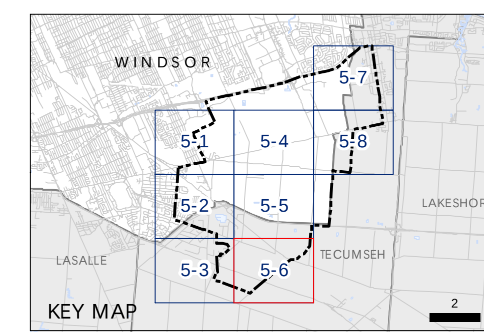

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Client/Project

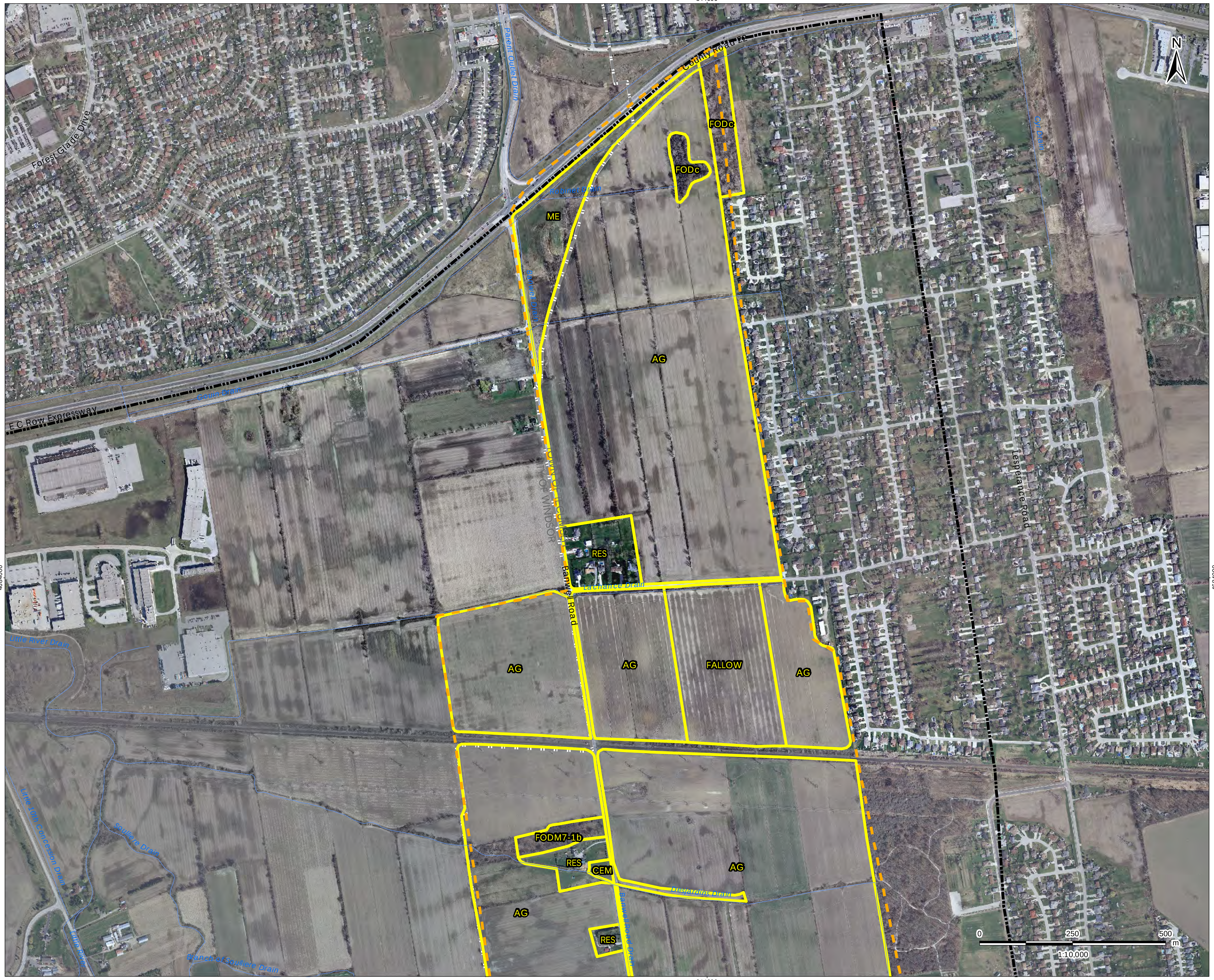
City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.

5-6

Title

Roadside Ecological Land Classification



Legend
- Study Area
- Watercourse
- ELC Fieldwork Extent
- ELC Boundary
- Municipal Boundary

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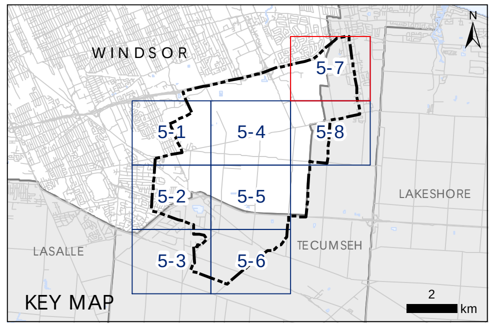

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January 2017
160311625

Client/Project
City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.
5-7

Title
Roadside Ecological Land Classification

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Revised: 2017-01-25 By: kbuchanan

Stantec

Legend
- Study Area
- Watercourse
- ELC Fieldwork Extent
- ELC Boundary
- Municipal Boundary

ELC Communities

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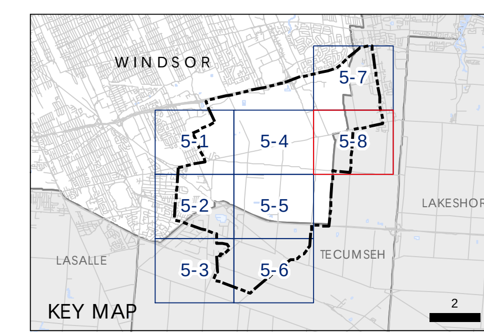

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Client/Project

City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.
5-8

Title
Roadside Ecological Land Classification

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Revised: 2017-01-25 By: kbuchanan

LATIN NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	COSSAR0 STATUS	COSEWIC STATUS
GYMNOSPERMS		**CONIFERS**						
Cupressaceae		**Cedar Family**						
Juniperus	*virginiana*	Eastern Red Cedar				S5		
Thuja	*occidentalis*	Eastern White Cedar	4	-3		S5		
DICOTYLEDONS		**DICOTS**						
Aceraceae		**Maple Family**						
Acer	*negundo*	Manitoba Maple	0	-2		S5		
Acer	*saccharinum*	Silver Maple	5	-3		S5		
Acer	*saccharum* ssp. *saccharum*	Sugar Maple	4	3		S5		
Acer X	*freemanii*	Freeman's Maple						
Amaranthaceae		**Amaranth Family**						
Amaranthus	*retroflexus*	Green Amaranth		2	-1	SE5		
Anacardiaceae		**Sumac or Cashew Family**						
Rhus	*typhina*	Staghorn Sumac	1	5		S5		
Apiaceae		**Carrot or Parsley Family**						
Daucus	*carota*	Wild Carrot		5	-2	SE5		
Asclepiadaceae		**Milkweed Family**						
Asclepias	*syriaca*	Common Milkweed	0	5		S5		
Asteraceae		**Composite or Aster Family**						
Achillea	*millefolium* ssp. *millefolium*	Common Yarrow		3	-1	SE?		
Ambrosia	*artemisiifolia*	Common Ragweed	0	3		S5		
Ambrosia	*trifida*	Giant Ragweed	0	-1		S5		
Aster	*species*	Aster species						
Aster	*lanceolatus* ssp. *lanceolatus*	Tall White Aster	3	-3		S5		
Aster	*lateriflorus* var. *lateriflorus*	Calico Aster	3	-2		S5		
Cirsium	*arvense*	Canada Thistle		3	-1	SE5		
Crepis	*capillaris*	Smooth Hawk's Beard		5	-1	SE1		
Hieracium	*caespitosum*	Field Hawkweed		5	-2	SE5		
Lactuca	*serriola*	Prickly Lettuce		0	-1	SE5		
Solidago	*canadensis*	Canada Goldenrod	1	3		S5		
Sonchus	*arvensis* ssp. *arvensis*	Field Sow-thistle				SE5		

LATIN NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	COSSAR0 STATUS	COSEWIC STATUS
Symphyotrichum	*novae-angliae*	New England Aster	2	-3		S5		
Taraxacum	*officinale*	Common Dandelion		3	-2	SE5		
Betulaceae		**Birch Family**						
Ostrya	*virginiana*	Hop Hornbeam	4	4		S5		
Brassicaceae		**Mustard Family**						
Alliaria	*petiolata*	Garlic Mustard		0	-3	SE5		
Cornaceae		**Dogwood Family**						
Cornus	*alternifolia*	Alternate-leaved Dogwood	6	5		S5		
Dipsacaceae		**Teasel Family**						
Dipsacus	*fullonum* ssp. *sylvestris*	Wild Teasel		5	-1	SE5		
Fabaceae		**Pea Family**						
Lotus	*corniculatus*	Bird's-foot Trefoil		1	-2	SE5		
Trifolium	*pratense*	Red Clover		2	-2	SE5		
Fagaceae		**Beech Family**						
Fagus	*grandifolia*	American Beech	6	3		S5		
Quercus	*macrocarpa*	Bur Oak	5	1		S5		
Juglandaceae		**Walnut Family**						
Carya	*ovata* var. *ovata*	Shagbark Hickory	6	3		S5		
Juglans	*nigra*	Black Walnut	5	3		S4		
Moraceae		**Mulberry Family**						
Morus	*alba*	White Mulberry		0	-3	SE5		
Oleaceae		**Olive Family**						
Fraxinus	*americana*	White Ash	4	3		S5		
Syringa	*vulgaris*	Common Lilac		5	-2	SE5		
Polygonaceae		**Smartweed Family**						
Rumex	*pallidus*	White Dock				SE1?		
Rhamnaceae		**Buckthorn Family**						
Rhamnus	*cathartica*	Common Buckthorn		3	-3	SE5		

LATIN NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	COSSAR0 STATUS	COSEWIC STATUS
Rosaceae		**Rose Family**						
Amelanchier	*laevis*	Smooth Juneberry	5	5		S5		
Prunus	*pensylvanica*	Pin Cherry	3	4		S5		
Rubus	*species*							
Salicaceae		**Willow Family**						
Populus	*deltoides* ssp. *deltoides*	Eastern Cottonwood	4	-1		SU		
Populus	*tremuloides*	Trembling Aspen		0		S5		
Salix	*species*	Willow species						
Tiliaceae		**Linden Family**						
Tilia	*americana*	American Basswood	4	3		S5		
Ulmaceae		**Elm Family**						
Ulmus	*americana*	White Elm	3	-2		S5		
Vitaceae		**Grape Family**						
Parthenocissus	*inserta*	Inserted Virginia-creeper	3	3		S5		
Vitis	*riparia*	Riverbank Grape	0	-2		S5		
MONOCOTYLEDONS		**MONOCOTS**						
Liliaceae		**Lily Family**						
Asparagus	*officinalis*	Garden Asparagus		3	-1	SE5		
Poaceae		**Grass Family**						
Alopecurus	*pratensis*	Meadow Foxtail		-3	-1	SE5		
Bromus	*inermis* ssp. *inermis*	Awnless Brome		5	-3	SE5		
Dactylis	*glomerata*	Orchard Grass		3	-1	SE5		
Echinochloa	*crusgalli*	Common Barnyard Grass		-3	-1	SE5		
Phalaris	*arundinacea*	Reed Canary Grass	0	-4		S5		
Typhaceae		**Cattail Family**						
Typha	*angustifolia*	Narrow-leaved Cattail	3	-5		S5		
Typha	*latifolia*	Broad-leaved Cattail	3	-5		S5		

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity

Total Species:		**53**	
Native Species:		**31**	58%
Exotic Species		**22**	42%
S1-S3 Species		0	0%
S4 Species		1	3%
S5 Species		29	97%

Co-efficient of Conservatism and Floristic Quality Index

Co-efficient of Conservatism (CC) (average)		**3.0**	
CC 0 to 3	*lowest sensitivity*	16	55%
CC 4 to 6	*moderate sensitivity*	13	45%
CC 7 to 8	*high sensitivity*	0	0%
CC 9 to 10	*highest sensitivity*	0	0%
Floristic Quality Index (FQI)		**16**	

Presence of Weedy & Invasive Species

mean weediness		**-1.7**	
weediness = -1	*low potential invasiveness*	10	50%
weediness = -2	*moderate potential invasiveness*	6	30%
weediness = -3	*high potential invasiveness*	4	20%

Presence of Wetland Species

average wetness value	**1.3**	
upland	10	20%
facultative upland	19	38%
facultative	8	16%
facultative wetland	11	22%
obligate wetland	2	4%

Legend

Study Area

Field Work Extents

Notes

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Stantec

September, 2011
160311265

Client/Project
Essex Region Conservation Authority
Upper Little River EA

Figure No.
1

Title
Site Plan 1

\\cd1004-f06\work_group\01609\active\160311265\planning\drawing\MXD\FieldWork\160311265_Field_Fig01_SitePlan.mxd
Revised: 2011-09-15

Stantec

(A) Commercial property in gravel ground, dominated by Phrag, open lawn (in Bulldozer). Tree cover throughout, including
- ACESACC, elm, Cottonwood, POPTREM
- VITRIPA PIC# 1031-1033

Tile 1

(12). Riparian - drainage ditch;
- White cedar, Silver maple
- Phrag. - reed canary - milkweed
- VITRIPA - Calico aster
- SOLCAND - White aster

~ 70% cover, Standing Water
- culverts
Pictures # 1023-1025

(13) open ditch ~ 2m wide, ~0.7m deep, 60% veg cover along side
Dominantly Phrag
Pics # - 1026-1028

(*) CHIMNEY SWIFTS OBSERVED (*)
~ 10 birds.

(14) ditch along railroad tracks - 100% Phrag; so dense, cannot see anything
Pics # - 1029-1030

- TUVU.
- Monarch

(15) ~ 40% Veg cover (Forb), new england & tall white aster, foxtail, VITRIPA
water ~ 0.3m deep, slow moving, large culverts.
Pics # 1037-1038

(16) Follows all along Con 8 - Heavy Phrag 100% cover -
Can't see any standing or flowing water.

Designed by: Checked by:

ELC COMMUNITY DESCRIPTION & CLASSIFICATION			
SITE: Windsor		POLYGON: 1-1	
SURVEYOR(S): MCO & NAL	DATE: Sept 28, 2011		UTME:
START: 2:25	END: 230	UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☒ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☒ FORB	☐ MARSH
	☐ CARB. BEDRK.	☒ TABLELAND		☐ LICHEN	☐ SWMAP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☐ DECIDUOUS	☐ BOG
		☐ TALUS		☐ CONIFEROUS	☐ BARREN
		☐ CREVICE / CAVE		☐ MIXED	☒ MEADOW
		☐ ALVAR			☐ PRAIRIE
		☐ ROCKLAND			☐ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

SITE	COVER
☐ OPEN WATER	☒ OPEN
☐ SHALLOW WATER	☐ SHRUB
☒ SURFICIAL DEP.	☐ TREED
☐ BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	/	/	
2	SUB-CANOPY	/	/	
3	UNDERSTOREY	/	/	
4	GRD. LAYER	5-7	4	Goldenrods, Asters,

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: NA | BA:

SIZE CLASS ANALYSIS:		<10		10 – 24		25 – 50		>50
STANDING SNAGS:		<10		10 – 24		25 – 50		>50
DEADFALL/LOGS:		<10		10 – 24		25 – 50		>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:		PIONEER	X	YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE: NA	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: Cultural	CODE: CU
COMMUNITY SERIES: Cultural Meadow	CODE: CUM
ECOSITE: Mineral Cultural Meadow	CODE: CUM1
VEGETATION TYPE: Old Field Meadow Type	CODE: CUM1-1
INCLUSION	CODE:
COMPLEX	CODE:

Evidence of Disturbance / Notes:

- Bordered by Phrag. - 10 m into habitat, larger CUM1-1 cover adjacent to ind./com. area. Pics # 1034-1036

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	
SITE:	
POLYGON:	CUM1-1a
DATE:	
SURVEYOR(S):	

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
Tall White aster					
New England Aster					
Phrag					
SOLCANA					
DACCARO					

SPECIES CODE	LAYER 1	2	3	4	COLL.

Page ___ of ___

Signature: [signature] (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Stantec

Windfarm Wildlife Habitat Assessment Form

Project Number: ______ Project Name: ______

Date: ______ Field Personnel: ______

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	17 C	2-3	90%	None	Rain

ELC Polygon: # 1-1 **Visual Assessment:** ☑-Roadside, no access **Physical Assessment:** ☐-Walk through feature

Extent of Physical Investigation of Feature: ☐-Entire / ☐-Partial, walk through polygon (indicate on map)

Reptile Hibernacula Features: Contains potential reptile hibernacula features?
☐-Y* / ☐-N / ☑-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED			
UTM	**Feature Description**	**Photo No.**	**Spp. Observed Using Feature**

Bat Hibernacula Features: Contains potential bat hibernacula features?
☐-Y* / ☐-N / ☑-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surrounding canopy (DBH >25cm, side-facing cavities ~10m high in tree)]

POTENTIAL BAT HIBERNACULA / ROOSTING FEATURE(S) IDENTIFIED					
UTM	**Tree ID**	**Tree Spp.**	**DBH**	**Photo No.**	**Spp. Observed Using Feature**

Presence of Stick Nests: Contains large stick nests?
☐-Y* / ☐-N / ☑-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED						
UTM	**Tree ID**	**Tree Spp.**	**Photo No.**	**Height/ Placement**	**Nest Size**	**Spp. Observed Using Feature**

Presence of Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
☐-Y* / ☐-N / ☑-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED						
UTM	**Feature No. & Type**	**Feature Size** (Diameter)	**Water Depth**	**Photo No.**	**Sub/Emergent Veg. Spp. Present?**	**Shrubs/ Logs at Edge Present?**

SPECIES OBSERVATIONS (list species and type of observation & indicate on map)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Pg. ___ of ___

Quality Control: This form is complete ☐ & legible ☐.

Signature: ______________ (Field Personnel)

Signature: ______________ (Project Manager)

REV: 2011-06-09

Legend

Study Area

Field Work Extents

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2011.
3. Orthoimagery © Essex Region Conservation Authority.

Stantec

September, 2011
160311265

Client/Project
Essex Region Conservation Authority
Upper Little River EA

Figure No.
2

Title
Site Plan 2

\\cd1004-f06\work_group\01609\active\160311265\planning\drawing\MXD\FieldWork\160311265_Field_Fig01_SitePlan.mxd

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Windsor		POLYGON: 2-1	
SURVEYOR(S): MCO & NAL	DATE: Sept 28, 2011	UTMZ:	UTME:
START: 3:21	END: 3:33		UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☒ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☒ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☐ FORB	☐ MARSH
	☐ CARB. BEDRK.	☐ TABLELAND		☐ LICHEN	☐ SWMAP
SITE		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
☐ OPEN WATER		☐ CLIFF		☒ DECIDUOUS	☐ BOG
☐ SHALLOW WATER		☐ TALUS		☐ CONIFEROUS	☐ BARREN
☒ SURFICIAL DEP.		☐ CREVICE / CAVE		☐ MIXED	☐ MEADOW
☐ BEDROCK		☐ ALVAR	**COVER**		☐ PRAIRIE
		☐ ROCKLAND	☐ OPEN		☐ THICKET
		☐ BEACH / BAR	☐ SHRUB		☐ SAVANNAH
		☐ SAND DUNE	☒ TREED		☐ WOODLAND
		☐ BLUFF			☒ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
CANOPY	1	4	ULMAMER > ACESACC > ACESASA > TILAMER
SUB-CANOPY	2	3	—
UNDERSTOREY	/	/	—
GRD. LAYER	/	/	—

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: | BA:

		<10		10 – 24		25 – 50		>50
SIZE CLASS ANALYSIS:	O	<10	A	10 – 24	R	25 – 50	N	>50
STANDING SNAGS:	O	<10	O	10 – 24	N	25 – 50	N	>50
DEADFALL/LOGS:	N	<10	N	10 – 24	N	25 – 50	N	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE: ☐ PIONEER ☐ YOUNG ☒ MID-AGE ☐ MATURE ☐ OLD GROWTH

SOIL ANALYSIS:

TEXTURE: NA	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: FOREST	CODE:	FO
COMMUNITY SERIES: Deciduous Forest	CODE:	FOD
ECOSITE: Fresh - Moist Lowland Dec. Forest	CODE:	FOD7
VEGETATION TYPE: Moist White Elm Lowland Dec Forest	CODE:	FOD7-1
INCLUSION	CODE:	
COMPLEX	CODE:	

Evidence of Disturbance / Notes:
-Cannot see Subcanopy - Grd Layer specie composition from Roadside
-Stream running through forest Pic #1041-1042.

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:
POLYGON: FOD7-1a
DATE:
SURVEYOR(S):

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
ACESASA	R				
ACESACC	O				
ULMAMER	O				
TILAMER	R				
BUROAK		R	R		
VITRIPA				R	

Page ___ of ___

Signature: Nata Leava (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

Stantec
Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Windfarm Wildlife Habitat Assessment Form

Project Number: ______ Project Name: ______

Date: ______ Field Personnel: ______

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	17°	2-3	100%	None	Rain

ELC Polygon: # **Visual Assessment:** ☒-Roadside, no access **Physical Assessment:** ☐-Walk through feature

Extent of Physical Investigation of Feature: ☐-Entire / ☐-Partial, walk through polygon (indicate on map)

Reptile Hibernacula Features: Contains potential reptile hibernacula features?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED

UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Hibernacula Features: Contains potential bat hibernacula features?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surrounding canopy (DBH >25cm, side-facing cavities ~10m high in tree)]

POTENTIAL BAT HIBERNACULA / ROOSTING FEATURE(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	DBH	Photo No.	Spp. Observed Using Feature

Presence of Stick Nests: Contains large stick nests?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	Photo No.	Height/ Placement	Nest Size	Spp. Observed Using Feature

Presence of Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED

UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES OBSERVATIONS (list species and type of observation & indicate on map)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Pg. ___ of ___ Quality Control: This form is complete ☐ & legible ☐.

Signature: ______ (Field Personnel) Signature: ______ (Project Manager)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Windsor		POLYGON: 2-2	
SURVEYOR(S): MCO & NAL	DATE: Sept 28, 2011		UTME:
START: 4:20	END: 4:33	UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☒ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
SITE	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☒ FORB	☐ MARSH
☐ OPEN WATER	☐ CARB. BEDRK.	☒ TABLELAND		☐ LICHEN	☐ SWMAP
☐ SHALLOW WATER		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
☒ SURFICIAL DEP.		☐ CLIFF		☐ DECIDUOUS	☐ BOG
☐ BEDROCK		☐ TALUS		☐ CONIFEROUS	☐ BARREN
		☐ CREVICE / CAVE	**COVER**	☐ MIXED	☒ MEADOW
		☐ ALVAR	☒ OPEN		☐ PRAIRIE
		☐ ROCKLAND	☐ SHRUB		☐ THICKET
		☐ BEACH / BAR	☐ TREED		☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	/	/	
2	SUB-CANOPY	/	/	
3	UNDERSTOREY	/	/	
4	GRD. LAYER	5-7	4	TALL WHITE ASTER > SOLCANA Wild carrot

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: NA					BA:
SIZE CLASS ANALYSIS:		<10	10 – 24	25 – 50	>50
STANDING SNAGS:		<10	10 – 24	25 – 50	>50
DEADFALL/LOGS:		<10	10 – 24	25 – 50	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS: NA

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: Cultural	CODE: CU
COMMUNITY SERIES: Cultural meadow	CODE: CUM
ECOSITE: Mineral Cultural Meadow	CODE: CUM1
VEGETATION TYPE: Dry-Moist Old field meadow Type	CODE: CUM1-1
INCLUSION	CODE:
COMPLEX	CODE:

Evidence of Disturbance / Notes:
- abandoned field adjacent to Green Amaranth dominated field → overgrown; Low specie composition
PC# 1051

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:
POLYGON:
DATE:
SURVEYOR(S):

CUM1-1b

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
SOLCANA					
SOLIDAGO SP					
TALL WHITE ASTER					
N.E. ASTER					
Phrag					
Reed Canary					
Can. Thistle					
milkweed					
foxtail					
Com dandelion					
Hawksbeard					
dock sp.					
Yarrow					
Green Amaranth			D	D	

SPECIES CODE	LAYER 1	2	3	4	COLL.

Page ___ of ___
Signature: Natal Loara
(Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.
Signature:
(Project Manager)

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Stantec

Windfarm Wildlife Habitat Assessment Form

Project Number: ____________ Project Name: ____________

Date: ____________ Field Personnel: ____________

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	17°C	2	100%	Rain	Rain

ELC Polygon: # 2-2 **Visual Assessment:** ☒-Roadside, no access **Physical Assessment:** ☐-Walk through feature

Extent of Physical Investigation of Feature: ☐-Entire / ☐-Partial, walk through polygon (indicate on map)

Reptile Hibernacula Features: Contains potential reptile hibernacula features?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED

UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Hibernacula Features: Contains potential bat hibernacula features?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surrounding canopy (DBH >25cm, side-facing cavities ~10m high in tree)]

POTENTIAL BAT HIBERNACULA / ROOSTING FEATURE(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	DBH	Photo No.	Spp. Observed Using Feature

Presence of Stick Nests: Contains large stick nests?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	Photo No.	Height/ Placement	Nest Size	Spp. Observed Using Feature

Presence of Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED

UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES OBSERVATIONS (list species and type of observation & indicate on map)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Pg. ___ of ___ Quality Control: This form is complete ☐ & legible ☐.

Signature: ____________ (Field Personnel) Signature: ____________ (Project Manager)

REV: 2011-06-09

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Windsor		POLYGON: 2-3	
SURVEYOR(S): MCO & NAL	DATE: Sept 29, 2011		UTME:
START: 12:40	END: 1:00	UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☒ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☒ FORB	☐ MARSH
	☐ CARB. BEDRK.	☒ TABLELAND		☐ LICHEN	☐ SWMAP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☐ DECIDUOUS	☐ BOG
SITE		☐ TALUS	**COVER**	☐ CONIFEROUS	☐ BARREN
☐ OPEN WATER		☐ CREVICE / CAVE	☐ OPEN	☐ MIXED	☒ MEADOW
☐ SHALLOW WATER		☐ ALVAR	☐ SHRUB		☐ PRAIRIE
☐ SURFICIAL DEP.		☐ ROCKLAND	☐ TREED		☐ THICKET
☐ BEDROCK		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY			
2	SUB-CANOPY			
3	UNDERSTOREY			
4	GRD. LAYER			

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION:								BA:
SIZE CLASS ANALYSIS: N/A		<10		10 – 24		25 – 50		>50
STANDING SNAGS:		<10		10 – 24		25 – 50		>50
DEADFALL/LOGS:		<10		10 – 24		25 – 50		>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:		PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: Cultural	CODE:	CU
COMMUNITY SERIES: Cultural Meadow	CODE:	CUM
ECOSITE: Mineral Cultural	CODE:	CUM1
VEGETATION TYPE: Meadow	CODE:	CUM1a
INCLUSION	CODE:	
COMPLEX	CODE:	

Evidence of Disturbance / Notes:
Small field w predominantly Barn Yard Grass

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:	
POLYGON:	CUM1a
DATE:	
SURVEYOR(S):	

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.	SPECIES CODE	LAYER 1	2	3	4	COLL.
BARNYARD GRASS				D							
Foxtail				R							
Asters				R							
DACCARO				R							
Cottonwoods				R							

Page ___ of ___

Signature: Natalie Loar (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

Stantec

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Windfarm Wildlife Habitat Assessment Form

Project Number: ____________ Project Name: ____________

Date: ____________ Field Personnel: ____________

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):

ELC Polygon: # **Visual Assessment:** ❑-Roadside, no access **Physical Assessment:** ❑-Walk through feature

Extent of Physical Investigation of Feature: ❑-Entire / ❑-Partial, walk through polygon (indicate on map)

Reptile Hibernacula Features: Contains potential reptile hibernacula features?
❑-Y* / ❑-N / ❑-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED

UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Hibernacula Features: Contains potential bat hibernacula features?
❑-Y* / ❑-N / ❑-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surrounding canopy (DBH >25cm, side-facing cavities ~10m high in tree)]

POTENTIAL BAT HIBERNACULA / ROOSTING FEATURE(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	DBH	Photo No.	Spp. Observed Using Feature

Presence of Stick Nests: Contains large stick nests?
❑-Y* / ❑-N / ❑-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	Photo No.	Height/ Placement	Nest Size	Spp. Observed Using Feature

Presence of Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
❑-Y* / ❑-N / ❑-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED

UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES OBSERVATIONS (list species and type of observation & indicate on map)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Pg. ___ of ___ Quality Control: This form is complete ❑ & legible ❑.

Signature: ____________ (Field Personnel) Signature: ____________ (Project Manager)

REV: 2011-06-09

Stantec

Tile 2

(17) Willows, Phrag dominant along edges, New England Aster, Goldenrods etc.
red Cedar, VITRIPA Photos: 1039, 1040

- no visible standing water -> shoulder gravel moving in

(18) Pics# 1043-1044 - Drainage ditch w/ white Elm, Pin cherry
Small Stones along drainage edge, Bur oak

(19) (A) Pics# 1045-1047
- Water crossing goes through soy crop; flows w/ water from (18) -> White Elm
(see other side)

(20) Scrubby/Phrag dominated; filled in, no open culverts, Scooped out

(21) open stream, white elm, Sugar maple, silver maple, vit Ripa boardering along train tracks, following water/drainage
- recently cut -> Some phrag, goldenrods & asters.
photos 1048-1051

Designed by: Checked by:

(22) pic 1052-1053

- water course / ditch recently cut; mostly Phrag. ~65% cover

-> A6 (mystery Plant, photos 1054-1055)

pics 1056-1058 of plant

of crop

(19) B - flowing water course, pics 1060-1062

~80% veg cover, Sugar maple, dominated by goldenrod, Some PHRAG, tall white aster, grasses

- Primrose; small rocks along culvert

(C) flowing water course pics 1063-1064

Shrubby cover -> dogwood (veg), goldenrod, phrag ~50% veg cover; along banks = 90% veg

- small rocks along culvert.

Polygon 23; reed canary? took sp

Legend

Study Area

Field Work Extents

Follow dotted line
- Stop where intersects w yellow boundary

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2011.
3. Orthoimagery © Essex Region Conservation Authority.

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September, 2011
160311265

Client/Project
Essex Region Conservation Authority
Upper Little River EA

Figure No.
3

Title
Site Plan 3

\\cd1004-f06\work_group\01609\active\160311265\planning\drawing\MXD\FieldWork\160311265_Field_Fig01_SitePlan.mxd
Revised: 2011-09-15 By: ccoghlan

ELC COMMUNITY ESCRIPTION & .ASSIFICATION			
SITE: Windsor		POLYGON: 3-1	
SURVEYOR(S): MCO & NAL	DATE: Sept 29, 2011		UTME:
START: 10:30	END: 11:00	UTMZ:	UTMN:

OLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☒ NATURAL	☐ PLANKTON	☐ LAKE
WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☐ FORB	☐ MARSH
	☐ CARB. BEDRK.	☒ TABLELAND		☐ LICHEN	☐ SWMAP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☒ DECIDUOUS	☐ BOG
		☐ TALUS		☐ CONIFEROUS	☐ BARREN
		☐ CREVICE / CAVE		☐ MIXED	☐ MEADOW
		☐ ALVAR			☐ PRAIRIE
		☐ ROCKLAND			☐ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☒ FOREST
					☐ PLANTATION

SITE	COVER
OPEN WATER	☐ OPEN
SHALLOW WATER	☐ SHRUB
SURFICIAL DEP.	☒ TREED
BEDROCK	

TAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
CANOPY	1	3	Oak > ACESASA > Cottonwood > FRAAMER
SUB-CANOPY	2	4	ACESASA = Cottonwood = Oak
UNDERSTOREY	3-4	2	ACESASA = TILAMER > MULBERRY > SALIX SP
GRD. LAYER	5-7	—	only see edge species

CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

R CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

AND COMPOSITION:	BA:

E CLASS ANALYSIS:	O	<10	A	10 – 24	O	25 – 50	N	>50
ANDING SNAGS:	R	<10	O	10 – 24	O	25 – 50	N	>50
ADFALL/LOGS:	A	<10	O	10 – 24	R	25 – 50	N	>50

UNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

MM. AGE:	PIONEER	YOUNG	X MID-AGE	MATURE	OLD GROWTH

IL ANALYSIS:

NA

XTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
ISTURE:	DEPTH OF ORGANICS:		(cm)
MOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

MMUNITY CLASSIFICATION:

MMUNITY CLASS: Forest	CODE: FO
MMUNITY SERIES: Deciduous Forest	CODE: FOD
OSITE: D-F - Oak Maple Hickory dec. Forest	CODE: FOD 2
GETATION TYPE: D-F Oak Hardwood Dec. Forest Type	CODE: FOD 2-4
INCLUSION	CODE:
COMPLEX	CODE:

dence of Disturbance / Notes:

INC - BLJA -This community boardered on west side has a steep drainage feature w high veg cover ~80%; & standing water ~0.5m deep. Abundant dead wood on forest floor - could not see into forest for floristic

---

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	
SITE:	
POLYGON:	
DATE:	
SURVEYOR(S):	

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
TILAMER		R	O		
ACESASA	O		O		
W. ELM	O	R			
MULBerry			R-O		
Cottonwood	O	O			
POPTREM	R	R			
FRAAMER	R-O	O			
Salix sp	R	R			
Burroak	O-A	O			
AM. Beech		R			
BL. Walnut	R	R-O			
Ironwood		R	R		
Hickory		R-O			
BUCKTHORN			R		
Salix sp		R	R		
SUMAC			R		

SPECIES CODE	LAYER 1	2	3	4	COLL.
Rubus sp					
Vir Creeper					
VITRIPA					
Tall w. Aster					
Cocks foot					
SOLCANA					

Page ___ of ___

Signature: (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

Stantec

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Windfarm Wildlife Habitat Assessment Form

Project Number: ______ Project Name: ______

Date: ______ Field Personnel: ______

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	17°C	2	80%	None	Rain

ELC Polygon: # 3-1 **Visual Assessment:** ❑-Roadside, no access **Physical Assessment:** ❑-Walk through feature

Extent of Physical Investigation of Feature: ❑-Entire / ☒-Partial, walk through polygon (indicate on map)

Reptile Hibernacula Features: Contains potential reptile hibernacula features?
❑-Y* / ❑-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED			
UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Hibernacula Features: Contains potential bat hibernacula features?
❑-Y* / ❑-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surrounding canopy (DBH >25cm, side-facing cavities ~10m high in tree)]

POTENTIAL BAT HIBERNACULA / ROOSTING FEATURE(S) IDENTIFIED					
UTM	Tree ID	Tree Spp.	DBH	Photo No.	Spp. Observed Using Feature

Presence of Stick Nests: Contains large stick nests?
❑-Y* / ❑-N / ☒-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED						
UTM	Tree ID	Tree Spp.	Photo No.	Height/ Placement	Nest Size	Spp. Observed Using Feature

Presence of Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
❑-Y* / ❑-N / ☒-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED						
UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES OBSERVATIONS (list species and type of observation & indicate on map)

CA=carcass; DP=distinctive parts; FE=feeding evidence; EY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

–walked along edge from old rail trail – indicated on map.

Pg. ___ of ___

Quality Control: This form is complete ❑ & legible ❑.

Signature: ______ (Field Personnel)

Signature: ______ (Project Manager)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Windsor		POLYGON: 3-2
	SURVEYOR(S): MCOÈNAL	DATE: Sept 29, 2011	UTME:
	START: 11:00 END: 11:20	UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☒ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☒ VALLEY SLOPE		☐ FORB	☐ MARSH
	☐ CARB. BEDRK.	☐ TABLELAND		☐ LICHEN	☐ SWMAP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☒ DECIDUOUS	☐ BOG
		☐ TALUS		☐ CONIFEROUS	☐ BARREN
		☐ CREVICE / CAVE		☐ MIXED	☐ MEADOW
		☐ ALVAR			☐ PRAIRIE
		☐ ROCKLAND			☒ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

SITE	COVER
☐ OPEN WATER	☐ OPEN
☐ SHALLOW WATER	☒ SHRUB
☒ SURFICIAL DEP.	☐ TREED
☐ BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	2	1	Cottonwood
2	SUB-CANOPY	3	3	Service Berry > Man Maple > Lilac > Mulberry
3	UNDERSTOREY	4	3	Serv. Berry > Man Maple > mac
4	GRD. LAYER	5-7	4	SOLCANA = T.W. Aster > Ragweed

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m

CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: | BA:

SIZE CLASS ANALYSIS:	A	<10	R	10 – 24	N	25 – 50	N	>50
STANDING SNAGS:	N	<10	N	10 – 24	N	25 – 50	N	>50
DEADFALL/LOGS:	N	<10	N	10 – 24	N	25 – 50	N	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE: ☐ PIONEER ☒ YOUNG ☐ MID-AGE ☐ MATURE ☐ OLD GROWTH

SOIL ANALYSIS:

TEXTURE: NA	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: Cultural	CODE:	CU
COMMUNITY SERIES: Cultural Thicket	CODE:	CUT
ECOSITE: Mineral Cultural Thicket	CODE:	CUT1
VEGETATION TYPE: Service Berry Cultural Thicket.	CODE:	CUT1-2
INCLUSION	CODE:	
COMPLEX	CODE:	

Evidence of Disturbance / Notes:

- along old rail trail - has a drainage ditch boardering east side of community - dry, disturbed & high gravel amounts on ground cover on west side

---

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: NOT IN STUDY AREA
	POLYGON:
	DATE:
	SURVEYOR(S):

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
MAN MAPLE		O	O		
SUMAC		R	R		
W. Cedar		O	R		
LILAC		O			
Mulberry		O			
Cotton ~~Wood~~	R	R			
Servi ce Berry		O	O		

SPECIES CODE	LAYER 1	2	3	4	COLL.
Red Clover				O	
SOLCANA				A	
milkweed				O	
DACCARO				R	
YARROW				R	
BROINER				R	
T.W. Aster				A-O	
Ragweed				A-O	
cocksfoot				O	
VITRIPA				R	
VIRG CREEPER				R	
Dock sp				R	
N E Aster				R	

NOT IN S.A.

Page ___ of ___

Signature: ____________ (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: ____________ (Project Manager)

Stantec

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Windfarm Wildlife Habitat Assessment Form

Project Number: ______ Project Name: ______

Date: ______ Field Personnel: ______

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	17°	2	80%	None	Rain

ELC Polygon: # 3-2 **Visual Assessment:** ❑-Roadside, no access **Physical Assessment:** ❑-Walk through feature

Extent of Physical Investigation of Feature: ❑-Entire / ☒-Partial, walk through polygon (indicate on map)

Reptile Hibernacula Features: Contains potential reptile hibernacula features?
❑-Y* / ☒-N / ❑-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED

UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Hibernacula Features: Contains potential bat hibernacula features?
❑-Y* / ☒-N / ❑-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surrounding canopy (DBH >25cm, side-facing cavities ~10m high in tree)]

POTENTIAL BAT HIBERNACULA / ROOSTING FEATURE(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	DBH	Photo No.	Spp. Observed Using Feature

Presence of Stick Nests: Contains large stick nests?
❑-Y* / ☒-N / ❑-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	Photo No.	Height/ Placement	Nest Size	Spp. Observed Using Feature

Presence of Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
❑-Y* / ☒-N / ❑-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED

UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES OBSERVATIONS (list species and type of observation & indicate on map)

- BLJA
- Monarch Butterfly

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Pg. ___ of ___ Quality Control: This form is complete ❑ & legible ❑.

Signature: ______ (Field Personnel) Signature: ______ (Project Manager)

REV: 2011-06-09

Stantec

TILE 3

(23) West

East

Pic 1069 - 1070 ← Switch → Pic 1067 - 1068

Dominated by Phrag along ditch, w/ Narrow leaved Cattails
- adjacent to CUT / CUM habitat in Res area
- Standing water w/ 70-90% veg cover

- adjacent to Corn field
- standing water w/ 80% veg cover.

(24) Drainage ditch all foxtail, some reed canary
- ~~open~~ no water, some small sections of pooling ~ 1m wide.
pic 1071

note
Pic 1071 wood piles → not in study area

Designed by:

Checked by:

RECYCLED Paper FSC FSC® C101537

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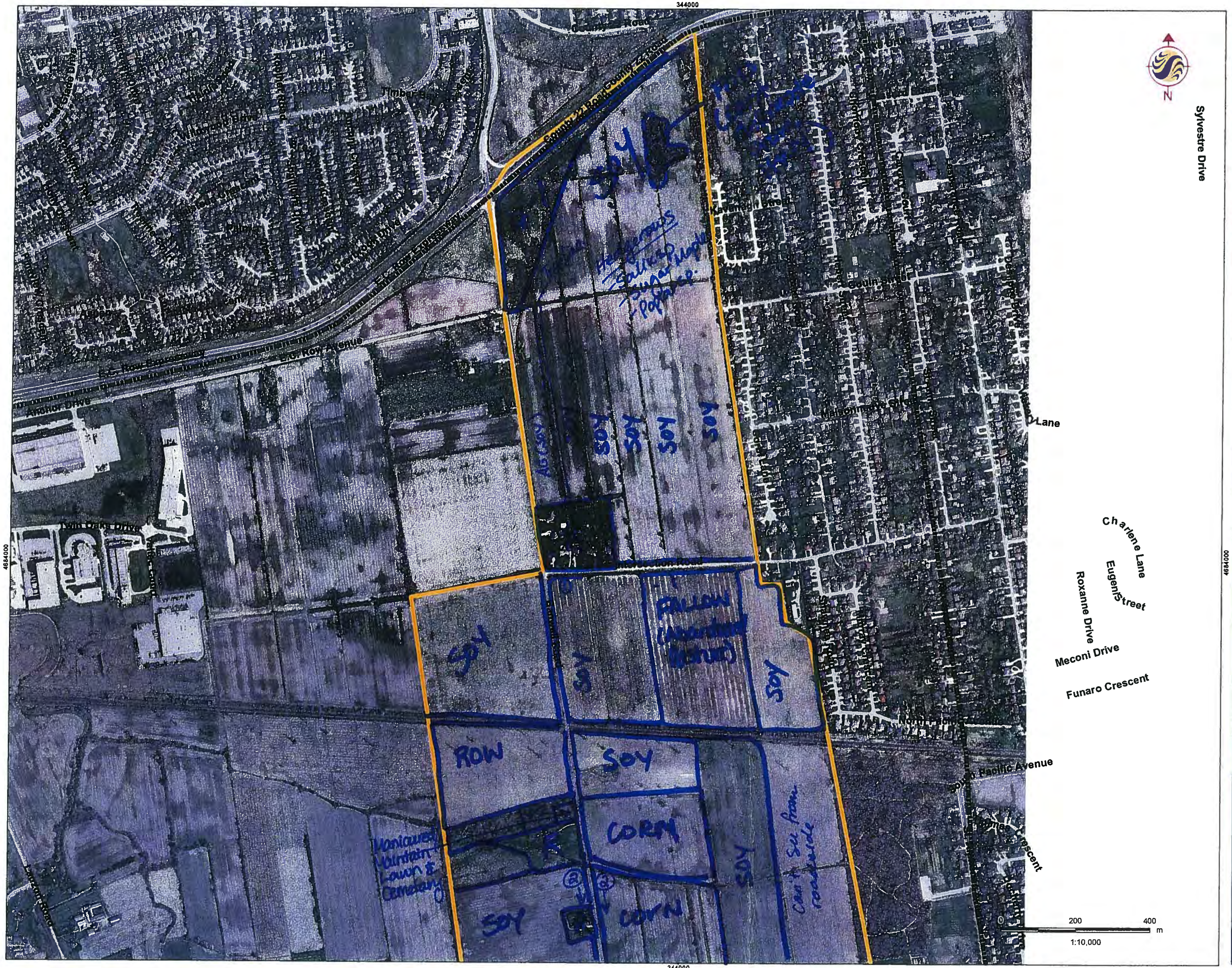

Legend

Study Area

Field Work Extents

- Dougal
- EC Row Expressway (east)
- Exit Banwell Road

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2011.
3. Orthoimagery © Essex Region Conservation Authority.

Stantec

September, 2011
160311265

Client/Project
Essex Region Conservation Authority
Upper Little River EA

Figure No.
4

Title
Site Plan 4

\\cd1004-f06\work_group\01609\active\160311265\planning\drawing\MXD\FieldWork\160311265_Field_Fig01_SitePlan.mxd
Revised: 2011-09-15 By: ccoghlan

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Windsor		POLYGON: 4-1	
SURVEYOR(S): MCO ENAL	DATE: Sept 28, 2011		UTME:
START: 8:35	END: 8:50	UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☒ CULTURAL	☐ SUBMERGED	☐ POND
AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☒ FORB	☐ MARSH
SITE	☐ CARB. BEDRK.	☒ TABLELAND		☐ LICHEN	☐ SWMAP
OPEN WATER		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
SHALLOW WATER		☐ CLIFF		☐ DECIDUOUS	☐ BOG
SURFICIAL DEP.		☐ TALUS		☐ CONIFEROUS	☐ BARREN
BEDROCK		☐ CREVICE / CAVE	**COVER**	☐ MIXED	☒ MEADOW
		☐ ALVAR	☒ OPEN		☐ PRAIRIE
		☐ ROCKLAND	☐ SHRUB		☐ THICKET
		☐ BEACH / BAR	☐ TREED		☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
CANOPY	/	/	
SUB-CANOPY	/	/	
UNDERSTOREY	/	/	
GRD. LAYER	4-7	3	GRASSES >> RAGWEED > THISTLE

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION:				BA:
SIZE CLASS ANALYSIS:	<10	10 – 24	25 – 50	>50
STANDING SNAGS:	<10	10 – 24	25 – 50	>50
DEADFALL/LOGS:	<10	10 – 24	25 – 50	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE:	☒ PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH

SOIL ANALYSIS:

TEXTURE: NA	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: Cultural	CODE: CU
COMMUNITY SERIES: Cultural Meadow	CODE: CUM
ECOSITE: Min. Cultural Meadow	CODE: CUM1
VEGETATION TYPE: ecosite	CODE: CUM1
INCLUSION	CODE:
COMPLEX	CODE:

Evidence of Disturbance / Notes:
- Highly disturbed; open bare ground throughout
- High dirt mound w thistles dominant
- tree line borders east side of field

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:	
POLYGON:	CUM1b
DATE:	
SURVEYOR(S):	

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.	SPECIES CODE	LAYER 1	2	3	4	COLL.
Crepis Capill											
LACTUCA SCAR											
Field Sow This											
reed can.											
Phrag											
Agrostis sp.											
Com. Ragwed											
Canola											
Garlic Must											
Teasle											
VITRIPA											

Page ___ of ___

Signature: Natahoava
(Field Personnel)

PIC: 969-975

INCL - MODO

Quality Control: This form is complete ☐ & legible ☐.

Signature: ____________
(Project Manager)

W:\resource\Internal-Info-and-Teams\FIELD FORMS\Vegetation\ELC\elc-field-form-excerpt_w_windfarm-wildlife-habitat-form_v2.docx / (DERIVED FROM LEE ET AL., 1998)

Stantec
Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Windfarm Wildlife Habitat Assessment Form

Project Number: ______ Project Name: ______

Date: ______ Field Personnel: ______

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	18°C	1	50-70%	None	Rain

ELC Polygon: #41 **Visual Assessment:** ☒-Roadside, no access **Physical Assessment:** ❑-Walk through feature

Extent of Physical Investigation of Feature: ❑-Entire / ❑-Partial, walk through polygon (indicate on map)

Reptile Hibernacula Features: Contains potential reptile hibernacula features?
❑-Y* / ❑-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED

UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Hibernacula Features: Contains potential bat hibernacula features?
❑-Y* / ❑-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surrounding canopy (DBH >25cm, side-facing cavities ~10m high in tree)]

POTENTIAL BAT HIBERNACULA / ROOSTING FEATURE(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	DBH	Photo No.	Spp. Observed Using Feature

Presence of Stick Nests: Contains large stick nests?
❑-Y* / ❑-N / ☒-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	Photo No.	Height/ Placement	Nest Size	Spp. Observed Using Feature

Presence of Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
❑-Y* / ❑-N / ☒-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED

UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES OBSERVATIONS (list species and type of observation & indicate on map)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Pg. ___ of ___ Quality Control: This form is complete ❑ & legible ❑.

Signature: ______ (Field Personnel) Signature: ______ (Project Manager)

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: Windsor	POLYGON: 4-2	
	SURVEYOR(S): MCO & NAL	DATE: Sept 28, 2011	UTME:
	START: 9:39 END: 9:48	UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☒ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☒ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☒ MINERAL SOIL	☐ RIVERINE	☐ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☐ FORB	☐ MARSH
	☐ CARB. BEDRK.	☒ TABLELAND		☐ LICHEN	☐ SWMAP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☒ DECIDUOUS	☐ BOG
		☐ TALUS		☐ CONIFEROUS	☐ BARREN
		☐ CREVICE / CAVE		☐ MIXED	☐ MEADOW
		☐ ALVAR			☐ PRAIRIE
		☐ ROCKLAND			☐ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☒ FOREST
					☐ PLANTATION

SITE	COVER
☐ OPEN WATER	☐ OPEN
☐ SHALLOW WATER	☐ SHRUB
☒ SURFICIAL DEP.	☒ TREED
☐ BEDROCK	

STAND DESCRIPTION:

	LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1	CANOPY	1	4	W. ELM > Cottonwood > Buroak > POPTREM
2	SUB-CANOPY	2	3	W. ELM. > BuRoak
3	UNDERSTOREY	3	2	VITRIPA
4	GRD. LAYER	\	\	

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: | BA:

		<10		10 – 24		25 – 50		>50
SIZE CLASS ANALYSIS:	O	<10	A	10 – 24	R	25 – 50	N	>50
STANDING SNAGS:	N	<10	N	10 – 24	N	25 – 50	N	>50
DEADFALL/LOGS:	N	<10	N	10 – 24	N	25 – 50	N	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE: ☐ PIONEER ☐ YOUNG ☒ MID-AGE ☐ MATURE ☐ OLD GROWTH

SOIL ANALYSIS:

TEXTURE: NA	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: Forest	CODE:	FO
COMMUNITY SERIES: Deciduous Forest	CODE:	FOD
ECOSITE: FM Lowland Dec. Forest	CODE:	FOD7
VEGETATION TYPE: FM White Elm Lowland Dec. Forest Type	CODE:	FOD7-1
INCLUSION		CODE:
COMPLEX		CODE:

Evidence of Disturbance / Notes:
- on air photo, FOD no longer exists beside house - Maintained Lawn & cemetary - riparian cover between Ag field & cemetary, stretching into behind house. (PIC976-978)
- Cannot see interior to road

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	
SITE:	
POLYGON:	FOD7-1b
DATE:	
SURVEYOR(S):	

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	LAYER 1	2	3	4	COLL.
W. ELM	A	O			
BUROAK	O	R			
COTTONWOOD	O				
POPTREM	R				
VITRIPA			A		

SPECIES CODE	LAYER 1	2	3	4	COLL.

Page ___ of ___

Signature: Natalie Hoara (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: (Project Manager)

Stantec

Stantec Consulting Ltd.
1 – 70 Southgate Drive
Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Windfarm Wildlife Habitat Assessment Form

Project Number: ____________ Project Name: ____________

Date: ____________ Field Personnel: ____________

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	17°C.	1-2	50-100%.	None.	RAIN.

ELC Polygon: #42. **Visual Assessment:** ☒-Roadside, no access **Physical Assessment:** ☐-Walk through feature

Extent of Physical Investigation of Feature: ☐-Entire / ☐-Partial, walk through polygon (indicate on map)

Reptile Hibernacula Features: Contains potential reptile hibernacula features?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED			
UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Hibernacula Features: Contains potential bat hibernacula features?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surrounding canopy (DBH >25cm, side-facing cavities ~10m high in tree)]

POTENTIAL BAT HIBERNACULA / ROOSTING FEATURE(S) IDENTIFIED					
UTM	Tree ID	Tree Spp.	DBH	Photo No.	Spp. Observed Using Feature

Presence of Stick Nests: Contains large stick nests?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED						
UTM	Tree ID	Tree Spp.	Photo No.	Height/ Placement	Nest Size	Spp. Observed Using Feature

Presence of Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED						
UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES OBSERVATIONS (list species and type of observation & indicate on map)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Pg. ___ of ___

Quality Control: This form is complete ☐ & legible ☐.

Signature: ____________ (Field Personnel)

Signature: ____________ (Project Manager)

REV: 2011-06-09

Kent Buchanan

Stantec

TILE 4

① Phragm dominant along drainage ditch
- VITRIPA
- ACESASA

- Culvert draining in & under Rd.
- Pic 965-966.

- SALIX Shrubs   Pic 967, 968
- ACESACC
- ACEFREE

② Culvert
- TYPHANGU
- WHITE ELM
- VITRIPA
- DOGWOOD (GRAY?)
- SOLCANA.
- WHITE HEATH ASTER
- PHRAG
- WILDASPAR

* Small creek / Stream, with 60% Tree & Shrub cover 90% Forb cover
→ ~ 0.5-1 m deep, Standing & Slow moving water in stream
→ standing water in drainage ditch (Phrag & TYPHANGU)

EAST   WEST

Pic# 979-982   983-985

- Dug out drainage ditch ; Cover 50-60%.
- horsetail, hawks~~beard~~weed, Foxtail.

Designed by: Checked by:

\\cd1004-f06\work_group\01609\active\160311265\planning\drawing\MXD\FieldWork\160311265_Field_Fig01_SitePlan.mxd

Legend

- Study Area
- Field Work Extents

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2011.
3. Orthoimagery © Essex Region Conservation Authority.

Stantec

September, 2011
160311265

Client/Project
Essex Region Conservation Authority
Upper Little River EA

Figure No.
5

Title
Site Plan 5

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE: Windsor		POLYGON: S-1	
SURVEYOR(S): MCO & NAL	DATE: Sept 28, 2011	UTME:	
START: 10:52	END: 11:08	UTMZ:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
X TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	X MINERAL SOIL	☐ RIVERINE	X CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☐ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		X FORB	☐ MARSH
SITE	☐ CARB. BEDRK.	X TABLELAND		☐ LICHEN	☐ SWMAP
☐ OPEN WATER		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
☐ SHALLOW WATER		☐ CLIFF		☐ DECIDUOUS	☐ BOG
X SURFICIAL DEP.		☐ TALUS		☐ CONIFEROUS	☐ BARREN
☐ BEDROCK		☐ CREVICE / CAVE	**COVER**	☐ MIXED	X MEADOW
		☐ ALVAR	X OPEN		☐ PRAIRIE
		☐ ROCKLAND	☐ SHRUB		☐ THICKET
		☐ BEACH / BAR	☐ TREED		☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (>>MUCH GREATER THAN; >GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY	2	2	Cottonwood > POPTREM > SALIX = ACEFREE
2 SUB-CANOPY	3	2	Cottonwood > POPTREM = RED CEDAR
3 UNDERSTOREY	4	1	COTTONWOOD
4 GRD. LAYER	5-7	4	SOLCANA >> ASTER SP > VITRIPA > GRASSES

HT CODES: 1=>25m 2=10<HT≤25m 3=2<HT≤10m 4=1<HT≤2m 5=0.5<HT≤1m 6=0.2<HT≤0.5m 7=HT<0.2m
CVR CODES: 0=NONE 1=0%<CVR≤10% 2=10<CVR≤25% 3=25<CVR≤60% 4=CVR>60%

STAND COMPOSITION: BA:

SIZE CLASS ANALYSIS:	O	<10	O	10 – 24	N	25 – 50	N	>50
STANDING SNAGS:	N	<10	N	10 – 24	N	25 – 50	N	>50
DEADFALL/LOGS:	N	<10	N	10 – 24	N	25 – 50	N	>50

ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT

COMM. AGE: PIONEER | X YOUNG | MID-AGE | MATURE | OLD GROWTH

SOIL ANALYSIS: NA

TEXTURE:	DEPTH TO MOTTLES/GLEY	g=	G=
MOISTURE:	DEPTH OF ORGANICS:		(cm)
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:		(cm)

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS: CULTURAL	CODE: CU
COMMUNITY SERIES: CULTURAL MEADOW	CODE: CUM
ECOSITE: MINERAL CULTURAL MEADOW	CODE: CUM1
VEGETATION TYPE:	CODE:
INCLUSION	CODE:
COMPLEX	CODE:

Evidence of Disturbance / Notes:
- Boarders a tilled field - Field has drainage ditch w/ standing water (Pic 998)
- Pic #999-101 ; on dirt mound

ELC COMMUNITY DESCRIPTION & CLASSIFICATION

SITE:
POLYGON: CUM1c
DATE:
SURVEYOR(S):

LAYERS: 1=CANOPY>10m 2=SUB-CANOPY 3=UNDERSTOREY 4=GROUND (GRD.) LAYER
ABUNDANCE CODES: N=NONE R=RARE O=OCCASIONAL A=ABUNDANT D=DOMINANT

SPECIES CODE	1	2	3	4	COLL.
Cottonwood	O	O	R		
SALIX SP.	R				
POPTREM	O	R			
ACEFREE	R				
REDCEDAR		R			
SUMAC			R		

SPECIES CODE	1	2	3	4	COLL.
milkweed					
White aster				A	
Calico aster				A	
SOLCANA				D	
VITRIPA				O	
PHRAG					
FOXTAIL					
BFT					
GRASSES					

Page ___ of ___
Signature: [signature] (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.
Signature: (Project Manager)

W:\resource\Internal Info and Teams\FIELD FORMS\Vegetation\ELC\elc-field-form-excerpt_w_windfarm-wildlife-habitat-form_v2.docx / (DERIVED FROM LEE ET AL 1998)

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Windfarm Wildlife Habitat Assessment Form

Project Number: ______ Project Name: ______

Date: ______ Field Personnel: ______

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	18	2	90-100%	None	Rain

ELC Polygon: # 5-1 Visual Assessment: ☒-Roadside, no access Physical Assessment: ☐-Walk through feature

Extent of Physical Investigation of Feature: ☐-Entire / ☐-Partial, walk through polygon (indicate on map)

Reptile Hibernacula Features: Contains potential reptile hibernacula features?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. features that would provide a route underground, including buried concrete or rock (e.g. foundations, bridge abutments or culverts with cracks/entry points, exposed rock crevices or inactive animal burrows)]

POTENTIAL HIBERNACULA FEATURE(S) IDENTIFIED

UTM	Feature Description	Photo No.	Spp. Observed Using Feature

Bat Hibernacula Features: Contains potential bat hibernacula features?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*
[i.e. tall trees with open surrounding canopy (DBH >25cm, side-facing cavities ~10m high in tree)]

POTENTIAL BAT HIBERNACULA / ROOSTING FEATURE(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	DBH	Photo No.	Spp. Observed Using Feature

Presence of Stick Nests: Contains large stick nests?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*

STICK NEST(S) IDENTIFIED

UTM	Tree ID	Tree Spp.	Photo No.	Height/ Placement	Nest Size	Spp. Observed Using Feature

Presence of Seeps/Springs/Vernal Pools: Contains seeps/springs/vernal pools?
☐-Y* / ☐-N / ☒-Unknown, no access *(*if yes, describe in table below)*

SEEP / SPRING / VERNAL POOL FEATURE(S) IDENTIFIED

UTM	Feature No. & Type	Feature Size (Diameter)	Water Depth	Photo No.	Sub/Emergent Veg. Spp. Present?	Shrubs/ Logs at Edge Present?

SPECIES OBSERVATIONS (list species and type of observation & indicate on map)

CA=carcass; DP=distinctive parts; FE=feeding evidence; FY=eggs/nest; HO=house/den; OB=observed; SC=scat; SI=other sign; TK=track; VO=vocalization

Pg. ___ of ___ Quality Control: This form is complete ☐ & legible ☐.

Signature: ______ (Field Personnel) Signature: ______ (Project Manager)

Stantec

Giant Burdock
- Rubarb lookalike

(3) East
PIC# 988
-
- more tree & Shrub cover of 70%.
- SOLIDAGO, ASTER, GRASSES

West
PIC# 986-987
drainage ditch high TYPANGU COVER 90%
- Standing water ~ 0.3m deep.
- high SOLCANA & Aster cover boardering ditch
- High Foxtail cover between ditch & Soy field.

(4) Rocky Drainage ditch w ~ 5-10% Forb cover of ASTER & GOLDENROD.
PIC # 989-991
- Small rocks, 3 culverts, standing water ~ 0.2-0.4m deep.
(Storm water drain)

(5) East
- Standing water ~ 0.2m
- Small rocks around culvert

SOUTHSIDE
PIC# 995-996

NORTHSIDE
PIC# 994
Boardering cornfield along Shields Ave
(north side) CUMI habitat
~20m in to cornfield

West
- high Phrag → ~0.1m deep, standing
90% cover
PIC# 992-993
997.

- NOTE: OLD BARN (*)

→ asters, wildcarrot, tasle, foxtail, ~~hawksbeard~~ Prickly Lettuce, Phrag, white aster, Calico aster.

Designed by:

Checked by:

⑥ Phrag dominant - no standing / pooling water.
Culverts open - little Standing water around culvert openings.
Pic# 1007 - 1010.

⑦ Pic 1013-1015 (not in S.A)

Large open drainage ditch, flowing water ~1m deep

- no veg cover
- no stone piles
- Soft muddy bottom, some gravel
- Steep stream banks

⑧ Shallow, no veg (~20% Grass) cover, standing water, algae growth, small culverts
Drainage Ditch Pic# 1016-1017

⑨ dry - small pools of water; BROINER dominant
Pic # 1018

⑩ East

- Phrag dominated
- ~80% cover
- Standing water of ~0.2m

West

- TYPHANGU & Phrag
- Standing water in drainage ditch ~0.3m
- 80% veg cover
- Pic# 1019, 1020.

⑪ 100% cover of Phrag, w̄ some small pockets of TYPHANGU.
- Too thick to see in ditch; appears dry → some Cedars boardering Soy field & drainage ditch w̄ occasional ACE FREE.

Sandwich South Employment Lands Trunk Sanitary Sewer
Habitat Evaluation and Species at Risk Survey

Date: December 23, 2009

Study Personnel:
Project Manager/Ecologist: *G. Waldron, B.Sc., M.Sc.*
Aquatic Biologist: *T. Leadley, B.Sc., M.Sc.*
Herpetile Biologists: *T. Preney, J. Choquette, B.Sc. & D. Noble, B.Sc.*
Aquatic Field Assistant: *M. Cook, B.Sc.*
Terrestrial Field Assistant*: P. Hurst, H.B.Sc.*

Table of Contents

Summary

The Sandwich South Employment Lands (SSEL) within the City of Windsor require sanitary sewer service. The City of Windsor has recently proceeded with the design of the sanitary sewer installation for the SSEL. The proposed alignment of the trunk sanitary sewer through the SSEL will result in the disruption of a number of municipal/agricultural drains. As a result, an ecological impact study has been commissioned by Stantec Consulting Limited to survey and assess the potential impacts to terrestrial natural heritage elements, fish and fish habitat and to provide mitigation and compensation recommendations in accordance with the Endangered Species Act, Provincial Policy Statement and No Net Loss Policy for the Management of Fish Habitat (Department of Fisheries and Oceans 1986).

Under the current design a total of 10 municipal/agricultural drains were indentified in the proposal that will be directly and/or indirectly be affected by the installation of the sanitary sewer lines across these channels. Proposed channel crossing procedures include open cut techniques and jack and bore tunnelling methods. Both these practices and the associated construction activities will affect aquatic resources to varying degrees at each of the identified crossings.

The Sandwich South Employment Lands fall within the Little River watershed, a small catchment area with the majority of its associated municipal/agricultural drains designated as Fish Habitat. Survey results identified regional fish communities in eight of the ten affected reaches, with most of the reaches containing sensitive fish habitat that will require project mitigation and habitat compensation. No Endangered species, Threatened species or species of Special Concern were identified in the municipal drains surveyed.

The following report provides channel habitat descriptions, fish survey results and mitigation/compensation recommendations for the municipal drain crossings that are at risk of harmful alteration, disruption or destruction (HADD) of fish habitat.

For the terrestrial study, the proposed route for the sanitary sewer was divided into eight sections. Each section was examined for Species at Risk and other significant natural heritage features. Ten Species at Risk were documented including two Threatened Species, Kentucky Coffeetree and Butler's Garter Snake, both listed under the Endangered Species Act. Under the provisions of the Act, individuals of these species and their habitat cannot be destroyed. Additionally a significant wetland was documented adjacent to the proposed route. Recommendations have been developed to mitigate the potential for harmful effects to the significant natural heritage found in six of the eight study sections.

1.0 Aquatic Study

1.1 Introduction

The Sandwich South Employment Lands (SSEL) comprises approximately 2,600 hectares of land within the City of Windsor. The property is primarily rural agricultural land, with small pockets of residential and industrial land use. In order to proceed with property development within the SSEL, the installation of sanitary sewer services are required.

Stantec Consulting Ltd. authored an Environmental Study Report (ESR) in 2005 that described a multi-phase plan to provide sanitary service for the SSEL. Portions of the work outlined within the ESR were completed in 2007 and the City of Windsor has now proceeded with the design and construction of the remaining phases of the sanitary sewer design and installation.
The proposed alignment of the trunk sanitary sewer generally runs in a south-westerly direction parallel to Banwell Road, CP Rail, Lauzon Road, Lauzon Parkway, County Road #42 and ultimately terminating along the 8th Concession, north of Highway 401. The total project length is approximately 10,500 metres.

The proposed alignment of the trunk sewer installation crosses a number of municipal drains including the main channel of Little River. The Little River is a small tributary of the Detroit River with a watershed that drains approximately 5,750 ha of agricultural, municipal and industrial land (UGLCCS 1988). The Little River and most of its associated drains are designated as Fish Habitat and map overlays of current Department of Fisheries and Oceans (DFO) mapping for Species at Risk (SAR) (ERCA DFO map 2008) suggest the potential for fish SAR to occur in the area of the proposed works.

The Federal Fisheries Act, Subsection 35(1) is a general prohibition of harmful alteration, disruption or destruction (HADD) of fish habitat. Any activity that results in HADD is a contravention of Subsection 35(1) (Minister of Justice, Fisheries Act 2009). The Act defines fish habitat as "spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly to carry out their life processes." The habitat protection provisions of the Act outline powers and authorities to protect the unobstructed passage of fish, provide sufficient flow for fish, prevent fish mortality and prohibit the harmful alteration, disruption or destruction of fish habitat without an authorization from Fisheries and Oceans Canada (Minister of Justice, Fisheries Act 2009).

As a result, an ecological impact study has been commissioned by Stantec Ltd. to survey and assess the potential impacts to fish habitat resulting from the proposed sanitary sewer installation works and to provide mitigation and compensation recommendations in accordance with the No Net Loss Policy for the Management of Fish Habitat (Department of fisheries and Oceans 1986).

Project Description

A preliminary site field survey of the current proposed alignment indicated ten potential stream crossings where a HADD may occur. The following report presents general stream site descriptions, aquatic survey results and mitigation/ compensation recommendations for each potential crossing identified in the current proposed alignment. The primary focus of the sampling program was to identify the fish assemblage and assess the fish habitat within the areas of the proposed stream crossings.

Methods

The preliminary site survey determined that in-stream structural habitat and cover in the upper reaches of Little River and the connecting channels (municipal drains) prohibit the effective use of seine netting as a method to accurately assess the fish community. As a result, all crossings and reaches were sampled for fish using Smith-Root LR-24 Back Pack Electro-fishing units, a more effective gear type for sampling fish and fish species at risk (Poos *et al.* 2007).

Electroshocking was conducted in a sweep pattern (systematic side to side pattern), a common method used in shallow wadeable streams with narrow channel widths (Watershed Science Centre 2006).

Electroshocking amperage was maintained between 3.5 - 5 amps with a voltage of 130 - 150V. Periodic voltage output adjustments were made as needed due to varying stream conductivities. In order to determine at least 95% of species composition, stream reaches were sampled at a recommended minimal distance of at least 50 stream widths on either side of the proposed stream crossing (Portt *et al.* 2008). Longer reaches parallel to the proposed project area were also sampled where fish habitat was suspected to occur (e.g. Little River Drain).

Results of the preliminary site survey conducted in August determined the existence of flowing water in all reaches of the study area except in the upper reaches of the 8th Concession Drain and Little 10th Concession Drain. A subsequent site survey in October and sampling in November revealed minimal water flow at the 8th Concession following recent precipitation.

Consideration of seasonal climatic (environmental) conditions and species that may be sensitive to such fluctuating flow conditions (e.g. various cyprinid species exhibiting temporal and spatial variations in response to flow and turbidity) was be taken into account during the sampling program (i.e. sampling at various times and in various flow conditions). The majority of the connecting drainage channels afford some in-stream protection from excessive flow conditions (significant runoff events) and the sampling program timeline reflected these potential fish community changes in response to such variable environmental conditions (e.g. high turbidity conditions during runoff events).

All fish collected were immediately removed and placed in live well containers for identification and enumeration in the field. All fish collected were rapidly enumerated and released back to the respective watercourse after species confirmation. For species requiring further taxonomic confirmation (e.g. suckers and various cyprinids) sample specimens were transported back to the lab in aerated live wells where they were sedated with MS 222 according to the standards of the Canadian Council on Animal Care (CCAC) guidelines (CCAC guidelines 2005). Species identifications were then confirmed through measured anatomical parameters using microscopy. These collected fish were also released back to their respective water courses following a short duration in captivity (less than 24hrs). Tank hauling temperatures were maintained at ambient conditions and losses were minimal.

In order to assess general water quality conditions at each sampling location a number of basic water quality parameters were measured during the preliminary field survey. Temperature (°C), pH, conductivity (µS/cm), oxidation-reduction potential (mvolts), and dissolved oxygen (mg/L) were measured in situ using a Hydrolab Surveyor 3/ Reporter Multiprobe Multiparameter Water Quality Logging System.

1.2 Site Descriptions and Assessment Results

1.2.1 Banwell Road Trunk Sanitary Sewer (SSEL Phase 4A)

Proposed Alignment

The proposed sanitary trunk sewer alignment is to be located on the east side of Banwell Road (south of the E.C. Row Expressway) south to E.C. Row Avenue where it then crosses Banwell Road to a permanent easement along the west side of Banwell Road. This proposed alignment will result in the crossing of two municipal drains, the Gouin Drain at E.C. Row Avenue and the LaChance Drain at Intersection Road. Both drains are storm water drains for the Town of Tecumseh with final discharge into Little River near Lauzon Road.

The Banwell Road sewer alignment will be open cut installation at both drain crossings with upstream water flow blocked during construction and downstream levels will be maintained through portable pumps.

Both the Gouin and LaChance drains display heavy flow during heavy significant precipitation events, otherwise flow reduces to marginal during dry periods.

(i) Gouin Drain Crossing

Habitat Description

The Gouin Drain crossing is located at the intersection E.C Row Avenue and Banwell Road (N 42˚17.913, W 082˚ 53.928). The Gouin Drain is a relatively small municipal stormwater drain (Municipal Drain Class Authorization F: intermittent) with an average bankfull width of 6.7 m and an average low flow wetted channel width of 220 cm.

Basic water quality measurements were collected on October 18, 2009. Water flow was marginal with an average depth of 10 cm. Basic water quality measurements indicate satisfactory conditions for the parameters measured.

Table 1: General water quality summary for the Gouin Drain (October 18 2009).

WATER QUALITY PARAMETER	Gouin Drain
Temperature (°C)	5.59
Dissolve Oxygen (mg/L)	9.22
Conductivity (mS/cm)	1.168
pH	7.9
Redox (µmhos)	218
Turbidity (NTU)	40.4

Sediment structure in the drain was categorized as soft sediments comprised of silt, mud (<2mm) and organic material. No other stream structure such as cobble or woody material was evident.

In stream cover is defined as any structure in the wetted channel or within 1 m above the water's surface that provides refuge, resting or foraging habitat for fish (B.C. Fisheries Information Branch 2001). In-stream cover on the west side of Banwell Road was categorized as moderate (5-20%) and comprised primarily of emergent macrophytes (i.e. in-stream vegetation) and riparian grasses. Abundant cover (>20%) on east side of Banwell Road was provided by in-stream vegetation in the form of robust stands of Cattails (*Typha*). The drain traverses Banwell Road through a small steel culvert.

Stream canopy cover is defined as canopy closure provided by stream side riparian vegetation that projects over the stream and is higher than 1 m above the water surface (BC Fisheries Information Branch 2001). Visual estimates characterize this parameter as low (approximately 5% or less) near the crossing (**Plate 1**).

The Gouin Drain was surveyed for fish on November 21, 2009 (*see fish survey methods*). A total of two fish were collected throughout the sampling reach. A single Pumpkinseed Sunfish (*Lepomis gibbosus*) and a single Mudminnow (*Umbra lumi*) were both collected near the culvert that crosses Banwell Road. It is expected that more fish currently occupy the drain and seek cover provided by the closed culvert, which has a small diameter preventing sampling inside.

Although the survey results revealed minimal species diversity and abundance, the creek is classified as fish habitat. Despite the survey results, the drain is a connecting channel to downstream areas of more sensitive aquatic habitat and prior to any construction activities mitigation plans should in place to prevent a HADD. It is also expected that all damage to creek beds, banks and associated fish habitat will be fully compensated for with appropriate local sites measures as direct by the project biologists and approved by the Essex Region Conservation Authority.

Plate 1: Gouin Drain culvert west side view of the intersection of Banwell Road and E.C Row Avenue.

Detailed mitigation and compensation recommendations for SSEL water crossings are provided on page 26 of this report.

Specific mitigation recommendations for Gouin Drain crossing include:

- Confine construction activity to low flow conditions.
- Maintain water levels downstream of the crossing.
- Install downstream silt screen to prevent the pumping of excessive suspended solids.

(ii) *LaChance Drain Crossing*

Habitat Description

The LaChance Drain crossing is located at the intersection of Banwell Road and Intersection Road (N 42˚17.533, W 082˚ 53.794). The LaChance Drain is agricultural/municipal stormwater drain (Municipal Drain Class Authorization F: intermittent) with an average bankfull width of 8.4 m and an average low flow wetted channel width of 180 cm.

Basic water quality measurements were collected on October 18, 2009. No water flow was evident during the water quality survey or during the fish survey in November. Standing water was present under the concrete bridge and in downstream pools with an average water depth of 2-5 cm. **Table 2**: General water quality summary for the LaChance Drain (October 18 2009).

WATER QUALITY PARAMETER	LaChance Drain
Temperature (°C)	5.57
Dissolve Oxygen (mg/L)	4.69
Conductivity (mS/cm)	3.00
pH	7.0
Redox (µmhos)	214
Turbidity (NTU)	9.79

The basic water quality measurements (e.g. low dissolved oxygen, high conductivity) are indicative of low flow conditions, rural runoff and abundant organic material. The drain is categorized as intermittent and as such regularly dries out. Low oxygen conditions are presumed to be a common condition in this drain during low flow periods.

Streambed substrate in the LaChance Drain channel was comprised primarily of thick muck/silt sediment with some sand (<2mm). The deep soft sediments suggest significant soil laden runoff from the adjacent agricultural fields losing to the drain. Abundant vegetation and excessive filamentous algae (*Cladophora)* in the channel pools was also observed suggesting the drain receives excessive nutrients (e.g. phosphorus) and limited flushing due to periodic flow.

In-stream cover on the west side of Banwell Road was categorized as abundant (>20%) and comprised primarily of emergent grasses (i.e. in-stream vegetation) and riparian (bank) vegetation. Abundant cover (>20%) on east side of Banwell Road was provided by in-stream vegetation in the form of robust stands of Cattails (*Typha*), Reed grass (*Phragmites*) and Water Plantain (*Alisma*).

Stream canopy cover is defined as canopy closure provided by stream side riparian vegetation that projects over the stream and is higher than 1 m above the water surface (BC Fisheries Information Branch 2001). Visual estimates characterize this parameter at trace levels (5%) near the crossing (**Plate 2**).

Plate 2: The LaChance Drain, west side of the intersection of Banwell Road and E.C Row Avenue.

The LaChance Drain was surveyed for fish on November 21, 2009 (*see fish survey methods*). A total of two species and nine fish were collected throughout the sampling reach. Four Pumpkinseed Sunfish (*Lepomis gibbosus*) and five Mudminnows (*Umbra lumi*) were collected in the remaining water near the culvert that crosses Banwell Road. Similar to the Gouin Drain crossing it is expected that more fish currently occupy the drain and seek refuge and cover provided by the bridge. Very thick sediments and narrow opening under the bridge prevented thorough sampling.

Although the survey results revealed minimal species diversity and sparse abundance, the LaChance Drain is classified as fish habitat. Despite the survey results, the drain is a connecting channel to downstream areas of more diverse and sensitive aquatic habitat (e.g. Little River). Prior to any construction activities, mitigation plans should in place to prevent downstream disruption and compensate for channel disruption. It is also expected that all damage to creek beds, banks and associated fish habitat will be fully compensated for with appropriate local sites measures as direct by the project biologists and approved by the Essex Region Conservation Authority. The intermittent flow in this drain provides the opportunity for construction activities to occur during periods of low flow thus reducing instream disruption and downstream effects. Although compensation opportunity exists for the construction of deeper pools that may improve fish survival during low flow periods, it is suspected that the thick soft sediments that exist at this site reflect the excessive sediment loads in this drain during wet events. All created pools would likely be filled in and covered after a short period.

1.2.2 Canadian Pacific Rail (CPR) Little River Bridge Crossing (SSEL Phase 4D)

Proposed Alignment

The proposed CPR sanitary trunk sewer alignment is to be located on the north side of the CPR Line and align west to Lauzon Road from Banwell Road. The sewer line crosses the CPR Line to a permanent easement along the west side of Lauzon Road. This proposed alignment will result in the crossing of the Little River Drain, near the confluence of the LaChance Drain north of the CPR Line Bridge.

The proposed method for sewer installation of this section of the sanitary trunk is through open cut measures along the CPR Line and across the Little River Drain. Water course diversion methods are proposed for the Little River Drain during construction and installation activities. This downstream section of Little River Drain is a large channelized municipal drain located 180 m east of the Lauzon Road (N 42˚17' 20.42", W 082˚ 54' 49.83"). The drain is a Municipal Class E drain defined as a permanent warm water drain with top predators (e.g. bass). Authorized Class (E) Drains contain fish and fish habitat that are sensitive to maintenance and construction activities and as such require Department of fisheries and Oceans approval prior to maintenance or work resulting in a HADD.

General Habitat Description

Channel substrate at the Little River Drain CPR crossing was classified as a hard bottom basin consisting primarily of sand, gravel and abundant cobble. Small pockets of accumulated soft sediments (silt) were also evident. Abundant leaf and woody debris were scattered throughout the channel. Water depths at the time of sampling averaged 30-40 cm with scattered deeper pockets of 50-60 cm. Bankfull widths on the north side (approximately 20 m from the CPR Bridge) averaged 20 m and channel widths ranged from 300 to 400 cm.

Significant water flow was evident at the time of sampling and basic water quality results indicate satisfactory values for the parameters measured (Table 3). Elevated turbidity concentrations were noted during the preliminary survey in October, and although water clarity had slightly improved during the November fish survey the drain is negatively impacted by upstream sources of suspended sediments.

In stream cover was categorized as moderate (5-20%) provided through abundant cobble, riparian shrubs and grasses primarily on the east bank. In stream cover south of the CPR Bridge (upstream) was noted to be similar. Overhead canopy cover at the crossing location was limited and visually estimated to be 10-20% (**Plate 3**).

Table 3: General water quality summary for the Little River Drain at Canadian Pacific Rail Bridge

(October 18 2009).

WATER QUALITY PARAMETER	LaChance Drain
Temperature (°C)	4.68
Dissolve Oxygen (mg/L)	10.2
Conductivity (mS/cm)	1.3
pH	7.35
Redox (µmhos)	218
Turbidity (NTU)	40.7

Plate 3: The Little River Drain north of the CPR Line Bridge (October 18 2009).

Significant channel attributes at the Little River Drain crossing (CPR site) include numerous gravel riffle-pool sequences, foreshore areas downstream of the bridge and elevated island bars. Although intermittent, an additional off channel habitat (LaChance Drain) exists ~20 meters downstream of the bridge crossing.

The site was surveyed for fish on November 23 2009 (*see fish survey methods*). The electrofishing survey was conducted approximately 50 m upstream and downstream of the CPR Line Bridge. A total of 14 species of fish were collected throughout the sampling reach.

Table 4: Fish Species collected in the Little River Drain north of the CPR Bridge (November 23, 2009).

Bluntnose Minnow (*Pimephales notatus*) (N=36)
Common Shiner (*Luxilus cornutus*) (N > 50)
Creek Chub (*Semotilus atromaculatus*) (N>50)
Fathead Minnow (*Pimephales promelas*) (N=30)
Largemouth Bass (*Micropterus salmoides*) (N=1)
Pumpkinseed (*Lepomis gibbosus*) (N=5)
Quillback (*Caproides cyprinus*) (N=23)
Spotfin Shiner (*Cyprinella spiloptera*) (N=15)
White Sucker (*Catostomus commersoni*) (N=10)
Rock Bass (*Ambloplites rupestris*) (N=3)

The results of the fish survey revealed a relatively abundant and diverse fish assemblage, with large numbers of Creek Chub and Shiners. Many of the species present (e.g. Creek Chub) suggest that this reach of the Little River Drain possesses good fish habitat and good water quality. Previous survey records collected downstream of this location fish indicate similar species, with the addition of Common Carp, Green Sunfish and Round Goby (Essex Region Conservation Authority Fish Survey Records (ERCA 2001). No Species at Risk were collected during the sampling survey.

As a result of the proposed open cut installation, this project will result in a HADD. Water diversion methods during construction activities must include silt barriers and procedures for closing and opening new diversion channels (outline in Mitigation and Recommendations Section). It is expected that all damage to creek beds, banks and associated fish habitat will be fully compensated by appropriate local site measures as direct by the project biologists and approved by the Essex Region Conservation Authority. Compensation measures should include the addition of riffle-pool sequences, creation of foreshore areas and rock clusters to improve fish habitat.

1.2.3 Little River Drain (Lauzon Road) (SSEL Phase 4D) Proposed Alignment

The proposed alignment of the Lauzon Road trunk sanitary sewer is to align in the middle of the southbound lane of Lauzon Road, from the CP Rail Line located to the north. The sewer line approaches the Little River Drain at the Service Road B Intersection with Lauzon Road. The current alignment proposal will not result in a crossing of this section of the Little River Drain, but turns west and runs parallel to Service Road B 80 meters north of the Little River Drain. The alignment will cross Little 10th Concession Drain near the CP Rail (Municipal Class Authorization F). This small intermittent drain contains no fish species and was dry during the preliminary and fish sampling surveys. However, during precipitation events the drain directly flows into the Little River Drain to the south and as result construction activity may negatively impact downstream fish habitat and must have stream protection measures (mitigation) in place (i.e. silt barriers).

General Habitat Description

The Little River Drain is a channelized municipal drain located 50 m south of the Service Road B intersection with Lauzon Road (N 42˚17’ 02.08”, W 082˚ 54’ 46.54”). This drain is a Municipal Class E drain defined as a permanent warm water drain with top predators (e.g. bass). Authorized Class (E) Drains contain fish and habitat that is sensitive to maintenance and construction activities.

The Little River Drain channel substrate within 10m west of the Little River Drain crossing was classified as a hard bottom substrate consisting primarily of sand, gravel (2-64 mm) and cobble (64-256 mm) with some silt accumulation. Channel substrate adjacent to the bridge was also hard bottom gravels and armour stone, installed as bank protection during bridge construction. Upstream bed substrates were primarily hard clay with a mixture of cobble, gravel and areas of sand/silt accumulations.

Armour stone (in-stream) was abundant near the bridge on both the east and west sides. Water depth at the time of sampling averaged 30 cm with scattered deep pockets of 50-60 cm. Riffle-pool sequences were observed under and adjacent to the bridge. The channel bankfull width west of the bridge (~25 m upstream from the bridge) were approximately 14 m and wetted channel widths ranged from 450-500 cm.

Water flow at the time of sampling was above base flow and basic water quality results indicate satisfactory values for the parameters measured (Table 5). Elevated turbidity concentrations were noted during the preliminary survey in October and although water clarity had slightly improved during the November fish survey, it is apparent that the river is negatively impacted from upstream sources of suspended solids.

Table 5: General water quality summary for Little River Drain at Lauzon Road (October 18, 2009).

WATER QUALITY PARAMETER	LaChance Drain
Temperature (°C)	4.66
Dissolve Oxygen (mg/L)	10.18
Conductivity (mS/cm)	1.330
pH	7.34
Redox (μmhos)	217
Turbidity (NTU)	40.3

Plate 4: Little River Drain west of Lauzon Road (October 18, 2009).

In-stream cover on the west side of Lauzon Road (within approximately 25 m of the bridge) was categorized as limited (5%) and provided primarily through armour stone and limited cover from riparian grasses and shrubs. Similar conditions were noted downstream of the bridge (eastside of Lauzon Road), although the abundance of riparian grasses and shrubs was significantly higher further downstream (~25 m) away from the bridge crossing and also included some woody debris (moderate to abundant).

Visual estimates of the drain canopy cover was considered sparse (<20%) immediately west of the Lauzon Road Bridge. Cover was provided through scattered shrubs and deciduous trees on the south bank. Further upstream overhead canopy was significantly more abundant estimated to be at (80-100%) seasonal cover.

Significant channel attributes at the Little River Drain crossing at Lauzon Road include numerous gravel riffle-pool sequences and foreshore areas downstream of the bridge. Additional off channel habitat (side channel) exists 30 meters downstream of the bridge crossing as well.

The site was surveyed for fish on November 22, 2009 (*see fish survey methods*). The electrofishing survey was conducted approximately 50 m upstream and downstream of the Lauzon Road Bridge. A total of 14 species of fish were collected throughout the sampling reach.

Table 6: Fish Species collected in Little River at Lauzon Road (November 22 2009)

Banded Killifish (*Fundulus diaphanous*) (N=6)
Bluntnose Minnow (*Pimephales notatus*) (N=12)
Brown Bullhead (*Amerius nebulosus*) (N=1)
Common Shiner (*Luxilus cornutus*) (N > 50)
Creek Chub (*Semotilus atromaculatus*) (N>50)
Fathead Minnow (*Pimephales promelas*) (N=14)
Gizzard Shad (Dorosoma cepedianum) (N=2)
Largemouth Bass (*Micropterus salmoides*) (N=2)
Mudminnow (*Umbra limi*) (N=2)
Spottail Shiner (*Notropis hudsonius*) (N=6)
Pumpkinseed (*Lepomis gibbosus*) (N=2)
Quillback (*Caproides cyprinus*) (N=43)
Spotfin Shiner (*Cyprinella spiloptera*) (N=12)
White Sucker (*Catostomus commersoni*) (N=36)

The results of the fish survey revealed an abundant and diverse fish assemblage, with large numbers of Creek Chub and other cyprinids (e.g. Shiners). Many of the species present are normally found in streams with good water quality and fish habitat. Previous survey records fish indicate similar species collections in 2000 (Essex Region Conservation Authority (ERCA 2000). No Species at Risk were collected during the sampling survey.

Sewer installation along Service Road B is approximately 50 m north of the Little River Drain and will unlikely result in a HADD to downstream aquatic resources. The addition of silt barrier fence adjacent to the construction activities along Service Road B and silt barriers in Little 10th Concession Drain to prevent excessive runoff of silt and un-stabilized soils to downstream drains is recommended. Additional protection measures and good practice guidelines are provided in the Mitigation and Compensation Recommendation section.

1.2.4 Rivard Drain and Little River Drain Crossing (Lauzon Parkway) (SSEL Phase 4D)

Proposed Alignment

The Rivard Drain is a small, channelized, primarily agricultural drain where the majority of the reach is located on the west side of Lauzon Parkway (north of County Road 42). The Rivard Drain has a Municipal Drain Class Authorization of F (intermittent). The drain flows west to east where it crosses Lauzon Parkway and joins Little River (N 42˚16’ 35.22”, W 082˚ 54’ 53.61”).

The sanitary sewer proposed alignment will cross the Rivard Drain on the west side of Lauzon Parkway by open cut method. Dewatering will occur through portable pumps if necessary. The Rivard Drain is an intermittent drain and no water flow or standing water was observed during both the preliminary survey in October or during the sampling in November.

As result of no flow or standing water conditions no fish species were observed in this drain. Municipal Class F drains are designated intermittent systems and therefore a harmful alteration, disruption or destruction of fish habitat will not occur provided the work is completed during dry conditions and disturbed soils are stabilized following construction activity (DFO Fact sheet 1999).

In order to prevent the migration of silt downstream silt barriers (straw bales) will be secured in the channel. During periods of heavy or persistent precipitation, construction activities should be suspended if they could result in excessive sediment delivery to the drain that would adversely affect aquatic resources downstream.

1.2.5 Little River Crossing at Lauzon Parkway

Proposed Alignment

The sanitary trunk sewer proposed alignment will cross the main channel of Little River on the west side of Lauzon Parkway by tunnelling under the channel of the river. The proposed crossing area is located west of Lauzon Parkway and north of County Road 42 (N 42˚16’ 33.27”, W 082˚ 54’ 52.18”) (**Plate 5**). This length of sewer pipe will be terminated to the south of County Road 42 and will be used for the future servicing of lands to the south. This upstream reach of the Little River Drain represents an area of sensitive fish habitat with quality stream attributes, unique conditions that are uncommon among the municipal drains particularly downstream conditions in the main channel of Little River.

Plate 5: Little River Drain west of Lauzon Parkway approximately 350 m north of County Road 42 (October 18 2009).

General Habitat Description

Channel substrate at the Little River crossing was classified as a hard bottom basin consisting primarily of sand, gravel and rocks with some silt accumulation. Abundant leaf and woody debris were scattered throughout the channel. Armour stone (in-stream) was abundant near the bridge on both the east and west side. Water depth at the time of sampling averaged 40 cm with scattered deeper pockets of 50-60 cm. The bankfull width on the proposed west crossing alignment was approximately 15 m and channel widths ranged 300 to 400 cm.

There was significant water flow at the time of sampling and basic water quality parameter results indicate satisfactory values for the parameters measured (Table 7). Elevated turbidity concentrations were noted during the preliminary survey in October, and although water clarity had slightly improved during the November fish survey, it is apparent that the Little River Drain negatively is impacted from upstream sources of excessive suspended solids, presumed to be agricultural runoff.

Table 7: General water quality summary for Little River at Lauzon Parkway approximately 330 m north of County Road 42 (October 18 2009).

WATER QUALITY PARAMETER	LaChance Drain
Temperature (°C)	5.52
Dissolve Oxygen (mg/L)	10.93
Conductivity (mS/cm)	1.172
pH	7.48
Redox (µmhos)	218
Turbidity (NTU)	50.3

In-stream cover on the west side of Lauzon Parkway (within approximately 25 m of the bridge) was categorized as moderate (5-20%) and comprised primarily of riparian grasses and woody debris. Similar conditions were also observed downstream, east of Lauzon Parkway. Limited canopy cover adjacent to the Lauzon Parkway Bridge allows sunlight penetration promoting the growth of riparian grasses and shrubs which in turn provide more near bank instream cover than observed upstream.

In-stream cover upstream of the crossing is limited to undercut banks, shrubs, woody debris and rocks. Visual estimates of 100% canopy cover was observed upstream of the crossing (100% cover).

Channel attributes at the crossing location included a number of island (sediment) bars, numerous gravel riffle-pool sequences and foreshore areas on the south bank.

The site was surveyed for fish on November 22 2009 (*see fish survey methods*). The electrofishing survey was approximately 50 m downstream of the Lauzon Parkway Bridge. Sampling was conducted 350 m upstream of the bridge. A total of nine species of fish were collected throughout the sampling reach.

Table 8: Fish Species collected in Little River at Lauzon Parkway south to County Road 42:

Spotfin Shiner (*Cyprinella spiloptera*)
Fathead Minnow (*Pimephales promelas*)
Common Shiner (*Luxilus cornutus*)
Striped Shiner *(Luxilus chrysocephalus*)
Creek Chub (*Semotilus atromaculatus*)
Quillback (*Caproides cyprinus*)
Banded Killifish (*Fundulus diaphanous*)
White Sucker (Catostomus commersoni)
Pumpkinseed (*Lepomis gibbosus*)
Mudminnow (*Umbra limi*)
Bluntnose Minnow (*Pimephales notatus*)
Spottail Shiner (*Notropis hudsonius*)

The results of the fish survey revealed a relatively abundant and diverse fish assemblage, predominantly represented by cyprinid species (e.g. Shiners) similar to downstream locations. Previous fish collection records indicated similar species in the survey area with the exception of the occurrence of Rockbass (*Ambloplites rupestris*) (Essex Region Conservation Authority 1984 and 2000). No large predator species were observed. No Species at Risk were collected during the sampling survey.

The proposed tunnelling installation of the sanitary trunk sewer across this section of Little River will avoid disruption to the channel and the existing fish habitat. A 26 m buffer will be maintained from the top of each bank and a fabric silt barrier fence will be installed to prevent excessive runoff of un-stabilized soils to the drain. The addition of straw bales to roadside swales will also help prevent silt runoff during the open cut installation of the sewer south to County Road 42. Additional protection measures and good practice guidelines are provided in the Mitigation and Compensation Recommendation section on page 26.

1.2.6 County Road 42 West of Lauzon Parkway (SSEL Phase 5A and 5B)

Proposed Alignment

The sanitary sewer alignment of the SSEL Phase 5 commences at the 8th Concession Road six metres inside the Windsor International Airport property and proceeds easterly to the termination point, west of the Little River Drain, inside the Windsor International Airport property.

The alignment of the sewer will run parallel with the north side of County Road 42 and lay six metres north of said limit within the Windsor International Airport lands.
The full extent of the work is proposed to be performed using an open cut method and no channel crossings or water diversions are proposed, however temporary culverts and filling of the roadside swale may be necessary to complete the work within the two private home properties.

This proposed alignment does not directly affect local fish habitat. Construction activities should apply protection measures (e.g. silt barriers) for runoff during unforeseen prolonged precipitation events that may affect downstream aquatic habitats. The placement of straw bales within the roadside swale downstream of the temporary culvert is recommended.

1.2.7 8th Concession Drain Alignment and the North Townline Drain and 6th Concession Drain Crossing (SSEL Phase 6).

Proposed Alignment

The proposed alignment of the 8th Concession sanitary trunk sewer line is to cross County Road 42 and North Townline Drain at the 8th Concession Road, run parallel to the east side of the 8th Concession Road crossing the 6th concession Drain and continuing south. Prior to terminating near highway 401, the sanitary trunk sewer then aligns west, crosses the 8th Concession Road and the 8th Concession Drain and terminates at an installed sanitary manhole 200 m north of Highway 401.

The proposed sewer trunk alignment across County Road 42 and the North Townline Drain is through open cut methods. Sewer line Installation along the 8th Concession Road is to be open cut with jack and bore installation (tunnelling) method across the 6th Concession Drain.

General Habitat Description

The North Townline Road is a channelized Municipal Class F Drain (intermittent) that has recently undergone maintenance activities (**Plate 6**). Although water was present in the drain during the preliminary survey and fish sampling survey (approximately 2-3 cm deep, undetectable flow) no fish species were observed. The North Townline Drain at the 8th Concession intersection does not represent significant fish habitat. Although, the drain does likely serve as fish passage during high flow events for upstream and downstream passage to and from more permanent connected water courses such as the Little River Drain.

Municipal Class F drains are designated intermittent systems and therefore a harmful alteration, disruption or destruction of fish habitat will not occur provided the work is completed during dry conditions and disturbed soils are stabilized following construction activity (DFO Fact sheet 1999).

During periods of heavy or persistent precipitation, construction activities should be suspended if they could result in excessive sediment delivery to the drain that would adversely affect aquatic resources downstream. The use of silt screens or other suitable silt barriers to prevent unstable soils washing out during construction activities in and around the North Townline Drain (e.g. culvert replacement) is highly recommended to prevent negative impacts to sensitive downstream fish habitat.

Plate 6: North Townline Drain south of adjacent County Road 42 (October 18 2009).

The 6th Concession Drain crossing is located south of the intersection of Baseline Road and the 8th Concession Road (N42˚14.779 W082˚56.736). The 6th Concession Drain has a Municipal Class Authorization E (permanent warm water drain with top predators). This drain is a channelized agricultural/municipal stormwater drain with an average bankfull width of 6.4 m and an average low flow wetted channel width of 2.5 m.

Table 9. The 6th Concession basic water quality measurements (October 18, 2009).

WATER QUALITY PARAMETER	6th Concession Drain
Temperature (°C)	7.25
Dissolve Oxygen (mg/L)	9.48
Conductivity (mS/cm)	1.01
pH	7.6
Redox (µmhos)	216
Turbidity (NTU)	NA

The 8th concession drain is a shallow intermittent reach bordered by agricultural lands and residential lawns. The drain near the project terminus (Highway 401) is characterized by thick emergent vegetation with steep banks and absence of any buffer riparian zone (recently mowed banks, lack of tree and shrub cover) (**Plate 7**). During rainfall events the drain flows in a northerly direction and subsequently empties into the 6th Concession Drain, a larger permanent watercourse. Average bankfull widths at the southern reach of the 8th Concession is approximately 5.5 meters with mean wetted channel width of 2.9 meters. Channel substrate is characterized as soft mud with abundant organic material (plant material). Channel canopy cover in this area of the drain was assessed as 100% open. In-stream cover was abundant provided through robust stands of Cattails and Reed Grass (emergent macrophytes).

Plate 7. The 8th Concession Road Drain (Location N42˚15.308 W082˚56.756).

The 8th Concession Drain in proximity to the confluence with the 6th Concession Drain possesses trace amounts of channel canopy cover (primarily through shrubs and a few trees), but remains largely disturbed habitat (mowed banks) with a minimal riparian buffer (**Plate 8**).

Plate 8. The 8th Concession Drain (Location N42˚14.949 W082˚56.783).

The 8th Concession Drain at the confluence with the 6th Concession Drain (**Plate 9**) has added tree cover and with cover in the form of driveway bridges and culverts. Bankfull widths averaged 6.4 meters with wetted channel widths averaging 2.5 meters. Stream substrates remain relatively homogenous throughout the 8th Concession drain (thick soft sediments with abundant plant material). Substrate conditions in drain reflect inputs from adjacent agricultural land where the absence of a buffer chokes the drain bottom with soft sediments and promotes growth of undesirable vegetation such as Reed Grass (*Phragmites*).

Plate 9. The 8th Concession Drain (upper left drain) at the confluence with 6th Concession Drain (Location N42˚14.779 W082˚56.736).

The 6th concession Drain at the 8th Concession confluence is a permanent drain containing significant fish habitat occurring both east and west of the concession crossing. Stream canopy cover west of the crossing was assessed as approximately 80% provided by a very narrow riparian buffer of trees and shrubs. Bankfull width was measured at 7.7 metres and the base flow wetted channel width was measured at 220 cm. Gabion stone lines the north bank west of the bridge, followed by residential lawn with a few scattered trees (10-20 metres upstream). The drain substrate west of the bridge crossing was primarily hard bottom with a substrate composition of sand, gravel and silt. Cobble stones were scattered through the site.

Drain substrates east of the crossing were also characterized as hard bottom with a composition of gravel, cobble, sand and silt. Stream cover was assessed at nearly 100% (trees and shrubs) with a narrow riparian buffer zone. The southern bank is bordered by a small naturalized area with trees and grasses (**Plate 10**). The northern bank is adjacent to agricultural lands. Bankfull widths east of the bridge approximated 10.5 metres, with wetted channel widths averaging 285 cm.

Water depths in 6th Concession Drain at the time of sampling average 10-25 cm with significant flow. Water clarity at the time of sampling was characterized as turbid (33.4 NTU). No in-stream vegetation (aquatic macrophyte) was observed. Riffle-pool sequences were evident on both sides of the crossing as well as under the concrete bridge.

Plate 10. 6th Concession Drain (east of the 8th Concession Bridge) (Location N42˚14.774 W082˚56.721).

The 8th Concession Drain was sampled for fish on October 12 and 18, 2009. Fish were only recovered from the drain near the confluence with 6th Concession Drain (nearby driveway bridges and culverts). No fish were observed or collected in the upstream reach of the drain (Highway 401). The drain exhibited moderate water flow at the time of sampling due to recent rainfall.

A total of 3 species were collected: *Luxilus sp.* (Striped Shiner), *Pimephales notatus* (Bluntnose Minnow), and *Catostomus commersonii* (YOY White Sucker).

The 6th Concession Drain at the 8th Concession Bridge was sampled for fish on east and west reaches including under the concrete bridge on October 12th and the 18th, 2009. A total of 10 species of fish were collected from an area of approximately 50 meters both east and west of the crossing:

Table 10. 6th Concession fish survey results (October 18, 2009) sampling survey.

Spotfin Shiner (*Cyprinella spilopterus*) (N=6)
Striped Shiner (*Luxilus chrysocephalus*) (N= 4)
Creek Chub (*Semotilus atromaculatus*) (N=12)
Fathead Minnow (*Pimephales promelas*) (N=4)

Bluntnose Minnow (*Pimephales notatus)* (N=13)
Quillback (*Caproides cyprinus*) (N=2)
Common Shiner (*Luxilus cornutus*) (N=3)
Banded Killifish (*Fundulus diaphanus*) (N=2)
Whiter Sucker (*Catostomus commersonii*) (N=6)
Central Mudminnow (*Umbra limi*) (N=7)

Although the species assemblage at this site was considered relatively diverse, the fish abundance was consider low and may be indicative of recent precipitation events (i.e. elevated water turbidity and current flow). Reference numbers from previous sampling events at this location were not available for comparison purposes.

Despite the low fish abundance observed, the 6th Concession Drain does represent significant fish habitat with quality stream attributes not commonly found in Essex County drainage, as evidenced by the moderate fish diversity that was observed. The drain represents a perennial stream with hard substrates that include gravel and cobble riffles, small pools and significant stream cover as well good water quality (at the time of sampling). No Species at Risk (SAR) in the 8th or 6th Concession Drains were recovered during the sampling program. It is important to point out that while the presence of a Species at Risk can be verified through sampling, the absence of such species with complete confidence cannot (Portt *et al*. 2008).

The proposed tunnelling method under the 6th Concession drain will avoid any disruption of the channel and fish habitat. Mitigation (i.e. silt barriers) to prevent roadside construction runoff into the drain is highly recommended. Additional protection measure and good practice guidelines are listed below.

1.3 Recommendations

1.3.1 In-stream Protection Measures

The following general stream protection measures are recommended:

- Complete the work during the appropriate instream work window. Minimize or avoid disturbing fish habitat above and below the area required for construction of the sewer installation.
- All works at the site where machinery, materials or silt laden runoff may impact the aquatic habitat downstream are to be scheduled for times outside the fish breeding period from March 15 to June 30. Works conducted within the breeding period will only be of a nature that does not alter or destroy aquatic habitat or organisms (e.g. young of the year).
- Maximum efforts should be made to reduce turbid runoff from entering the drain as a result of excavation and dredge materials should be contained until returned as backfill.

- A silt curtain should be erected around excavation sites to intercept the movement of unconsolidated soils into the drain. Eliminate or reduce sediment-related problems during installation through silt screens. Prevent deleterious substances from entering the drain (e.g. diesel fuel, oil and grease, waste construction materials etc.).
- Sediment delivered to stream channels can harm fish and fish habitat particularly during sensitive spawning periods. Most sedimentation occurs when soils are exposed, during and immediately following construction. The amount of sediment generated at a stream crossing is directly related to the sensitivity of the soil to erosion, the amount of area exposed to runoff or drain flow. Prevention of sedimentation by minimizing disturbance to stream banks and retaining riparian vegetation is essential. Planning construction activities during dry periods allows foregoing of special measures for erosion and sediment.
- During periods of heavy or persistent precipitation, construction activities should be suspended if they could result in excessive sediment delivery to the drain that would adversely affect aquatic resources.
- Replant and stabilize the work site to prevent post-construction erosion. Minimize clearing width at the crossing site and retain streamside vegetation within the stream crossing right-of-way wherever possible, recognizing operational requirements control. When water is present, most erosion and sediment problems can be avoided through the use of a variety of methods that control sediment at the source and prevent it from becoming entrained in the flowing water. The primary goal is to isolate the flowing water from the construction site.
- Where practical, water can be pumped across the work site and discharged into the stream channel below the construction site. This technique requires the stream to be dammed above the construction site. This eliminates the need for a diversion channel, and thus greatly reduces the problems of sediment production associated with digging and operating a newly created stream channel.
- Ensure that the design specifications for safe fish passage are achieved (i.e. drain diversion) or if pumping water, resident fish are temporarily and safely restricted from passage and protected from pumping. Pump intakes should be screened to prevent entrainment of juvenile fish. Backup pumps on site are highly recommended in all pumping situations.
- Temporary stream diversions should always be excavated in isolation from stream flow, starting from the bottom end of the diversion channel and working upstream to minimize sediment production. To prevent loss of sediment, the bottom end of the diversion channel should be left intact until the trench is almost complete and it should not be opened until all measures have been taken to reduce surface erosion resulting from the channel. After the stream crossing has been completed, the diversion should be closed from the upstream end first and, on completion, actions should be taken to re-establish the pre-diversion conditions and to stabilize and replant the site.

- If channel de-watering is conducted, fish should be salvaged from the dewatered area and returned to the stream. Personnel undertaking the fish salvage operation should obtain and hold all necessary permits required by fisheries agencies to collect and transport fish. Fish salvage is the relocation of live fish from a work site to a safe location above or below the site. Salvage operations require the isolation of the work site and the collection and removal of all fish from areas where fish may be entrapped or destroyed by construction activities. Fish can be collected through the use of electrofishing equipment and small nets.

1.3.2 In-stream Mitigation / Habitat Compensation Recommendations

- All large rocks, stumps, large logs or any woody material existing on the present banks and excavation zone should be retained and reinstalled if deemed beneficial fish habitat material.
- It is important that water depths within the stream channel be maintained at natural levels to accommodate fish passage of representative species for the waterways (during and after construction). Cobble and boulders should be properly embedded into the channel substrate to help retain natural stream sediment structure and flow velocities following backfill of the disturbed channel.
- Stream substrates at many of the sampling location are characterized as hard bottom and finished backfill should mimic the pre-existing channel. Gravel, cobble and some scattered boulders (>250mm) would enhance fish habitat.
- Bankfull widths should be maintained to avoid any channel restrictions that would result in areas of increased flow velocity.
- In stream cover should replaced and enhanced in the construction area, usually in the form of woody debris or boulder clusters as suggested to provide habitat for invertebrates, predation refuge, and attachment sites for adhesive fish eggs. In-stream cover is an important component of most lotic habitats and generally the more in-stream cover the more species diversity.
- All riparian vegetation (cover) that is not within the active construction zone is to be left untouched. Access to the site by land should be limited to existing disturbed areas.
- Compensation directives should focus on enhancing the overall fish habitat with special emphasis on retaining a maximum portion of the existing fish habitat. The greatest threat is habitat degradation through increased erosion and excessive turbidity during construction activities. Therefore special care during project excavation should be given to reduce increased turbidity in the area through silt curtains as explained in the previous bullets.

2.0 Terrestrial Study

Fieldwork Dates: August 28-29, October 13-14, 2009. (for herpetile fieldwork dates see Appendices)

2.1 Introduction

To facilitate the terrestrial study, the route was divided into the following sections which are discussed below;

i) Banwell Road (SSEL Phase 4A)

ii) North Side of CPR Tracks to Little River (SSEL Phase 4B)

iii) Little River Area (SSEL Phase 4C)

iv) Lauzon Road & Service Road B (SSEL Phase 4D, part)

v) Lauzon Parkway (SSEL Phase 4D, part)

vi) North of Little River from Lauzon Parkway to Airport Lands (SSEL Phase 4D, part)

vii) Airport Lands North of Co. Rd. 42 from Little River to Eighth Concession (SSEL Phase 5A and 5B)

viii) Eighth Concession (SSEL Phase 6)

In this study, Species at Risk are defined as species with the following designations: S1, S2, S3, Endangered, Threatened or Special Concern.

Provincial rarity ranks (S-ranks) are assigned by the Ontario Natural Heritage Information Centre of MNR as follows:

S1 **Extremely rare** in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.

S2 **Very rare** in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.

S3 **Rare to uncommon** in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

S4 **Common** and apparently secure in Ontario; usually with more than 100 occurrences in the province.

S5 **Very common** and demonstrably secure in Ontario.

The rank of **Special Concern (SC)** (formerly Vulnerable, VUL) is assigned by the Committee on the Status of Endangered Wildlife and Canada (COSEWIC) and the Committee on the Status of Species at Risk in Ontario (COSSARO) and is defined as **Any indigenous species that is particularly at risk because of low or declining numbers, occurrence at the fringe of its range or in restricted areas, or for some other reason but is not a threatened species.**

The rank of **Threatened (THR)** is assigned by COSEWIC to **Any indigenous species of fauna or flora that is likely to become endangered in Canada if the factors affecting its vulnerability do not become reversed.**

Endangered (END) Species are defined as **Any indigenous species of fauna or flora that, on the basis of the best available scientific evidence, is indicated to be threatened with immediate extinction throughout all or a significant portion of its Ontario range.**

Both Threatened and Endangered species are covered by the Endangered Species Act of Ontario, which prohibits destruction of the organism or its habitat.

2.2 Results and Recommendations

(i) Banwell Road (SSEL Phase 4A)

Natural heritage along Banwell Road is restricted to the narrow vegetated roadside verge and swale which lies between the gravel road shoulder and the adjacent agricultural fields. This vegetation experiences periodic mowing and herbicide application. The swale is subject to variable runoff flows from the road surface and no doubt receives pulses of de-icing salts during winter thaws. The vegetation is typical roadside vegetation dominated by disturbance-tolerant Eurasian grasses and weedy species.

There are two drain crossings in this section; the Gouin Drain at the corner of Banwell and E.C. Rowe Avenue and the LaChance Drain the junction of Banwell and Intersection Road. These drains exhibit terrestrial natural heritage features and functions of low value. Most of the vegetation consists of a mix of weedy herbaceous plant cover, groomed home landscape and a mix of native and exotic woody plants. Because of the disturbed nature of the drain vegetation, the resulting plant community is considered anthropogenic. It is not classified under the Ecological Land Classification system (Lee *et al*. 1998) and has not been assigned a natural heritage value.

No Species at Risk or other significant natural heritage were observed.

Recommendations

- None

ii) North Side of CPR Tracks to Little River (SSEL Phase 4B)

This section traverses agricultural lands from Banwell Road to Little River. Natural vegetation is restricted to the railway corridor. Near the tracks the vegetation is managed by mowing and herbicide application but is less disturbed adjacent to the agricultural fields. Here the vegetation consists of shrubs, vines and small trees both native and introduced. Dogwood-Prickly Ash thickets are the dominant vegetation. A shallow swale within the railway corridor parallels the tracks and supports wetland sedges, grasses and forbs. Water in this swale is ephemeral but may permit amphibian breeding in the deeper pooled areas. The vegetated habitat may support Butler's Garter Snake (Threatened)

The following Species at Risk were observed:

Scientific Name	Common Name	SRANK	COSEWIC	COSSARO
Carya laciniosa	Shellbark Hickory	S3		
*Quercus palustris	Pin Oak	S4		
Quercus shumardii	Shumard Oak	S3	SC	SC
Rosa setigera	Prairie Rose	S3	SC	SC
Sporobolus asper	Rough Dropseed	S3		
Vernonia missurica	Missouri Ironweed	S3?		

All the above species occur on railroad property.

*Note that Pin Oak, which was formerly classified S3, has been reclassified as S4 and is no longer considered at risk.

Recommendations

- All construction activity should be confined to the agricultural lands.

iii) Little River Area (SSEL Phase 4C)

The sewer is projected to tunnel under the CPR tracks at the former Lauzon Road crossing and then turn 90° east and proceed under the Little River near the junction of Little River with the LaChance Drain. This area presently supports vegetation characterized by successional old fields and the riparian community along the Little River. The LaChance Drain also supports aquatic vegetation although it was recently reconstructed – this reconstruction included both significantly deepening and widening the drain.

The successional areas include a mix of meadow and shrub thicket communities. They do not appear to have been mowed recently.

The following floral Species at Risk were observed:

Scientific Name	**Common Name**	**SRANK**	**COSEWIC**	**COSSARO**
*Eupatorium altissimum	Tall Boneset	S1		
Gleditsia triacanthos	Honey Locust	S2		
Rosa setigera	Prairie Rose	S3	SC	SC
Vernonia missurica	Missouri Ironweed	S3?		

* Note that only the Pelee Island population of this species is considered native, so these plants can be considered adventive most likely as railroad waifs. There are hundreds of Tall Boneset plants in this and adjoining areas.

The Honey Locust trees are found in the railroad fenceline east of Little River. These are possibly descended from native trees that grew along the river. Prairie Rose and Missouri Ironweed are widely scattered through the old fields.

In addition this is the only study site that had a documented SAR faunal species.

Scientific Name	**Common Name**	**SRANK**	**COSEWIC**	**COSSARO**
Thamnophis butleri	Butler's Gartersnake	S2	Threatened	Threatened

Two Butler's Garter Snakes, *Thamnophis butleri*, were observed during the course of the faunal survey. This observation was made at the southeast corner of the cul-de-sac on Munich Court as illustrated in Figure 2 of Appendix 1. Butler's Gartersnake is listed as Threatened and subject to the Endangered Species Act. The two snakes were found together under household debris. During the winter months until early to mid-April these snakes will be hibernating in crayfish and small mammal burrows.

Recommendations

- Construction activities should be placed as far south from the Munich Court cul-de-sac area as possible.
- Construction should be confined to the narrowest corridor possible with temporary fencing.
- Access to the site should be via old Lauzon Road in the west and Oaks Drive in the east.
- Topsoil from the excavations should be stored separately from subsoil and replaced over the subsoil at the completion of backfilling. Seeding of the backfill is not recommended.
- Snake habitat can be enhanced through the construction of a hibernaculum at the discretion of the Essex Region Conservation Authority or Ministry of Natural Resources. Plans and assistance can be obtained through the Essex County Stewardship Network.
- If the LaChance Drain requires reconstruction, a broader bottom of at least two metres

width will enhance crayfish habitat and thus increase the habitat available to the Butler's Gartersnake.

If works are conducted after the termination of snake hibernation, the additional recommendations below should be followed.

- Snake barrier fencing (3' wide landscape fabric embedded 4" underground supported by wooden stakes) should be erected around the perimeter of the construction site. Prior to the commencement of each workweek the fence the fence will be inspected for any damage (e.g. tears in fabric, no longer embedded into the ground).

- An intensive snake monitoring survey will be conducted inside the snake barrier fencing. Qualified personnel will perform the survey and any snakes found will be relocated outside of the fenced area. Limit of work to be surveyed multiple times.

iv) Lauzon Road & Service Road B (SSEL Phase 4D, part)

South of the CPR tracks, Lauzon Road is bordered on the east by agricultural fields and on the west by a highly maintained landscape of lawn and specimen trees. There is a shallow swale and vegetated strip between the road and the agricultural fields. Service Road B runs east from Lauzon Parkway and then curves north to connect with Lauzon Road. Shallow agricultural drains are found along the roadside and the road bisects a fencerow with an associated surface drain. West of the fencerow agricultural fields lie adjacent to the road. East of the fencerow, the vegetation along the north side of Service Road B is mainly herbaceous and dominated by grasses with scattered individual and clumped shrubs. Along the south there is a mix of trees and shrubs.

The following Species at Risk were observed:

Scientific Name	**Common Name**	**SRANK**	**COSEWIC**	**COSSARO**
Eupatorium altissimum	Tall Boneset	S1		
Quercus shumardii	Shumard Oak	S3	SC	SC
Rosa setigera	Prairie Rose	S3	SC	SC
Vernonia missurica	Missouri Ironweed	S3?		

Two plants of Tall Boneset were noted, one along the north side of Service Road B and the other at the north end of Lauzon Road near the railway. It should be noted that only the Pelee Island population of this species is considered native, so these plants can be considered adventive. There is one Shumard Oak growing along the south side of Service Road. Two Prairie Roses are found in this location as well. On the north side of Service Road B, one Prairie Rose and 16 flowering stems of Missouri Ironweed were noted. The status of Missouri Ironweed is uncertain. Both species are Common and widespread in Essex County.

Recommendations

- Construction along Lauzon Road can proceed with little or no risk of negative impacts to natural heritage.
- Construction along Service Road B should be restricted to the roadbed until west of the Shumard Oak root zone before entering the agricultural fields on the south side of the road. Both the Shumard Oak and a single plant of Prairie Rose are to be protected from construction activities with temporary fencing.

v) Lauzon Parkway (SSEL Phase 4D, part)

The proposed sanitary sewer sanitary sewer route lies along the west side of Lauzon Parkway within the road allowance. This places it adjacent to a swamp wetland complex that has been determined to be Provincially Significant. Therefore Provincial Policy dictates that all development within the area defined as 'Adjacent Lands' i.e. those lands within 120 metres of the wetland boundary, should demonstrate no negative effects upon the features and functions exhibited by the wetland. There can be little doubt that the existing parkway has negative effects including pollution from noise, light and engine emissions. The swale along the parkway likely contributes to desiccation of the wetland by removing surface water.

The swamp forest is dominated by Shellbark Hickory and Silver Maple (formerly ash) and therefore is classified under the Ecological Land Classification system as a Silver Maple Mineral Deciduous Swamp Type, SWD3-2, (S5). This is merely the closest approximation and the S-rank would be much higher given that the S-rank of Shellbark Hickory alone is S3. Other common trees here are Shumard Oak, Swamp White Oak and Shagbark Hickory.

The following Species at Risk were observed:

Scientific Name	Common Name	SRANK	COSEWIC	COSSARO
Carya laciniosa	Shellbark Hickory	S3		
Quercus shumardii	Shumard Oak	S3	SC	SC
Rosa setigera	Prairie Rose	S3	SC	SC
Vernonia missurica	Missouri Ironweed	S3?		

All of the above species are Common in Essex County

Recommendations

- To reduce root damage construction activities should occur as far east of the forest as possible.
- Construct a low earth berm (≈ 30 cm) along the forest edge to retain surface water.
- Place a chain link fence on the berm in advance of further construction activity.

vi) North of Little River from Lauzon Parkway to Airport Lands (SSEL Phase 4D, part)

This portion of the proposed sewer route runs in a northeast to southwest direction to the north of the Little River. The site was formerly farmland. The vegetation is early successional in nature with a mix of Cultural Dry - Moist Old Field Meadow (CUM1-1) and Mineral Cultural Thicket Ecosite including Grey Dogwood Cultural Thicket Type (CUT1-4) Cultural plant communities do not receive an S-rank. Much of the dogwood thicket is composed of Rough-leaved Dogwood (S4). Succession was, until recently, towards an ash dominated woodland but the ash trees have been destroyed by Emerald Ash Borer. The remaining trees are mainly elm.

The banks of the Little River support a more mature growth of woody plants which provide cover and other benefits to the stream water.

The following Species at Risk were observed:

Scientific Name	Common Name	SRANK	COSEWIC	COSSARO
*Agrimonia parviflora	Swamp Agrimony	S3/S4		
Rosa setigera	Prairie Rose	S3	SC	SC
Solidago rigida	Stiff Goldenrod	S3		
Vernonia gigantea	Tall Ironweed	S3?		

*Note that Swamp Agrimony which was formerly classified S3/S4 has been reclassified as S4 and is no longer considered at risk.

The other SAR species are widely distributed over former agricultural lands from the forest edge in the north to the banks of the Little River. With the exception of Stiff Goldenrod these species are Common in Essex County. Stiff Goldenrod is considered Uncommon.

Although the airport lands were formerly known to support a large population of Butler's Garter Snake (Threatened), none were observed in this or recent studies (see Appendices 1 & 2)

Recommendations

- Construction activities should occur at a minimum of 20 m from the river bank.
- Construction activities should be confined to the narrowest corridor possible.
- Topsoil from the excavations should be kept separate from subsoil and replaced on completion of backfilling.
- Seeding the backfill is not recommended except where slopes are vulnerable to erosion.

vii) Airport Lands North of Co. Rd. 42 from Little River to Eighth Concession (SSEL Phase 5A and 5B)

Natural heritage along County Road 42 is restricted to the vegetated roadside verge and swale which lies between the gravel road shoulder and the airport agricultural fields. A chain link fence surrounds the airport lands. A mowed grass lane occupies the space between the perimeter fence and the agricultural lands. All of this vegetation experiences periodic mowing and herbicide application. The swale is subject to variable runoff flows from the road surface and receives pulses of de-icing salts during winter thaws. The vegetation is typical roadside vegetation dominated by disturbance-tolerant Eurasian grasses and weedy species.

There are two residential lots in this section; both lots have groomed residential landscapes. Because the vegetation is manipulated and disturbed by human activity, the resulting plant communities are considered anthropogenic. They are not classified under the Ecological Land Classification system (Lee *et al*. 1998) and have not been assigned a natural heritage value.

The frequent mowing of this portion removes most plant growth above a couple of centimeters except at the base of the fence. This makes plant identification challenging. But the following Species at Risk were observed.

Scientific Name	Common Name	SRANK	COSEWIC	COSSARO
Rosa setigera	Prairie Rose	S3	SC	SC
Vernonia gigantea	Tall Ironweed	S3?		

Both species are Common in Essex County.

Recommendations

- None

viii) Eighth Concession (SSEL Phase 6)

The 8th Concession Drain is a constructed watercourse that runs parallel, on the west side, to the 8th Concession Road of the former Township of Sandwich South. It functions as both a residential storm and an agricultural drain. This portion of the Drain receives water from a landscape of intensive agriculture and low density residential housing. In the reach examined, water enters the drain through overland flows, tile drains and stormwater outfalls. Sections of the drain are covered for road and lane crossings.

The drain is characterized by relatively steep slopes (approximately 1:1) and is buffered from adjacent land uses by a narrow vegetated strip. Vegetation (dominated by introduced and weedy species) is restricted to the rim, slopes and bottom of the drain. Additionally, the vegetation is mowed frequently enough to suppress the growth of woody plants. In this reach the drain receives no water from natural wetlands or woodlands. The bottom of the drain has been periodically dug and sidecast to remove sediments that restrict flow. The last episode of this maintenance is unknown.

The drain is subject to variable flows and is apparently ephemeral (anecdotal observations). Because it parallels a paved road and other hardened traffic surfaces, it likely receives pulses of de-icing salts during winter thaws.

The drainside vegetation is highly disturbed as is typical of agricultural drains in southwestern Ontario. It thus exhibits terrestrial natural heritage features and functions of low value
Most of drain study area consists of a mix of weedy herbaceous plant cover and mown woody plant cover or groomed home landscape.

Because of the disturbed nature of the drain vegetation, the resulting plant community is considered anthropogenic. It is not classified under the Ecological Land Classification system (Lee *et al*. 1998) and has not been assigned a natural heritage value.

One Species at Risk (SAR) was observed.

Scientific Name	Common Name	SRANK	COSEWIC	COSSARO
Gymnocladus dioica	Kentucky Coffeetree	S2	Threatened	Threatened

Kentucky Coffeetree, *Gymnocladus dioica*, grows as a yard tree in a home landscape on the west side of the Eighth Concession about 1,250 m south of Baseline Rd. Several suckers of the older trees on this property grow along the west bank of the Drain. No other SAR as defined above was observed.

Recommendations

- Confining the proposed excavations to the roadbed of the Eighth Concession Road and the east bank of the Eighth Concession Drain should prevent damage to individuals of this Threatened Species and to the habitat (landscaped home grounds) that supports them.

3.0 References

Canadian Council on Animal Care, 2005. CCAC Guidelines on the Care and Use of Fish in Research, Teaching and Testing. ISBN 0-919087-43-4. 86 pp.

Department of Fisheries and Oceans, 1986. The Department of Fisheries and Oceans Policy for the Management of Fish Habitat. Ottawa, Ontario. ISBN 0-662-15034-1. 27 pp.

Department of Fisheries and Oceans, 1999. A Class Authorization System for Agricultural Municipal Drains in the Southern Ontario Region. Fact Sheet L-2. 6 pp.

Department of Fisheries and Oceans Canada 2009 (www.dfo-mpo.gc.ca).

Essex Region Conservation Authority. Regional Fish Survey Records (Sites 1-11).

Government of Ontario, 2007. Bill 184: An act to protect species at risk and to make other related changes to other acts. 51 pp.

Lee, H., W. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. Murray, 1998. Ecological Land Classification for Southern Ontario. Ontario Ministry of Natural Resources. 225 pp.

Minister of Justice, 2009. Fisheries Act, Chapter F-14. http://laws-lois.justice.gc.ca.

Oldham, M.J. 1996. Natural Heritage Resources of Ontario: Rare Vascular Plants. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. 53 pp.

Poos, M.S., Mandrak, N.E. and R.L. McLaughlin, 2007. The Effectiveness of Two Common Sampling Methods for Assessing Imperilled Freshwater Fishes. Journal of Fish Biology 70, pp 691-708.

Portt, C.B., G.A. Coker, N.E. Mandrak and D.L. Ming, 2008. Protocol for the Detection of Fish Species at Risk in Ontario Great Lakes Area (OGLA). Fisheries and Oceans Canada. ISSN 149-3848.

4.0 Appendices

Appendix 1: Herpetefaunal Survey (September-October, 2009)

T. Preney & R. Jones

A reptile and amphibian survey was performed during September and October 2009. All animals encountered were discovered while conducting random searches. The site was visited 14 times and a total of 33 party hours were spent searching in the study area (**Figure 1.**). The survey yielded one species of reptile and one species of amphibian = 2 Butler's Gartersnakes (Thamnophis butleri) and 2 Northern Leopard Frogs (*Rana pipiens*).

Random searches were performed throughout the study area (**Figure 1.**). The monitoring was completed in the early morning, late afternoon and early evening. Previous experience has shown that these are the optimal periods to find reptiles and amphibians during these months. The random searches focused predominately in open meadow habitat.

Butler's Gartersnakes are considered a threatened species in Canada, and are also threatened in Ontario. The following tables are species accounts from the 2009 snake survey at the Sandwich South Employment Lands.

Significant Fauna					
Scientific Name	**Common Name**	**GRANK**	**SRANK**	**COSEWIC**	**COSSARO**
Thamnophis butleri	Butler's Gartersnake	G4	S2	THR	THR

Reptiles:

Surveyor(s): Tom Preney, Russ Jones **Field Date(s) month/day/year: 09/08/2009, 09/09/2009, 09/10/2009, 09/13/2009, 09/14/2009, 09/15/2009, 09/16/2009, 09/21/2009, 09/23/2009, 09/24/2009, 09/26/2009, 09/27/2009, 10/01/2009, 10/02/2009**					
Common Name	**Evidence/# Individuals**	**GRANK**	**SRANK**	**COSEWIC**	**COSSARO**
Butler's Gartersnake	2 individuals	G4	S2	THR	THR

Amphibians:

Surveyor(s): Tom Preney, Russ Jones **Field Date(s): 09/08/2009, 09/09/2009, 09/10/2009, 09/13/2009, 09/14/2009, 09/15/2009, 09/16/2009, 09/21/2009, 09/23/2009, 09/24/2009, 09/26/2009, 09/27/2009, 10/01/2009, 10/02/2009**					
Common Name	**Evidence/# Individuals**	**GRANK**	**SRANK**	**COSEWIC**	**COSSARO**
Northern Leopard Frog	2 Individuals	G5	S5	NAR	NAR

Figure 1. The sections outlined in red are the survey locations where random searches were conducted during September and October 2009.

Figure 2. BGS= Location of the two adult Butler's Gartersnakes encountered during the survey.

Appendix 2: Surveys for Butler's Gartersnake (*Thamnophis butleri*) at Windsor Airport

J. Choquette & D. Noble

The purpose of this survey was to confirm the presence of Butler's Gartersnake (*Thamnophis butleri*), a Threatened species, and its habitat, and to obtain morphological and genetic data for the preparation of the COSEWIC Status Report update on this species.

No Butler's Gartersnakes were found during the surveys however suitable habitat was identified. A list of survey dates and observations of other reptile and amphibian species are provided in this report. Total search effort spent in the area was 21.75 hours (Windsor Airport grounds =14.0; Adjacent lands= 7.75).

Results of 2009 Snake Surveys for Butler's Gartersnake (*Thamnophis butleri*)

Table 1- Survey details for Windsor Airport grounds, 2009.

Survey Date	Location	Weather	Survey Time (hours)	Search Effort (hours)	Observations
May 12, 2009, 11:00	East end of grounds including the perimeter of Provincially Significant Wetlands	sunny, few clouds, light wind, 22C	3.0	6.0	• 1 snake seen but not identified in junk pile • 1 American Toad found at edge of farm field. • Cover objects were laid out (Shingles as well as existing wood and tin)
May 25, 2009, 11:00	Survey of cover objects in east end of grounds (2.0h). Survey of infield adjacent runways (1.0h)	sunny, few clouds, light wind, 21.5C	3.0	6.0	• No snakes seen • 2 Snapping Turtles found in swale. (carapace lengths = 24.5 cm and 23.5 cm)
May 29, 2009, 20:30	Survey of cover objects in east end of grounds	Clear, 19C	1.0	2.0	• No snakes seen • Cover objects removed from site (Shingles) • Cover objects left on site include: boards at junk pile and tins at shooting range.

Figure 1- Survey locations for Windsor Airport and adjacent lands, 2009. SG = Survey area where shingle grids were laid, SA= Survey area where cover objects were not laid.

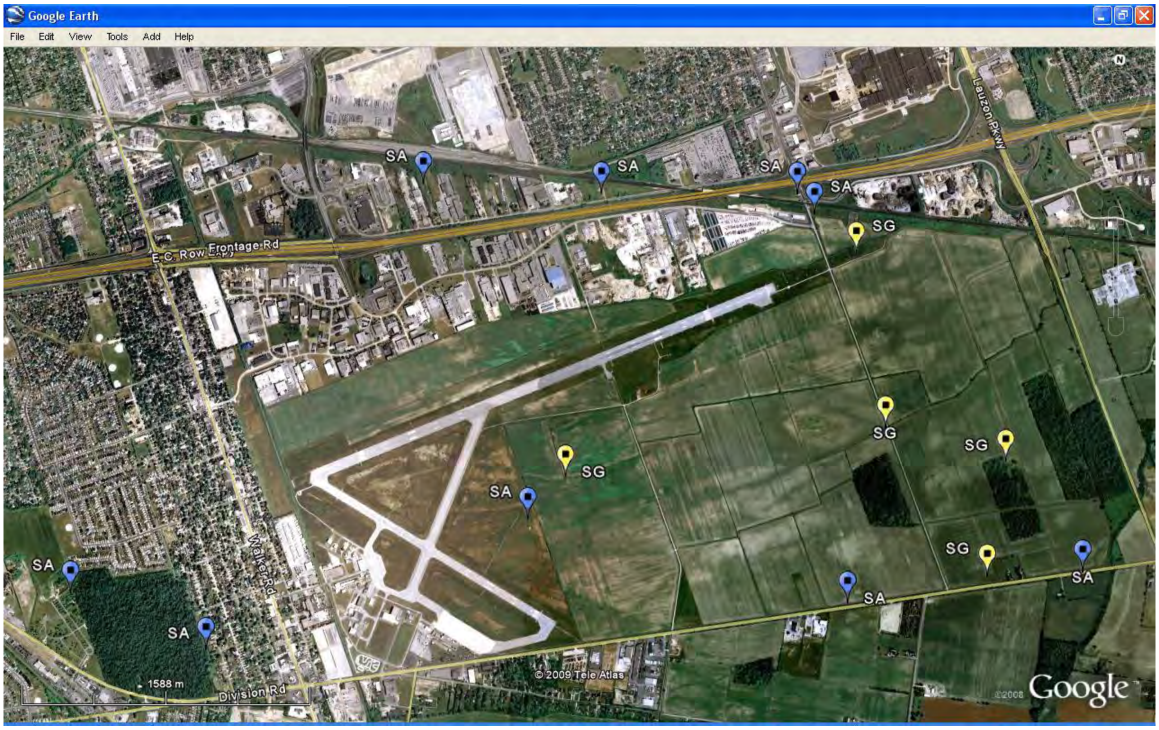


Table 2- Survey details for lands adjacent Windsor Airport, 2009.

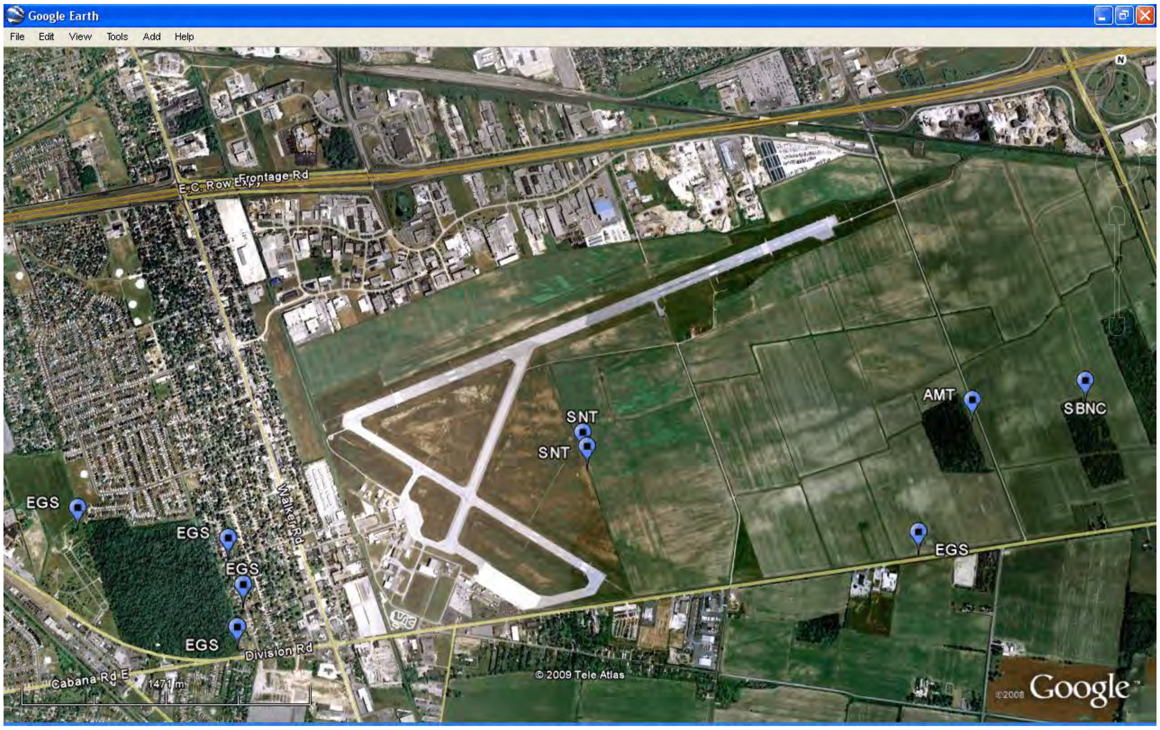
Survey Date	Location	Weather	Survey Time (hours)	Search Effort (man-hours)	Observations
May 1, 2009, 17:30	West perimeter of Devonwood Conservation Area. Windsor Memorial Cemetery property.	No data	0.75	1.5	• 1 Eastern Gartersnake (EGS) found under concrete piece in area of cemetery expansion
May 5, 2009, 17:30	East Perimeter of Devonwood Conservation Area	20C	1.0	2.0	• 7 EGS found. Many were found under rocks in the deep ditches of the subdivision adjacent Devonwood
May 12, 2009, 14:40	Swale alongside Hwy 42 adjacent to the south boundary of Windsor Airport.	sunny, with clear skies and few clouds, cool breeze,	1.0	2.0	• 1 EGS found under concrete at mouth of culvert

		22C			
May 25, 2009, 13:30	North Service Rd, Hydro Corridor	sunny, few clouds, light wind, 21.5C	0.25	0.5	• No snakes seen
May 25, 2009, 14:00	Private Residence, 3936 North Service Rd.	sunny, few clouds, light wind, 21.5C	0.5	1.5	• No snakes seen • Checked the railway corridor also • 3 observers present
May 29, 2009, 20:30	Hydro corridor adjacent to the North boundary of the Airport	Clear, 19C	0.25	0 .25	• No snakes seen • 1 observer present

Table 3- Reptiles and Amphibians encountered at Windsor Airport and vicinity during surveys for Butler's Gartersnake, 2009.

Species	**Numbers Observed**
Butler's Gartersnake (*Thamnophis butleri*)	*0*
Eastern Gartersnake (*Thamnophis sirtalis*)	*9*
Common Snapping Turtle (*Chelydra serpentina)*	*2*
American Toad (*Bufo americanus*)	*1*

Figure 2- Reptile and Amphibian species encountered during surveys of Windsor Airport and vicinity, 2009. EGS = Eastern Gartersnake, SNT = Common Snapping Turtle, AMT = American Toad, SBNC = Snake seen but not caught.



Habitat Notes and Management Recommendations

Butler's Gartersnakes (BGS) inhabit seasonally mowed cultural meadows, tallgrass prairie, and vacant urban lands. They have also been observed by the authors in sandy, dune-like habitats and along rocky shorelines of large water bodies. They feed almost exclusively on earthworms and are speculated to use either crayfish burrows or ant mounds or both as hibernacula. Despite the persistence of a few grassy meadow habitats at the Windsor Airport and an abundance of meadow crayfish holes, the majority of the property is currently under intensive agriculture, which is likely hostile to Butler's Gartersnake.The large patch of Scrubland habitat which existed on the property during Dr. Planck's study in 1977 supported a population of approximately 300 BGS. This habitat was destroyed in the early 1980s and was slowly converted to agriculture. The authors were unable to find any BGS during their surveys at Windsor Airport and adjacent lands. If there in fact are no more BGS at the Windsor Airport, we speculate the latter was the major cause of extirpation. Due to the continued presence of seasonally mowed cultural meadows and what appears to be a healthy meadow crayfish population BGS may still persist at the Windsor Airport, although at much lower concentrations than in 1977.

APPENDIX G

Hydrogeology

TABLE 1 - MONTHLY WATER BALANCE
Windsor Annexed Area - Pre-Development

Monthly Water Balance Analysis
Upper Little River EA
Existing Conditions

Sub-Area 1 Urban Lawn, Clay, Flat to Rolling
Sub-Area 2 Urban Lawn, Clay Loam, Flat to Rolling
Sub-Area 3 Moderately Rooted Crops, Clay, Flat to Rolling
Sub-Area 4 Moderately Rooted Crops, Clay Loam, Flat to Rolling
Sub-Area 5 Moderately Rooted Crops, Loam, Rolling
Sub-Area 6 Mature Forest, Clay, Flat to Rolling
Sub-Area 7 Mature Forest, Clay Loam, Flat to Rolling

Land Description Factors	Sub-Area 1	Sub-Area 2	Sub-Area 3	Sub-Area 4	Sub-Area 5	Sub-Area 6	Sub-Area 7	
Topography	0.21	0.26	0.22	0.26	0.20	0.30	0.28	
Soils	0.1	0.15	0.1	0.15	0.2	0.1	0.15	
Cover	0.05	0.05	0.1	0.1	0.1	0.2	0.2	
Sum (Infiltration Factor)	0.36	0.46	0.42	0.51	0.50	0.60	0.63	
Soil Moisture Capacity (mm)	75	100	150	200	200	350	400	
Area (ha)	560.9	704.4	2351.1	681.5	44.2	80.1	37.3	*4459.5*
Percentage of Total Site Area	12.6%	15.8%	52.7%	15.3%	1.0%	1.8%	0.8%	**100%**
Total Site Area (ha)	4459.5							

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Climate Data (Data from WINDSOR A Station via Environment Canada Website - Climate Normals from 1981-2010)													
Average Daily Temperature (°C)	-3.8	-2.6	2.3	8.9	15	20.5	23	22	17.9	11.3	5.1	-1.2	
Precipitation (mm)	62.1	62.2	70	83	89.3	86.1	89.2	72.6	93.9	72.6	79.6	74.1	**934.7**
Evapotranspiration Analysis													
Saturation Vapour Pressure (mb)	4.61	5.04	7.21	11.42	17.09	24.18	28.18	26.52	20.56	13.41	8.79	5.60	
PET (Malstrom, 1969) (mm/month)	0.00	0.00	29.50	46.71	69.90	98.90	115.25	108.45	84.09	54.86	35.96	0.00	**643.6**
Precipitation - PET (mm)	62.10	62.20	40.50	36.29	19.40	-12.80	-26.05	-35.85	9.81	17.74	43.64	74.10	
Weighted Soil Storage Capacity (mm)	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	146.49	
Actual Soil Moisture (mm)	146.49	146.49	146.49	146.49	146.49	133.69	107.64	71.79	81.60	99.34	142.98	146.49	
Change in Soil Moisture (mm)	0.00	0.00	0.00	0.00	0.00	-12.80	-26.05	-35.85	9.81	17.74	43.64	3.52	
Actual Evapotranspiration (mm)	**0.00**	**0.00**	**29.50**	**46.71**	**69.90**	**98.90**	**115.25**	**108.45**	**84.09**	**54.86**	**35.96**	**0.00**	**643.6**
Recharge/Runoff Analysis													
Surplus	62.1	62.2	40.5	36.3	19.4	0.0	0.0	0.0	0.0	0.0	0.0	70.6	**291.1**
Deficit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Weighted Infiltration Factor	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	0.439	
Runoff (mm)	**34.85**	**34.90**	**22.72**	**20.37**	**10.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**39.61**	**163.3**
Recharge (mm)	**0.00**	**0.00**	**103.30**	**15.93**	**8.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**127.7**
												Balance Check (should equal zero)	0

Volume-Based Balance (m^3)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation	2,769,374	2,773,834	3,121,678	3,701,418	3,982,369	3,839,664	3,977,910	3,237,626	4,187,508	3,237,626	3,549,794	3,304,519	41,683,320
Evapotranspiration	0	0	1,315,762	2,082,841	3,117,042	4,410,667	5,139,563	4,836,276	3,750,119	2,446,628	1,603,730	0	28,702,630
Runoff	1,554,027	1,556,529	1,013,385	908,260	485,576	0	0	0	0	0	0	1,766,302	7,284,078
Groundwater Recharge	0	0	4,606,544	710,317	379,751	0	0	0	0	0	0	0	5,696,612
												Balance Check (should equal zero)	0

TABLE 2 - MONTHLY WATER BALANCE
Windsor Annexed Area
Post-Development

Monthly Water Balance Analysis
Upper Little River EA
Proposed Conditions

Land Description Factors for Pervious Areas	Sub-Area A	Sub-Area B	Sub-Area C	Sub-Area D	Sub-Area E	Sub-Area F	Sub-Area G	Sub-Area H	Sub-Area I	Sub-Area J	
Topography	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	
Soils	0.1	0.15	0.2	0.1	0.15	0.1	0.15	0.2	0.1	0.15	
Cover	0.05	0.05	0.05	0.05	0.05	0.15	0.15	0.15	0.05	0.05	
Sum (Infiltration Factor)	0.42	0.47	0.52	0.42	0.47	0.52	0.57	0.62	0.42	0.47	
Soil Moisture Capacity (mm)	150	100	125	150	100	200	250	250	150	100	
Percent Impervious (Assumed)	90%	90%	90%	80%	80%	5%	5%	5%	50%	50%	
Area (ha)	261.8	46.7	2.0	1006.1	510.5	637.9	203.8	1.5	1086.3	702.8	4459.5
Impervious Area (ha)	236	42	2	805	408	32	10	0	543	351	2429.5
Pervious Area (ha)	26	5	0	201	102	606	194	1	543	351	2030.1
Percentage of Total Pervious Area	1.3%	0.2%	0.0%	9.9%	5.0%	29.9%	9.5%	0.1%	26.8%	17.3%	**100%**

Total Pervious Area (ha)	2030.1	46%
Total Impervious Area (ha)	2429.5	54%
Total Site Area (ha)	4459.5	

Land Cover Descriptions

Sub-Area A Commerical with Urban Lawn, Clay, Rolling to Hilly
Sub-Area B Commercial with Urban Lawn, Clay Loam/Clay Sand, Rolling to Hilly
Sub-Area C Commercial with Urban Lawn, Loam, Rolling to Hilly
Sub-Area D Mixed Use (Urban Lawn), Clay, Rolling to Hilly
Sub-Area E Mixed Use (Urban Lawn), Clay Loam/Clay Sand, Rolling to Hilly
Sub-Area F Natural Environment (Pasture and Shrubs), Clay, Rolling to Hilly
Sub-Area G Natural Environment (Pasture and Shrubs), Clay Loam/Clay Sand, Rolling to Hilly
Sub-Area H Natural Environment (Pasture and Shrubs), Loam, Rolling to Hilly
Sub-Area I Residential with Urban Lawn, Clay, Rolling to Hilly
Sub-Area J Residential with Urban Lawn, Clay Loam/Clay Sand, Rolling to Hilly

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Climate Data (Data from Waterloo Wellington Airport Station via Environment Canada Website - Climate Normals from 1981-2010)													
Average Daily Temperature (°C)	-3.8	-2.6	2.3	8.9	15	20.5	23	22	17.9	11.3	5.1	-1.2	
Precipitation (mm)	62.1	62.2	70	83	89.3	86.1	89.2	72.6	93.9	72.6	79.6	74.1	**934.7**
Evapotranspiration Analysis - Pervious Areas													
Saturation Vapour Pressure (mb)	4.6	5.0	7.2	11.4	17.1	24.2	28.2	26.5	20.6	13.4	8.8	5.6	
PET (Malstrom, 1969) (mm/month)	0.0	0.0	29.5	46.7	69.9	98.9	115.2	108.4	84.1	54.9	36.0	0.0	**643.6**
Precipitation - PET (mm)	62.1	62.2	40.5	36.3	19.4	-12.8	-26.0	-35.8	9.8	17.7	43.6	74.1	
Weighted Soil Storage Capacity (mm)	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	163.2	
Actual Soil Moisture (mm)	163.2	163.2	163.2	163.2	163.2	150.4	124.4	88.5	98.4	116.1	159.7	163.2	
Change in Soil Moisture (mm)	0.0	0.0	0.0	0.0	0.0	-12.8	-26.0	-35.8	9.8	17.7	43.6	3.5	
Actual Evapotranspiration (mm)	**0.0**	**0.0**	**29.5**	**46.7**	**69.9**	**98.9**	**115.2**	**108.4**	**84.1**	**54.9**	**36.0**	**0.0**	**643.6**
Recharge/Runoff Analysis - Pervious Areas													
Surplus	62.1	62.2	40.5	36.3	19.4	0.0	0.0	0.0	0.0	0.0	0.0	70.6	**291.1**
Deficit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Weighted Infiltration Factor	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Runoff (mm)	**32.6**	**32.6**	**21.2**	**19.0**	**10.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**37.0**	**152.6**
Recharge (mm)	**0.0**	**0.0**	**111.9**	**17.3**	**9.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**138.4**

Balance Check (should equal zero) 0

Recharge/Runoff Analysis - Impervious Areas	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation	62.1	62.2	70.0	83.0	89.3	86.1	89.2	72.6	93.9	72.6	79.6	74.1	**934.7**
Runoff (mm)	**62.1**	**62.2**	**70.0**	**83.0**	**89.3**	**86.1**	**89.2**	**72.6**	**93.9**	**72.6**	**79.6**	**74.1**	**934.7**
Recharge (mm)	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Site-Wide Volume-Based Balance (m^3)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Year (mm)
Precipitation	2,769,374	2,773,834	3,121,678	3,701,418	3,982,369	3,839,664	3,977,910	3,237,626	4,187,508	3,237,626	3,549,794	3,304,519	41,683,320	**934.7**
Evapotranspiration	0	0	598,961	948,151	1,418,940	2,007,824	2,339,632	2,201,570	1,707,129	1,113,754	730,050	0	13,066,013	**293**
Runoff	2,169,799	2,173,293	2,131,732	2,402,842	2,376,084	2,091,772	2,167,085	1,763,794	2,281,270	1,763,794	1,933,856	2,551,639	25,806,960	**579**
Groundwater Recharge	0	0	2,272,577	350,425	187,345	0	0	0	0	0	0	0	2,810,348	**63**

Balance Check (should equal zero) 0

MOE WELL RECORDS

Well ID	Conc.	Lot	Township	Easting	Northing	Year Built	Casing Diameter (inches)	Water Found (feet)	Static WL (feet)	Pump Test WL (feet)	Pump Rate (IGPM)	Test Time (hrs)	Well Depth (feet)	Well Elevation (ft. AMSL)	Water Found Elevation (ft. AMSL)	Static WL Elevation (ft. AMSL)	Pump Rate m3/d	Pump Rate L/min	Test Time (hrs)	Well Depth (m BGS)	Well Screen Depth (m BGS)	Well Screen Length (m BGS)	Well Elevation (m AMSL)	Water Found Elevation (m AMSL)	Static WL Elevation (m AMSL)	Test Water Elevation (m AMSL)	Water Level Drawdown (m)	Height of Water Static (m)	Height of Water Test (m)	Specific Capacity m3/d/m	Specific Capacity L/min/m
21-02684	3	95	Sandwich East	337420	4680670	1949	4	149	35		6	3.0	149	625	476	590	39.3	27.3		45.4			190.5	145.1	179.8			34.7			
21-02685	3	95	Sandwich East	337280	4680660	1957	10	145	32	108	154	8.0	192	620	475	588	1008.1	700.1		58.5			189.0	144.8	179.2	146.3	23.2	48.8	25.6	43.5	30.2
21-02686	3	96	Sandwich East	337525	4680670	1949	4	140	24		6	5.0	140	625	485	601	39.3	27.3		42.7			190.5	147.8	183.2			35.4			
21-02687	3	96	Sandwich East	336960	4680910	1952	2	144	28	32	4		144	620	476	592	26.2	18.2		43.9			189.0	145.1	180.4	170.7	1.2	35.4	34.1	21.5	14.9
21-02688	3	110	Sandwich East	338865	4683180	1960	4						191	614						58.2			187.1								
21-02689	3	111	Sandwich East	339880	4681250	1950	2	218	15	20	3		219	610	392	595	19.6	13.6		66.8			185.9	119.5	181.4	175.3	1.5	62.2	60.7	12.9	8.9
21-02690	3	136	Sandwich East	342385	4682810	1962	3	130	10	25	10	4.0	130	600	470	590	65.5	45.5		39.6			182.9	143.3	179.8	172.2	4.6	36.6	32.0	14.3	9.9
21-02691	3	140	Sandwich East	343360	4682035	1952	2	139	7				139	600	461	593				42.4			182.9	140.5	180.7			40.2			
21-02700	5	6	Sandwich South	336360	4675090	1967	4	120	25	30	10	1.0	120	615	495	590	65.5	45.5	1.0	36.6			187.5	150.9	179.8	170.7	1.5	29.0	27.4	43.0	29.8
21-02702	5	8	Sandwich South	335275	4676370	1949	2	114	22		6	4.0	114	620	506	598	39.3	27.3	4.0	34.7			189.0	154.2	182.3			28.0			
21-02703	5	7	Sandwich South	335145	4676410	1949	4	108	21		6	3.0	108	610	502	589	39.3	27.3	3.0	32.9			185.9	153.0	179.5			26.5			
21-02704	5	7	Sandwich South	336230	4675000	1963	3	113	29	40	4	3.0	113	620	507	591	26.2	18.2	3.0	34.4			189.0	154.5	180.1	167.9	3.4	25.6	22.3	7.8	5.4
21-02705	5	7	Sandwich South	336330	4676010	1963	4	116	33	45	5	2.0	116	620	504	587	32.7	22.7	2.0	35.4			189.0	153.6	178.9	165.2	3.7	25.3	21.6	8.9	6.2
21-02706	5	13	Sandwich South	336240	4678615	1950	2	142	30	35	4		142	610	468	580	26.2	18.2		43.3			185.9	142.6	176.8	166.1	1.5	34.1	32.6	17.2	11.9
21-02707	5	13	Sandwich South	336595	4678710	1951	3	147	35				147	610	463	575				44.8			185.9	141.1	175.3			34.1			
21-02708	5	13	Sandwich South	336620	4678740	1964	3	135	35	70	4	3.0	135	610	475	575	26.2	18.2		41.1			185.9	144.8	175.3	153.9	10.7	30.5	19.8	2.5	1.7
21-02709	5	15	Sandwich South	335520	4680030	1953	4	134	26	26	4	4.0	134	610	476	584	26.2	18.2		40.8			185.9	145.1	178.0	170.1	0.0	32.9	32.9		
21-02710	5	15	Sandwich South	336555	4680310	1959	3	138	30	85	4	5.0	142	620	482	590	26.2	18.2		43.3			189.0	146.9	179.8	153.9	16.8	34.1	17.4	1.6	1.1
21-02711	5	15	Sandwich South	336540	4680340	1959	3	158	28	100	4	3.0	160	620	462	592	26.2	18.2		48.8			189.0	140.8	180.4	150.0	21.9	40.2	18.3	1.2	0.8
21-02712	5	16	Sandwich South	336680	4680340	1951	4	180	35				180	620	440	585				54.9			189.0	134.1	178.3			44.2			
21-02717	6	6	Sandwich South	337760	4675185	1964	3	320	30	45	5	3.0	121	620	300	590	32.7	22.7	3.0	36.9			189.0	91.4	179.8	166.1	4.6	27.7	23.2	7.2	5.0
21-02719	6	7	Sandwich South	337745	4675500	1956	3	117	42	45	6		117	620	503	578	39.3	27.3		35.7			189.0	153.3	176.2	162.5	0.9	22.9	21.9	43.0	29.8
21-02720	6	13	Sandwich South	337995	4678870	1955	3	142	38	39	11	1.5	142	625	483	587	72.0	50.0		43.3			190.5	147.2	178.9	167.0	0.3	31.7	31.4	236.2	164.1
21-02721	6	14	Sandwich South	337670	4679450	1956	3	154	40	50	2	2.0	154	620	466	580	13.1	9.1		46.9			189.0	142.0	176.8	161.5	3.0	34.7	31.7	4.3	3.0
21-02722	6	15	Sandwich South	337980	4679620	1952	2	152	30		1		153	620	468	590	6.5	4.5		46.6			189.0	142.6	179.8			37.5			
21-02723	6	15	Sandwich South	337410	4680240	1954	2		30	32	4	2.5	140	620		590	26.2	18.2		42.7			189.0		179.8	170.1	0.6	33.5	32.9	43.0	29.8
21-02724	6	15	Sandwich South	337330	4679720	1955	3	167	30	40	6	0.5	167	625	458	595	39.3	27.3		50.9			190.5	139.6	181.4	169.2	3.0	41.8	38.7	12.9	8.9
21-02725	6	15	Sandwich South	336900	4680330	1956	3	145	28	40	8		152	625	480	597	52.4	36.4		46.3			190.5	146.3	182.0	169.8	3.7	37.8	34.1	14.3	9.9
21-02726	6	15	Sandwich South	337700	4679605	1957	5	153	65	70	6	6.0	153	620	467	555	39.3	27.3		46.6			189.0	142.3	169.2	147.8	1.5	26.8	25.3	25.8	17.9
21-02727	6	16	Sandwich South	337340	4680520	1950	3	140	32	32	6		150	625	485	593	39.3	27.3		45.7			190.5	147.8	180.7	171.0	0.0	36.0	36.0		
21-02728	6	16	Sandwich South	337120	4680520	1950	4	147	35		7	3.0	147	625	478	590	45.8	31.8		44.8			190.5	145.7	179.8			34.1			
21-02729	6	16	Sandwich South	337640	4680610	1951	4	165	35				165	625	460	590				50.3			190.5	140.2	179.8			39.6			
21-02730	6	16	Sandwich South	337605	4680620	1953	4		32	33	3	3.0	156	625		593	19.6	13.6		47.5			190.5		180.7	170.7	0.3	37.8	37.5	64.4	44.7
21-02737	7	6	Sandwich South	338925	4675050	1959	4	123	40	60	12	3.5	125	625	502	585	78.6	54.6	3.5	38.1			190.5	153.0	178.3	160.0	6.1	25.9	19.8	12.9	8.9
21-02738	6	7	Sandwich South	336625	4675900	1954	3	117	30	45	5	1.0	117	620	503	590	32.7	22.7	1.0	35.7			189.0	153.3	179.8	166.1	4.6	26.5	21.9	7.2	5.0
21-02738	7	12	Sandwich South	339300	4678070	1958	3	135	40	42	4	2.0	135	620	485	580	26.2	18.2	2.0	41.1			189.0	147.8	176.8	164.0	0.6	29.0	28.3	43.0	29.8
21-02739	7	12	Sandwich South	338000	4678000	1965	4	122	40	50	6	3.0	122	625	503	585	39.3	27.3	3.0	37.2			190.5	153.3	178.3	163.1	3.0	25.0	21.9	12.9	8.9
21-02740	7	13	Sandwich South	339300	4678310	1959	3	100	40	60	4	8.0	101	620	520	580	26.2	18.2	8.0	30.8			189.0	158.5	176.8	158.5	6.1	18.6	12.5	4.3	3.0
21-02741	7	13	Sandwich South	338820	4678580	1960	4						63	620						19.2			189.0								
21-02742	7	13	Sandwich South	338825	4678540	1960	4	83	33	35	7	2.0	83	620	537	587	45.8	31.8	2.0	25.3			189.0	163.7	178.9	168.2	0.6	15.2	14.6	75.2	52.2
21-02743	7	13	Sandwich South	338045	4678880	1962	4	130	38	43	8	1.0	130	625	495	587	52.4	36.4	1.0	39.6			190.5	150.9	178.9	165.8	1.5	28.0	26.5	34.4	23.9
21-02744	7	13	Sandwich South	338075	4678590	1964	5	122	38	40	10	5.0	122	625	503	587	65.5	45.5	5.0	37.2			190.5	153.3	178.9	166.7	0.6	25.6	25.0	107.4	74.6
21-02745	7	13	Sandwich South	339260	4678610	1965	8	145	20	60	25	48.0	152	620	475	600	163.7	113.7	48.0	46.3			189.0	144.8	182.9	164.6	12.2	40.2	28.0	13.4	9.3
21-02746	7	13	Sandwich South	338020	4678430	1967	4	113	35	65	5	3.0	114	628	515	593	32.7	22.7	3.0	34.7			191.4	157.0	180.7	160.9	9.1	24.1	14.9	3.6	2.5
21-02747	7	15	Sandwich South	339440	4679880	1956	4	140	20	40	5	24.0	145	620	480	600	32.7	22.7	24.0	44.2			189.0	146.3	182.9	170.7	6.1	38.1	32.0	5.4	3.7
21-02748	7	15	Sandwich South	338120	4679815	1959	3	166	80	170	1	2.0	178	620	454	540	6.5	4.5		54.3			189.0	138.4	164.6	112.8	27.4	29.9	2.4	0.2	0.2
21-02749	7	15	Sandwich South	338140	4679815	1959	3	160	10	130	4	2.0	160	620	460	610	26.2	18.2		48.8			189.0	140.2	185.9	146.3	36.6	45.7	9.1	0.7	0.5
21-02750	7	15	Sandwich South	338120	4679900	1960	3	210	35	100	2	2.0	213	620	410	585	13.1	9.1		64.9			189.0	125.0	178.3	147.8	19.8	54.3	34.4	0.7	0.5
21-02751	7	16	Sandwich South	338190	4680710	1954	2	183	24	26	5	3.0	183	622	439	598	32.7	22.7	3.0	55.8			189.6	133.8	182.3	174.3	0.6	48.5	47.9	53.7	37.3
21-02752	7	16	Sandwich South	338165	4680470	1954	2	162	25	27	4	2.0	162	620	458	595	26.2	18.2	2.0	49.4			189.0	139.6	181.4	173.1	0.6	41.8	41.1	43.0	29.8
21-02753	7	16	Sandwich South	339445	4679880	1964	5	130	20	45	6	3.0	130	620	490	600	39.3	27.3	3.0	39.6			189.0	149.4	182.9	169.2	7.6	33.5	25.9	5.2	3.6
21-02754	7	16	Sandwich South	339470	4680145	1966	4	155	28	120	3	2.0	180	620	465	592	19.6	13.6	2.0	54.9			189.0	141.7	180.4	143.9	28.0	46.3	18.3	0.7	0.5
21-02755	7	16	Sandwich South	339450	4680100	1967	4	148	40	70	4	4.0	150	620	472	580	26.2	18.2	4.0	45.7			189.0	143.9	176.8	155.4	9.1	33.5	24.4	2.9	2.0
21-02756	7	17	Sandwich South	338220	4680760	1952	2						165	622						50.3			189.6								
21-02757	7	17	Sandwich South	338800	4680790	1957	4	110	15	60	2		129	620	510	605	13.1	9.1		39.3			189.0	155.4	184.4	166.1	13.7	34.7	21.0	1.0	0.7
21-02765	8	11	Sandwich South	340165	4677220	1955	2	104	32	35	2	2.0	105	620	516	588	13.1	9.1	2.0	32.0			189.0	157.3	179.2	168.6	0.9	22.3	21.3	14.3	9.9
21-02766	8	11	Sandwich South	340330	4677220	1965	4	112	32	80	1	3.0	124	620	508	588	6.5	4.5	3.0	37.8			189.0	154.8	179.2	154.8	14.6	28.0	13.4	0.4	0.3
21-02767	8	12	Sandwich South	339310	4677660	1947	3	99	30		4	2.5	99	624	525	594	26.2	18.2	2.5	30.2			190.2	160.0	181.1			21.0			
21-02768	8	12	Sandwich South	339865	4677830	1960	4	107	15	50	6	2.0	107	620	513	605	39.3	27.3	2.0	32.6			189.0	156.4	184.4	169.2	10.7	28.0	17.4	3.7	2.6
21-02769	8	12	Sandwich South	339370	4677770	1963	4	96	35	60	5	3.0	97	624	528	589	32.7	22.7	3.0	29.6			190.2	160.9	179.5	161.2	7.6	18.9	11.3	4.3	3.0
21-02770	8	12	Sandwich South	339900	4677820	1964	4	109	20	50	8	3.0	109	620	511	600	52.4	36.4	3.0	33.2			189.0	155.8	182.9	167.6	9.1	27.1	18.0	5.7	4.0
21-02771	8	14	Sandwich South	340725	4679110	1952	4	158	9	30	5		158	620	462	611	32.7	22.7		48.2			189.0	140.8	186.2	177.1	6.4	45.4	39.0	5.1	3.6
21-02772	8	14	Sandwich South	339460	4678850	1955	3	82	27	30	6	0.5	82	620	538	593	39.3	27.3	0.5	25.0			189.0	164.0	180.7	171.6	0.9	16.8	15.8	43.0	29.8
21-02773	8	14	Sandwich South	340625	4679105	1956	3	132	20	26	8		139	620	488	600	52.4	36.4		42.4			189.0	148.7	182.9	175.0	1.8	36.3	34.4	28.6	19.9
21-02774	8	14	Sandwich South	339480	4679370	1967	4	153	42	45	8	1.0	155	620	467	578	52.4	36.4		47.2			189.0	142.3	176.2	162.5	0.9	34.4	33.5	57.3	39.8
21-02775	8	15	Sandwich South	340065	4680000	1960	3	115	12	27	10	1.0	116	620	505	608	65.5	45.5		35.4			189.0	153.9	185.3	177.1	4.6	31.7	27.1	14.3	9.9
21-02776	8	15	Sandwich South	340215	4680000	1960	3	130	20	65	4	5.0	137	615	485	595	26.2	18.2		41.8			187.5	147.8	181.4	161.5	13.7	35.7	21.9	1.9	1.3
21-02777	8	15	Sandwich South	339740	4680135	1960	4	130	20	45	10	2.0	131	620	490	600	65.5	45.5		39.9			189.0	149.4	182.9	169.2	7.6	33.8	26.2	8.6	6.0
21-02778	8	16	Sandwich South	339595	4680470	1956	4	130	30	35	20	12.0	131	615	485	585	130.9	90.9		39.9			187.5	147.8	178.3	167.6	1.5	30.8	29.3	85.9	59.7
21-02779	8	16	Sandwich South	339585	4680550	1964	5		20	125	10	2.0	136	615		595	65.5	45.5		41.5			187.5		181.4	143.3	32.0	35.4	3.4	2.0	1.4
21-02780	8	16	Sandwich South	340810	4680220	1966	4	154	38	60	4	4.0	156	610	456	572	26.2	18.2		47.5			185.9	139.0	174.3	156.1	6.7	36.0	29.3	3.9	2.7
21-02781	8	16	Sandwich South	340800	4680130	1966	4	138	25	35	5	4.0	140	610	472	585	32.7	22.7		42.7			185.9	143.9	178.3	167.6	3.0	35.1	32.0	10.7	7.5
21-02787	9	11	Sandwich South	340640	4677060	1956	3	310	30	30	6	4.0	110	620	310	590	39.3	27.3		33.5			189.0	94.5	179.8	170.7	0.0	24.4	24.4		
21-02788	9	12	Sandwich South	340760	4677490	1952	3	127	8	8	5	4.0	127	620	493	612	32.7	22.7		38.7			189.0	150.3	186.5	184.1	0.0	36.3	36.3		
21-02789	9	13	Sandwich South	342025	4678040	1956	3	132	25	25	8	4.0	132	620	488	595	52.4	36.4		40.2			189.0	148.7	181.4	173.7	0.0	32.6	32.6		
21-02790	9	13	Sandwich South	342000	4678100	1958	4	145	40	45	4	2.5	145	620	475	580	26.2	18.2		44.2			189.0	144.8	176.8	163.1	1.5	32.0	30.5	17.2	11.9
21-02791	9	14	Sandwich South	342080	4679025	1960	4	151	20	100	2	2.0	155	610	459	590	13.1	9.1		47.2			185.9	139.9	179.8	149.4	24.4	41.1	16.8	0.5	0.4
21-02792	9	16	Sandwich South	340990	4680040	1955	3	128	25	40	6	2.0	128	610	482	585	39.3	27.3		39.0			185.9	146.9	178.3	166.1	4.6	31.4	26.8	8.6	6.0
21-02793	9	16	Sandwich South	341900	4680160	1964	7	119	21	80	1	6.0	119	610	491	589	6.5	4.5		36.3			185.9	149.7	179.5	155.1	18.0	29.9	11.9	0.4	0.3
21-02794	9	16	Sandwich South	343900	4680160	1964	4						175	610						53.3			185.9								
21-02795	9	19	Sandwich South	342300	4681620	1950	3	118	15		7		116	600	482	585	45.8	31.8		35.4			182.9	146.9	178.3			30.8			

MOE WELL RECORDS

Well ID	Conc.	Lot	Township	Easting	Northing	Year Built	Casing Diameter (inches)	Water Found (feet)	Static WL (feet)	Pump Test WL (feet)	Pump Rate (IGPM)	Test Time (hrs)	Well Depth (feet)	Well Elevation (ft. AMSL)	Water Found Elevation (ft. AMSL)	Static WL Elevation (ft. AMSL)	Pump Rate m3/d	Pump Rate L/min	Test Time (hrs)	Well Depth (m BGS)	Well Screen Depth (m BGS)	Well Screen Length (m BGS)	Well Elevation (m AMSL)	Water Found Elevation (m AMSL)	Static WL Elevation (m AMSL)	Test Water Elevation (m AMSL)	Water Level Drawdown (m)	Height of Water Static (m)	Height of Water Test (m)	Specific Capacity m3/d/m	Specific Capacity L/min/m
21-02808	10	10	Sandwich South	342880	4676300	1964	3						110	620						33.5			189.0								
21-02809	10	10	Sandwich South	342885	4676340	1964	3	110	28	33	8	3.0	110	620	510	592	52.4	36.4		33.5			189.0	155.4	180.4	170.4	1.5	25.0	23.5	34.4	23.9
21-02810	10	10	Sandwich South	342000	4676780	1967	4	117	27	30	10	1.0	117	620	503	593	65.5	45.5		35.7			189.0	153.3	180.7	171.6	0.9	27.4	26.5	71.6	49.7
21-02811	10	10	Sandwich South	342960	4676250	1967	4	110	30	40	10	2.5	111	620	510	590	65.5	45.5		33.8			189.0	155.4	179.8	167.6	3.0	24.7	21.6	21.5	14.9
21-02812	10	12	Sandwich South	342100	4678020	1963	3	135	20	30	4	2.0	135	615	480	595	26.2	18.2		41.1			187.5	146.3	181.4	172.2	3.0	35.1	32.0	8.6	6.0
21-02814	10	13	Sandwich South	342070	4678030	1956	3	167	30				170	615	448	585				51.8			187.5	136.6	178.3			42.7			
21-02815	10	13	Sandwich South	342125	4678590	1958	3	135	20	25	6	3.0	136	615	480	595	39.3	27.3		41.5			187.5	146.3	181.4	173.7	1.5	35.4	33.8	25.8	17.9
21-02816	10	15	Sandwich South	342215	4679160	1966	4	155	50	160	0	3.0	160	610	455	560				48.8			185.9	138.7	170.7	121.9	33.5	33.5	0.0		
21-02817	10	16	Sandwich South	343100	4680280	1954	2	145	16	20	6	2.0	146	610	465	594	39.3	27.3		44.5			185.9	141.7	181.1	175.0	1.2	39.6	38.4	32.2	22.4
21-02818	10	19	Sandwich South	342340	4681600	1950	2	118	15	20	5		119	602	484	587	32.7	22.7		36.3			183.5	147.5	178.9	172.8	1.5	31.7	30.2	21.5	14.9
21-02819	10	19	Sandwich South	342590	4681640	1950	2	124	12	16	5		124	602	478	590	32.7	22.7		37.8			183.5	145.7	179.8	175.0	1.2	34.1	32.9	26.8	18.6
21-02826	11	9	Sandwich South	344180	4675840	1950	2	115	24	30	5		115	620	505	596	32.7	22.7		35.1			189.0	153.9	181.7	172.5	1.8	27.7	25.9	17.9	12.4
21-02827	11	12	Sandwich South	343430	4677380	1955	4	145	26	27	12	2.0	145	610	465	584	78.6	54.6		44.2			185.9	141.7	178.0	169.8	0.3	36.3	36.0	257.7	179.0
21-02828	11	12	Sandwich South	343500	4677850	1952	3	137	23	35	4	4.0	137	610	473	587	26.2	18.2		41.8			185.9	144.2	178.9	168.2	3.7	34.7	31.1	7.2	5.0
21-02829	11	17	Sandwich South	343645	4680340	1952	2	110	7				110	605	495	598				33.5			184.4	150.9	182.3			31.4			
21-02830	11	18	Sandwich South	343700	4681200	1952	2	116	7	12	3		116	604	488	597	19.6	13.6		35.4			184.1	148.7	182.0	178.3	1.5	33.2	31.7	12.9	8.9
21-02831	11	18	Sandwich South	343740	4681100	1965	4	120	30	20	10	3.0	120	604	484	574	65.5	45.5		36.6			184.1	147.5	175.0	168.9	-3.0	27.4	30.5	-21.5	-14.9
21-02833	10	12	Sandwich South	343340	4677850	1967	5	178	40	140	3	2.0	180	610	432	570	19.6	13.6		54.9			185.9	131.7	173.7	131.1	30.5	42.7	12.2	0.6	0.4
21-02860		297	Sandwich South	341905	4675360	1956	3	108	30	30	6	3.0	108	625	517	595	39.3	27.3		32.9			190.5	157.6	181.4	172.2	0.0	23.8	23.8		
21-02861		296	Sandwich South	342230	4675250	1949	4	119	25		5	6.0	119	625	506	600	32.7	22.7		36.3			190.5	154.2	182.9			28.7			
21-02862		296	Sandwich South	342640	4675100	1953	4		25	25	5	4.0	120	625		600	32.7	22.7		36.6			190.5		182.9	175.3	0.0	29.0	29.0		
21-02863		296	Sandwich South	342860	4675060	1953	3	116	30	30	5	3.0	116	625	509	595	32.7	22.7		35.4			190.5	155.1	181.4	172.2	0.0	26.2	26.2		
21-02864		296	Sandwich South	343265	4676060	1954	3	106	25	25	5	3.0	106	602	496	577	32.7	22.7		32.3			183.5	151.2	175.9	168.2	0.0	24.7	24.7		
21-02865		296	Sandwich South	342660	4675090	1957	3	109	24	24	8	4.0	109	625	516	601	52.4	36.4		33.2			190.5	157.3	183.2	175.9	0.0	25.9	25.9		
21-02866		296	Sandwich South	342500	4675145	1967	4	110	25	60	5	2.0	120	625	515	600	32.7	22.7		36.6			190.5	157.0	182.9	164.6	10.7	29.0	18.3	3.1	2.1
21-02867		297	Sandwich South	341825	4675425	1952	3	109	27	27	5		109	625	516	598	32.7	22.7		33.2			190.5	157.3	182.3	174.0	0.0	25.0	25.0		
21-02869		298	Sandwich South	341345	4675570	1953	4	108	35	40	3		112	625	517	590	19.6	13.6		34.1			190.5	157.6	179.8	167.6	1.5	23.5	21.9	12.9	8.9
21-02870		299	Sandwich South	340330	4675960	1948	4	115	35		5	2.0	115	625	510	590	32.7	22.7		35.1			190.5	155.4	179.8			24.4			
21-02871		300	Sandwich South	339840	4676090	1952	3	104	28	104	3		104	625	521	597	19.6	13.6		31.7			190.5	158.8	182.0	150.3	23.2	23.2	0.0	0.8	0.6
21-02872		300	Sandwich South	340090	4675985	1957	4	87	36	55	5	2.0	87	625	538	589	32.7	22.7		26.5			190.5	164.0	179.5	162.8	5.8	15.5	9.8	5.7	3.9
21-02873		300	Sandwich South	340155	4675990	1965	4	84	50	60	6	3.0	86	625	541	575	39.3	27.3		26.2			190.5	164.9	175.3	157.0	3.0	11.0	7.9	12.9	8.9
21-02874		300	Sandwich South	339880	4676085	1966	4	95	36	55	5	10.0	96	625	530	589	32.7	22.7		29.3			190.5	161.5	179.5	162.8	5.8	18.3	12.5	5.7	3.9
21-02875		301	Sandwich South	340420	4677065	1951	3	107	25		6	3.0	107	620	513	595	39.3	27.3		32.6			189.0	156.4	181.4			25.0			
21-02876		301	Sandwich South	340200	4677120	1952	3	90	14	30	10	1.0	90	620	530	606	65.5	45.5		27.4			189.0	161.5	184.7	175.6	4.9	23.2	18.3	13.4	9.3
21-02877		301	Sandwich South	339360	4676280	1966	4	113	27	50	5	4.0	115	625	512	598	32.7	22.7		35.1			190.5	156.1	182.3	167.0	7.0	26.8	19.8	4.7	3.2
21-02878		302	Sandwich South	339580	4677340	1953	2		30	30	4	5.0	104	620		590	26.2	18.2		31.7			189.0		179.8	170.7	0.0	22.6	22.6		
21-02879		303	Sandwich South	337720	4676870	1949	2	138	30		5	5.0	138	628	490	598	32.7	22.7		42.1			191.4	149.4	182.3			32.9			
21-02880		303	Sandwich South	338220	4677040	1950	4	135	35		6	6.0	135	628	493	593	39.3	27.3		41.1			191.4	150.3	180.7			30.5			
21-02881		303	Sandwich South	337815	4677080	1952	4	128	30	30	5		128	628	500	598	32.7	22.7		39.0			191.4	152.4	182.3	173.1	0.0	29.9	29.9		
21-02882		303	Sandwich South	338450	4676520	1952	3	130	30	30	5		130	628	498	598	32.7	22.7		39.6			191.4	151.8	182.3	173.1	0.0	30.5	30.5		
21-02883		303	Sandwich South	337865	4676950	1954	4	140	30	31	5	3.0	140	628	488	598	32.7	22.7		42.7			191.4	148.7	182.3	172.8	0.3	33.5	33.2	107.4	74.6
21-02884		303	Sandwich South	337940	4676970	1955	4	141	44	45	10	2.5	141	628	487	584	65.5	45.5		43.0			191.4	148.4	178.0	164.3	0.3	29.6	29.3	214.8	149.1
21-02885		303	Sandwich South	338310	4676760	1956	3	131	16	23	5	2.0	131	628	497	612	32.7	22.7		39.9			191.4	151.5	186.5	179.5	2.1	35.1	32.9	15.3	10.7
21-02886		303	Sandwich South	337900	4677160	1957	3	139	42	50	3	1.0	139	626	487	584	19.6	13.6		42.4			190.8	148.4	178.0	162.8	2.4	29.6	27.1	8.1	5.6
21-02887		303	Sandwich South	338600	4677690	1960	4	119	37	37	8	3.0	119	624	505	587	52.4	36.4		36.3			190.2	153.9	178.9	167.6	0.0	25.0	25.0		
21-02888		303	Sandwich South	337880	4677000	1961	7	135	38	39	15	2.0	138	628	493	590	98.2	68.2		42.1			191.4	150.3	179.8	167.9	0.3	30.5	30.2	322.2	223.7
21-02889		303	Sandwich South	337980	4676760	1963	5	131	44	47	8	24.0	132	628	497	584	52.4	36.4		40.2			191.4	151.5	178.0	163.7	0.9	26.8	25.9	57.3	39.8
21-02890		303	Sandwich South	337870	4676870	1963	3	141	37	43	12	3.0	141	628	487	591	78.6	54.6		43.0			191.4	148.4	180.1	167.0	1.8	31.7	29.9	43.0	29.8
21-02891		303	Sandwich South	338260	4676750	1963	4	126	39	49	7	3.0	126	628	502	589	45.8	31.8		38.4			191.4	153.0	179.5	164.6	3.0	26.5	23.5	15.0	10.4
21-02892		304	Sandwich South	337940	4677330	1960	4	133	38	50	10	2.0	137	625	492	587	65.5	45.5		41.8			190.5	150.0	178.9	163.7	3.7	30.2	26.5	17.9	12.4
21-02893		304	Sandwich South	337500	4676930	1963	7	145	37	40	30	2.0	150	628	483	591	196.4	136.4		45.7			191.4	147.2	180.1	167.9	0.9	34.4	33.5	214.8	149.1
21-02894		305	Sandwich South	337405	4678120	1954	3	114	30	45	6	2.0	115	620	506	590	39.3	27.3		35.1			189.0	154.2	179.8	166.1	4.6	25.9	21.3	8.6	6.0
21-02895		305	Sandwich South	337190	4678150	1965	4	120	40	50	5	3.0	128	620	500	580	32.7	22.7		39.0			189.0	152.4	176.8	161.5	3.0	26.8	23.8	10.7	7.5
21-02896		306	Sandwich South	336940	4678040	1948	4	133	35		6	3.0	133	620	487	585	39.3	27.3		40.5			189.0	148.4	178.3			29.9			
21-02897		306	Sandwich South	336645	4678400	1956	3	133	34	44	7		133	670	537	636	45.8	31.8		40.5			204.2	163.7	193.9	180.4	3.0	30.2	27.1	15.0	10.4
21-02898		306	Sandwich South	335720	4677520	1967	4	113	28	45	5	4.0	115	610	497	582	32.7	22.7		35.1			185.9	151.5	177.4	163.7	5.2	26.5	21.3	6.3	4.4
21-02899		307	Sandwich South	336275	4678490	1955	3	139	35	40	6	3.0	139	615	476	580	39.3	27.3		42.4			187.5	145.1	176.8	164.6	1.5	31.7	30.2	25.8	17.9
21-02917		296	Sandwich South	342180	4675180	1956	3	112	30	30	8	3.0	112	625	513	595	52.4	36.4		34.1			190.5	156.4	181.4	172.2	0.0	25.0	25.0		
21-02919		298	Sandwich South	341195	4675620	1950	3	117	30		6	3.0	117	625	508	595	39.3	27.3		35.7			190.5	154.8	181.4			26.5			
21-02920		298	Sandwich South	341220	4675490	1966	4	108	34	34	5	1.0	110	628	520	594	32.7	22.7		33.5			191.4	158.5	181.1	170.7	0.0	23.2	23.2		
21-02921		300	Sandwich South	340050	4675900	1951	3	75	12	22	15	3.0	76	625	550	613	98.2	68.2		23.2			190.5	167.6	186.8	180.1	3.0	19.5	16.5	32.2	22.4
21-02922		301	Sandwich South	338880	4676300	1957	3	121	35	38	6	1.0	123	625	504	590	39.3	27.3		37.5			190.5	153.6	179.8	168.2	0.9	26.8	25.9	43.0	29.8
21-02923		302	Sandwich South	338200	4676325	1949	4	131	38		6	3.0	131	625	494	587	39.3	27.3		39.9			190.5	150.6	178.9			28.3			
21-02924		303	Sandwich South	337920	4676580	1950	2	127	35				127	628	501	593				38.7			191.4	152.7	180.7			28.0			
21-02925		302	Sandwich South	337920	4676240	1951	2		35	40		0.1	127	625		590				38.7			190.5		179.8	167.6	1.5	28.0	26.5		
21-02926		303	Sandwich South	337920	4676390	1951	2		35	40	10		129	625		590	65.5	45.5		39.3			190.5		179.8	167.6	1.5	28.7	27.1	43.0	29.8
21-02927		303	Sandwich South	337680	4676800	1951	2	145	30				145	628	483	598				44.2			191.4	147.2	182.3			35.1			
21-02928		303	Sandwich South	337805	4676300	1952	2	126	28		4		126	625	499	597	26.2	18.2		38.4			190.5	152.1	182.0			29.9			
21-02929		303	Sandwich South	337945	4676480	1952	2	127	25		2	10.0	127	625	498	600	13.1	9.1		38.7			190.5	151.8	182.9			31.1			
21-02930		303	Sandwich South	337985	4676660	1954	3	130	30	32	5	3.0	131	628	498	598	32.7	22.7		39.9			191.4	151.8	182.3	172.5	0.6	30.8	30.2	53.7	37.3
21-02931		303	Sandwich South	337680	4676650	1955	4	130	48	48	10	2.5	133	628	498	580	65.5	45.5		40.5			191.4	151.8	176.8	162.2	0.0	25.9	25.9		
21-02932		303	Sandwich South	337950	4676460	1956	3	133	43	43	5		133	625	492	582	32.7	22.7		40.5			190.5	150.0	177.4	164.3	0.0	27.4	27.4		
21-02933		303	Sandwich South	337910	4676490	1957	3	105	35	40	6	1.0	135	625	520	590	39.3	27.3		41.1			190.5	158.5	179.8	167.6	1.5	30.5	29.0	25.8	17.9
21-02934		303	Sandwich South	337930	4676520	1958	4	120	40	50	5	2.0	128	625	505	585	32.7	22.7		39.0			190.5	153.9	178.3	163.1	3.0	26.8	23.8	10.7	7.5
21-02935		303	Sandwich South	337850	4676570	1958	4	124	42	55	4	3.0	126	628	504	586	26.2	18.2		38.4			191.4	153.6	178.6	161.8	4.0	25.6	21.6	6.6	4.6
21-02936		303	Sandwich South	337980	4676630	1959	4	120	38	60	10	4.0	124	628	508	590	65.5	45.5		37.8			191.4	154.8	179.8	161.5	6.7	26.2	19.5	9.8	6.8
21-02937		304	Sandwich South	337000	4676550	1956	5	132	30	50	25	4.0	132	624	492	594	163.7	113.7		40.2			190.2	150.0	181.1	165.8	6.1	31.1	25.0	26.8	18.6
21-02938		304	Sandwich South	336850	4677070	1956	3	134	30	50	2	4.0	134	620	486	590	13.1	9.1		40.8			189.0	148.1	179.8	164.6	6.1	31.7	25.6	2.1	1.5
21-02982		3	Sandwich West	335000	4675860	1957	3	102	18	20	8	2.0	102	610	508	592	52.4	36.4		31.1			185.9	154.8	180.4	174.3	0.6	25.6	25.0	85.9	59.7
21-03047			Windsor City	336736	4684469	1939			30	62	143	24.0	200				936.1	650.1		61.0							9.8	51.8	42.1	96.0	66.7
21-03048			Windsor City	336736	4684469	1940	11		14	60	3	24.0	453				19.6	13.6		138.1							14.0	133.8	119.8	1.4	1.0
21-03055	5	13	Sandwich South	336600	4678780	1966	4	138	25	45	5	4.0	140	610	472	585	32.7	22.7		42.7			185.9	143.9	178.3	164.6	6.1	35.1	29.0	5.4	3.7

MOE WELL RECORDS

Well ID	Conc.	Lot	Township	Easting	Northing	Year Built	Casing Diameter (inches)	Water Found (feet)	Static WL (feet)	Pump Test WL (feet)	Pump Rate (IGPM)	Test Time (hrs)	Well Depth (feet)	Well Elevation (ft. AMSL)	Water Found Elevation (ft. AMSL)	Static WL Elevation (ft. AMSL)	Pump Rate m3/d	Pump Rate L/min	Test Time (hrs)	Well Depth (m BGS)	Well Screen Depth (m BGS)	Well Screen Length (m BGS)	Well Elevation (m AMSL)	Water Found Elevation (m AMSL)	Static WL Elevation (m AMSL)	Test Water Elevation (m AMSL)	Water Level Drawdown (m)	Height of Water Static (m)	Height of Water Test (m)	Specific Capacity m3/d/m	Specific Capacity L/min/m
21-03063	6	12	Sandwich South	337905	4678090	1968	4	139	30	50	3	2.0	140	625	486	595	19.6	13.6		42.7			190.5	148.1	181.4	166.1	6.1	33.5	27.4	3.2	2.2
21-03082	6	12	Sandwich South	337885	4678150	1968	4	114	35	45	5	2.0	114	625	511	590	32.7	22.7		34.7			190.5	155.8	179.8	166.1	3.0	24.1	21.0	10.7	7.5
21-03085	8	16	Sandwich South	339970	4680210	1968	4	123	27	30	10	1.0	323	615	492	588	65.5	45.5		98.5			187.5	150.0	179.2	170.1	0.9	90.2	89.3	71.6	49.7
21-03086	8	16	Sandwich South	339110	4680190	1968	4	123	22	123	2	16.0	123	615	492	593	13.1	9.1		37.5			187.5	150.0	180.7	143.3	30.8	30.8	0.0	0.4	0.3
21-03087	8	16	Sandwich South	339565	4680150	1968	4	117	27	120	12	2.0	120	618	501	591	78.6	54.6		36.6			188.4	152.7	180.1	143.6	28.3	28.3	0.0	2.8	1.9
21-03088		295	Sandwich South	343350	4675240	1968	4	115	25	117	20	2.0	117	622	507	597	130.9	90.9		35.7			189.6	154.5	182.0	146.3	28.0	28.0	0.0	4.7	3.2
21-03125		305	Sandwich South	336260	4677250	1968	4	123	29	40	5	3.0	124	616	493	587	32.7	22.7		37.8			187.8	150.3	178.9	166.7	3.4	29.0	25.6	9.8	6.8
21-03177		297	Sandwich South	342060	4675320	1968	4	112	30	35	7	3.0	112	626	514	596	45.8	31.8		34.1			190.8	156.7	181.7	171.0	1.5	25.0	23.5	30.1	20.9
21-03178		304	Sandwich South	337890	4677450	1968	4	128	35	45	4	1.0	129	626	498	591	26.2	18.2		39.3			190.8	151.8	180.1	166.4	3.0	28.7	25.6	8.6	6.0
21-03183		305	Sandwich South	337560	4678070	1968	4	124	37	50	5	2.0	125	626	502	589	32.7	22.7		38.1			190.8	153.0	179.5	164.3	4.0	26.8	22.9	8.3	5.7
21-03189	10	10	Sandwich South	342820	4676290	1968	4	143	33	90	4		145	622	479	589	26.2	18.2		44.2			189.6	146.0	179.5	152.1	17.4	34.1	16.8	1.5	1.0
21-03189	10	10	Sandwich South	342820	4676290	1968	4	143	33	90	4		145	622	479	589	26.2	18.2		44.2			189.6	146.0	179.5	152.1	17.4	34.1	16.8	1.5	1.0
21-03215	8	11	Sandwich South	340220	4677200	1969	4	118	28	75	3	1.0	120	620	502	592	19.6	13.6	1.0	36.6			189.0	153.0	180.4	157.6	14.3	28.0	13.7	1.4	1.0
21-03233	5	13	Sandwich South	336600	4678690	1969	4	138	28	35	5	3.0	140	620	482	592	32.7	22.7		42.7			189.0	146.9	180.4	169.8	2.1	34.1	32.0	15.3	10.7
21-03234		296	Sandwich South	342440	4675070	1969	4	118	27	40	5	2.0	133	626	508	599	32.7	22.7		40.5			190.8	154.8	182.6	170.4	4.0	32.3	28.3	8.3	5.7
21-03252		303	Sandwich South	336850	4675900	1969	4	126	35				127	621	495	586				38.7			189.3	150.9	178.6			28.0			
21-03253		303	Sandwich South	336840	4675870	1969	4	123	27	28	5	2.0	124	621	498	594	32.7	22.7		37.8			189.3	151.8	181.1	172.5	0.3	29.6	29.3	107.4	74.6
21-03269	11	14	Sandwich South	343500	4678770	1969	4	150	18	130	2	2.5	165	610	460	592	13.1	9.1		50.3			185.9	140.2	180.4	140.8	34.1	44.8	10.7	0.4	0.3
21-03305	3	127	Sandwich East	341980	4683200	1969	4	101	14	75	4	0.4	113	605	504	591	26.2	18.2		34.4			184.4	153.6	180.1	157.3	18.6	30.2	11.6	1.4	1.0
21-03354	8	16	Sandwich South	339570	4680510	1970	4	204	26	100	2	4.0	205	615	411	589	13.1	9.1		62.5			187.5	125.3	179.5	149.0	22.6	54.6	32.0	0.6	0.4
21-03355	8	16	Sandwich South	339780	4680200	1970	4	123	26	30	5	2.5	123	615	492	589	32.7	22.7		37.5			187.5	150.0	179.5	170.4	1.2	29.6	28.3	26.8	18.6
21-03385	6	12	Sandwich South	337680	4678090	1970	4	121	35	50	10	3.0	124	625	504	590	65.5	45.5		37.8			190.5	153.6	179.8	164.6	4.6	27.1	22.6	14.3	9.9
21-03404	6	7	Sandwich South	336900	4675800	1970	4	116	27	29	8	3.0	116	620	504	593	52.4	36.4	3.0	35.4			189.0	153.6	180.7	171.9	0.6	27.1	26.5	85.9	59.7
21-03405	8	14	Sandwich South	339470	4679410	1970	4	86	33	53	5	5.0	86	625	539	592	32.7	22.7		26.2			190.5	164.3	180.4	164.3	6.1	16.2	10.1	5.4	3.7
21-03427	8	16	Sandwich South	339800	4680160	1970	4	121	25	35	5	2.0	121	615	494	590	32.7	22.7		36.9			187.5	150.6	179.8	169.2	3.0	29.3	26.2	10.7	7.5
21-03431	7	15	Sandwich South	338170	4680120	1970	4						358	622						109.1			189.6								
21-03461	5	8	Sandwich South	335720	4676120	1971	4	110	30	40	5	4.0	112	614	504	584	32.7	22.7	4.0	34.1			187.1	153.6	178.0	165.8	3.0	25.0	21.9	10.7	7.5
21-03524		303	Sandwich South	338720	4677160	1971	4	125	33	45	8	3.0	125	626	501	593	52.4	36.4		38.1			190.8	152.7	180.7	167.0	3.7	28.0	24.4	14.3	9.9
21-03568	7	13	Sandwich South	339360	4678765	1971	4	116	33	43	8	1.0	116	625	509	592	52.4	36.4	1.0	35.4			190.5	155.1	180.4	167.3	3.0	25.3	22.3	17.2	11.9
21-03605	10	10	Sandwich South	343250	4676165	1971	4	112	32	50	5	4.0	113	620	508	588	32.7	22.7		34.4			189.0	154.8	179.2	164.0	5.5	24.7	19.2	6.0	4.1
21-03605	10	10	Sandwich South	343250	4676165	1971	4	112	32	50	5	4.0	113	620	508	588	32.7	22.7		34.4			189.0	154.8	179.2	164.0	5.5	24.7	19.2	6.0	4.1
21-03606	11	11	Sandwich South	344410	4676625	1971	4	89	40	50	5	4.0	90	620	531	580	32.7	22.7		27.4			189.0	161.8	176.8	161.5	3.0	15.2	12.2	10.7	7.5
21-03723	9	11	Sandwich South	341080	4676900	1972	4	109	31	33	5	3.0	109	622	513	591	32.7	22.7		33.2			189.6	156.4	180.1	170.1	0.6	23.8	23.2	53.7	37.3
21-03724		303	Sandwich South	337840	4676830	1972	4	132	32	45	10	6.0	132	628	496	596	65.5	45.5		40.2			191.4	151.2	181.7	167.9	4.0	30.5	26.5	16.5	11.5
21-03737	8	13	Sandwich South	340270	4678510	1972	7	109	27	60	25	3.0	111	618	509	591	163.7	113.7	3.0	33.8			188.4	155.1	180.1	161.8	10.1	25.6	15.5	16.3	11.3
21-03752	7	6	Sandwich South	338510	4675220	1972	4	82	23	56	10	3.0	84	624	542	601	65.5	45.5	3.0	25.6			190.2	165.2	183.2	166.1	10.1	18.6	8.5	6.5	4.5
21-03756	8	11	Sandwich South	340230	4677460	1972	4	91	26	46	10	6.0	102	620	529	594	65.5	45.5	6.0	31.1			189.0	161.2	181.1	167.0	6.1	23.2	17.1	10.7	7.5
21-03758	7	16	Sandwich South	339480	4680320	1972	4	205	28	145	5	6.0	207	616	411	588	32.7	22.7	6.0	63.1			187.8	125.3	179.2	135.0	35.7	54.6	18.9	0.9	0.6
21-03862	9	15	Sandwich South	340925	4679951	1973	4	130	25	40	8	2.0	131	612	482	587	52.4	36.4		39.9			186.5	146.9	178.9	166.7	4.6	32.3	27.7	11.5	8.0
21-03890		304	Sandwich South	336222	4676111	1974	4	114	32	38	10	2.0	114	618	504	586	65.5	45.5		34.7			188.4	153.6	178.6	167.0	1.8	25.0	23.2	35.8	24.9
21-03919	11	9	Sandwich South	343877	4675965	1974	4	102	35	40	12	2.0	102	620	518	585	78.6	54.6		31.1			189.0	157.9	178.3	166.1	1.5	20.4	18.9	51.5	35.8
21-03936		296	Sandwich South	342257	4675155	1974	4	106	35	45	5	4.0	108	626	520	591	32.7	22.7		32.9			190.8	158.5	180.1	166.4	3.0	22.3	19.2	10.7	7.5
21-03937		302	Sandwich South	337834	4676275	1974	4	123	34	50	10	4.0	126	624	501	590	65.5	45.5		38.4			190.2	152.7	179.8	164.6	4.9	28.0	23.2	13.4	9.3
21-03949		302	Sandwich South	338767	4677052	1974	4	130	45	75	10	3.0	130	624	494	579	65.5	45.5		39.6			190.2	150.6	176.5	153.6	9.1	25.9	16.8	7.2	5.0
21-03959	10	13	Sandwich South	342182	4678572	1974	4	125	22	40	6	2.0	125	615	490	593	39.3	27.3		38.1			187.5	149.4	180.7	168.6	5.5	31.4	25.9	7.2	5.0
21-03960	10	13	Sandwich South	343502	4678353	1974	4	128	25	40	5	4.0	131	612	484	587	32.7	22.7		39.9			186.5	147.5	178.9	166.7	4.6	32.3	27.7	7.2	5.0
21-03973	8	16	Sandwich South	340057	4680185	1974	4	118	24	50	4	4.0	121	615	497	591	26.2	18.2		36.9			187.5	151.5	180.1	164.9	7.9	29.6	21.6	3.3	2.3
21-03988	11	12	Sandwich South	344488	4677532	1974	4	77	27	35	6	6.5	86	616	539	589	39.3	27.3		26.2			187.8	164.3	179.5	168.9	2.4	18.0	15.5	16.1	11.2
21-04016	5	7	Sandwich South	335156	4675728	1975	4	112	30	35	10	1.5	112	608	496	578	65.5	45.5	1.5	34.1			185.3	151.2	176.2	165.5	1.5	25.0	23.5	43.0	29.8
21-04020		302	Sandwich South	338767	4676987	1975	4	130	42	55	10	1.0	130	624	494	582	65.5	45.5		39.6			190.2	150.6	177.4	160.6	4.0	26.8	22.9	16.5	11.5
21-04024	8	17	Sandwich South	339573	4680984	1974	8	127	26	95	4	5.0	131	612	485	586	26.2	18.2		39.9			186.5	147.8	178.6	149.7	21.0	32.0	11.0	1.2	0.9
21-04035		302	Sandwich South	338700	4676993	1975	4	130	42	60	15	2.0	130	624	494	582	98.2	68.2		39.6			190.2	150.6	177.4	159.1	5.5	26.8	21.3	17.9	12.4
21-04035		302	Sandwich South	338700	4676993	1975	4	130	42	60	15	2.0	130	624	494	582	98.2	68.2		39.6			190.2	150.6	177.4	159.1	5.5	26.8	21.3	17.9	12.4
21-04036		296	Sandwich South	342288	4675106	1974	4	109	28	35	12		110	626	517	598	78.6	54.6		33.5			190.8	157.6	182.3	171.6	2.1	25.0	22.9	36.8	25.6
21-04046		302	Sandwich South	338506	4676840	1975	4	132	47	60	10	2.0	132	624	492	577	65.5	45.5		40.2			190.2	150.0	175.9	157.6	4.0	25.9	21.9	16.5	11.5
21-04085		301	Sandwich South	339218	4676121	1975	4	101	42	42	5	2.0	102	624	523	582	32.7	22.7		31.1			190.2	159.4	177.4	164.6	0.0	18.3	18.3		
21-04112		301	Sandwich South	338955	4676411	1975	4	123	40	45	5	4.0	123	624	501	584	32.7	22.7		37.5			190.2	152.7	178.0	164.3	1.5	25.3	23.8	21.5	14.9
21-04124	8	12	Sandwich South	340049	4677745	1975	4	87	34		5	12.0	103	624	537	590	32.7	22.7	12.0	31.4			190.2	163.7	179.8			21.0			
21-04130	6	14	Windsor City	337340	4679660	1975	4	154	35	120	4	2.0	154	622	468	587	26.2	18.2		46.9			189.6	142.6	178.9	142.3	25.9	36.3	10.4	1.0	0.7
21-04135		303	Sandwich South	338560	4677000	1977	4	132	45	60	20	24.0	132	625	493	580	130.9	90.9		40.2			190.5	150.3	176.8	158.5	4.6	26.5	21.9	28.6	19.9
21-04162		296	Sandwich South	342540	4675160	1976	4	119	36	50	10	2.0	119	624	505	588	65.5	45.5		36.3			190.2	153.9	179.2	164.0	4.3	25.3	21.0	15.3	10.7
21-04163		302	Sandwich South	338520	4676580	1976	4	142	50	60	10	1.0	142	626	484	576	65.5	45.5		43.3			190.8	147.5	175.6	157.3	3.0	28.0	25.0	21.5	14.9
21-04170	5	6	Sandwich South	336360	4675040	1976	4	102	28	28	8	2.0	103	616	514	588	52.4	36.4	2.0	31.4			187.8	156.7	179.2	170.7	0.0	22.9	22.9		
21-04173	6	7	Sandwich South	336940	4675800	1976	4	323	33	33	8	2.5	124	622	299	589	52.4	36.4	2.5	37.8			189.6	91.1	179.5	169.5	0.0	27.7	27.7		
21-04198		301	Sandwich South	339400	4676240	1976	4	104	38	38	8	2.0	105	624	520	586	52.4	36.4		32.0			190.2	158.5	178.6	167.0	0.0	20.4	20.4		
21-04230		301	Sandwich South	340040	4676960	1976	4	90	35	48	8	10.0	95	622	532	587	52.4	36.4		29.0			189.6	162.2	178.9	164.3	4.0	18.3	14.3	13.2	9.2
21-04243	8	11	Sandwich South	340380	4677420	1977	4	108	31	34	8	4.0	112	620	512	589	52.4	36.4	4.0	34.1			189.0	156.1	179.5	169.2	0.9	24.7	23.8	57.3	39.8
21-04283	8	12	Sandwich South	340000	4677720	1977	4	113	35	38	20	1.0	113	622	509	587	130.9	90.9	1.0	34.4			189.6	155.1	178.9	167.3	0.9	23.8	22.9	143.2	99.4
21-04306		295	Sandwich South	343960	4675760	1977	4	96	32	32	10	3.5	97	620	524	588	65.5	45.5		29.6			189.0	159.7	179.2	169.5	0.0	19.8	19.8		
21-04380		305	Sandwich South	336740	4677200	1978	4	125	38	45	20	2.0	125	621	496	583	130.9	90.9		38.1			189.3	151.2	177.7	164.0	2.1	26.5	24.4	61.4	42.6
21-04381	8	12	Sandwich South	340060	4677620	1978	4	114	38	45	20	1.0	120	622	508	584	130.9	90.9	1.0	36.6			189.6	154.8	178.0	164.3	2.1	25.0	22.9	61.4	42.6
21-04443		297	Sandwich South	341740	4675280	1978	4	107	36	40	20	2.0	107	625	518	589	130.9	90.9		32.6			190.5	157.9	179.5	167.3	1.2	21.6	20.4	107.4	74.6
21-04474	7	6	Sandwich South	338920	4675800	1978	4	115	41	70	4	20.0	123	625	510	584	26.2	18.2	20.0	37.5			190.5	155.4	178.0	156.7	8.8	25.0	16.2	3.0	2.1
21-04475		299	Sandwich South	341040	4676600	1970	4	97	34	34	5	6.0	107	625	528	591	32.7	22.7		32.6			190.5	160.9	180.1	169.8	0.0	22.3	22.3		
21-04476	10	12	Sandwich South	342060	4677660	1978	4	137	33	36	15		141	617	480	584	98.2	68.2		43.0			188.1	146.3	178.0	167.0	0.9	32.9	32.0	107.4	74.6
21-04499	11	10	Sandwich South	343300	4676240	1979	30	50	50	68			68	620	570	570				20.7			189.0	173.7	173.7	153.0	5.5	5.5	0.0		
21-04500		295	Sandwich South	343300	4675060	1979	4	110	34	43	20	1.0	110	625	515	591	130.9	90.9		33.5			190.5	157.0	180.1	167.0	2.7	23.2	20.4	47.7	33.1
21-04527	9	14	Sandwich South	342080	4679120	1979	30	97	75				106	630	533	555				32.3			192.0	162.5	169.2			9.4			
21-04528		303	Sandwich South	338700	4676100	1979	4	132	4	60	10	2.0	132	620	488	616	65.5	45.5		40.2			189.0	148.7	187.8	169.5	17.1	39.0	21.9	3.8	2.7
21-04541	10	15	Sandwich South	342140	4679200	1979	30	52	33	103			103	610	558	577				31.4			185.9	170.1	175.9	144.5	21.3	21.3	0.0		
21-04555	10	11	Sandwich South	342040	4677280	1979	4	116	30	50	10	2.0	116	620	504	590	65.5	45.5		35.4			189.0	153.6	179.8	164.6	6.1	26.2	20.1	10.7	7.5
21-04572		296	Sandwich South	342520	4675100	1979	4	119	29	110	4	2.0	119	625	506	596	26.2	18.2		36.3			190.5	154.2	181.7	148.1	24.7	27.4	2.7	1.1	0.7

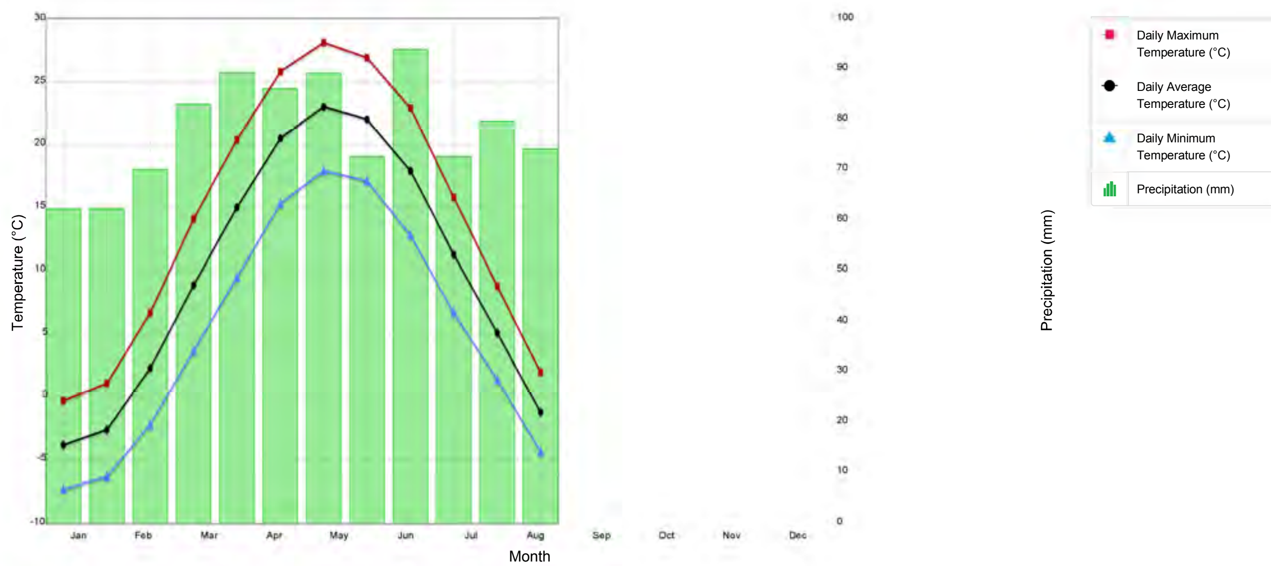
MOE WELL RECORDS

Well ID	Conc.	Lot	Township	Easting	Northing	Year Built	Casing Diameter (inches)	Water Found (feet)	Static WL (feet)	Pump Test WL (feet)	Pump Rate (IGPM)	Test Time (hrs)	Well Depth (feet)	Well Elevation (ft. AMSL)	Water Found Elevation (ft. AMSL)	Static WL Elevation (ft. AMSL)	Pump Rate m3/d	Pump Rate L/min	Test Time (hrs)	Well Depth (m BGS)	Well Screen Depth (m BGS)	Well Screen Length (m BGS)	Well Elevation (m AMSL)	Water Found Elevation (m AMSL)	Static WL Elevation (m AMSL)	Test Water Elevation (m AMSL)	Water Level Drawdown (m)	Height of Water Static (m)	Height of Water Test (m)	Specific Capacity m3/d/m	Specific Capacity L/min/m
21-04574	10	10	Sandwich South	343200	4676140	1979	4	111	32	35	10	3.0	111	620	509	588	65.5	45.5		33.8			189.0	155.1	179.2	168.6	0.9	24.1	23.2	71.6	49.7
21-04580	11	16	Sandwich South	343600	4680040	1979	4	100	14	20	4	3.0	103	603	503	589	26.2	18.2		31.4			183.8	153.3	179.5	173.4	1.8	27.1	25.3	14.3	9.9
21-04599		296	Sandwich South	342860	4675460	1980	4	113	34	36	15	3.0	113	620	507	586	98.2	68.2		34.4			189.0	154.5	178.6	167.6	0.6	24.1	23.5	161.1	111.9
21-04600		295	Sandwich South	342960	4675000	1980	4	109	32	45	12	3.0	109	625	516	593	78.6	54.6		33.2			190.5	157.3	180.7	167.0	4.0	23.5	19.5	19.8	13.8
21-04606		297	Sandwich South	341640	4675500	1981	36	100	36	100	10		100	625	525	589	65.5	45.5		30.5			190.5	160.0	179.5	149.0	19.5	19.5	0.0	3.4	2.3
21-04618		300	Sandwich South	339680	4676160	1980	4	99	38	38	8	2.0	100	620	521	582	52.4	36.4		30.5			189.0	158.8	177.4	165.8	0.0	18.9	18.9		
21-04619		301	Sandwich South	339360	4676280	1980	4	106	40	40	8	2.0	106	625	519	585	52.4	36.4		32.3			190.5	158.2	178.3	166.1	0.0	20.1	20.1		
21-04643	10	16	Sandwich South	343540	4680260	1980	4	100	14	40	10	4.0	103	600	500	586	65.5	45.5		31.4			182.9	152.4	178.6	166.4	7.9	27.1	19.2	8.3	5.7
21-04644	12	10	Sandwich South	344500	4676120	1960	4	94					95	620	526					29.0			189.0	160.3							
21-04645	12	10	Sandwich South	344480	4676120	1980	4	90	15	36	10	4.0	90	620	530	605	65.5	45.5		27.4			189.0	161.5	184.4	173.4	6.4	22.9	16.5	10.2	7.1
21-04662		302	Sandwich South	338700	4676960	1981	4	129	40	60	10	2.0	129	620	491	580	65.5	45.5		39.3			189.0	149.7	176.8	158.5	6.1	27.1	21.0	10.7	7.5
21-04664	10	11	Sandwich South	342060	4677380	1961	4	127	29	38	15	10.0	127	620	493	591	98.2	68.2		38.7			189.0	150.3	180.1	168.6	2.7	29.9	27.1	35.8	24.9
21-04711		296	Sandwich South	343000	4675320	1982	4	114	33	38	20	24.0	114	625	511	592	130.9	90.9		34.7			190.5	155.8	180.4	168.9	1.5	24.7	23.2	85.9	59.7
21-04728		303	Sandwich South	337920	4676600	1982	4	125	38	50	10	2.0	125	615	490	577	65.5	45.5		38.1			187.5	149.4	175.9	160.6	3.7	26.5	22.9	17.9	12.4
21-04740	9	12	Sandwich South	341920	4677360	1983	4	133	29	34	20	10.0	133	620	487	591	130.9	90.9		40.5			189.0	148.4	180.1	169.8	1.5	31.7	30.2	85.9	59.7
21-04762	8	11	Sandwich South	340300	4677200	1963	4	86	24	29	5	24.0	96	620	534	596	32.7	22.7	24.0	29.3			189.0	162.8	181.7	172.8	1.5	21.9	20.4	21.5	14.9
21-04763	11	12	Sandwich South	344480	4677300	1983	4	78	24	31	7	0.4	91	610	532	586	45.8	31.8		27.7			185.9	162.2	178.6	169.2	2.1	20.4	18.3	21.5	14.9
21-04769		296	Sandwich South	343080	4675260	1984	5	115	32	80	15	1.0	115	620	505	588	98.2	68.2		35.1			189.0	153.9	179.2	154.8	14.6	25.3	10.7	6.7	4.7
21-04795		302	Sandwich South	337620	4675620	1984	4	115	37	45	12	8.0	115	620	505	583	78.6	54.6		35.1			189.0	153.9	177.7	164.0	2.4	23.8	21.3	32.2	22.4
21-04829		303	Sandwich South	337920	4676500	1985	5	138	35	132	4	2.0	138	620	482	585	26.2	18.2		42.1			189.0	146.9	178.3	138.1	29.6	31.4	1.8	0.9	0.6
21-04907		297	Sandwich South	342705	4676210	1986	5	125	31	60	30	1.0	125	620	495	589	196.4	136.4		38.1			189.0	150.9	179.5	161.2	8.8	28.7	19.8	22.2	15.4
21-04921	9	14	Sandwich South	340825	4678870	1986	4	132	15	25	3	48.0	132	620	488	605	19.6	13.6		40.2			189.0	148.7	184.4	176.8	3.0	35.7	32.6	6.4	4.5
21-04943		296	Sandwich South	342170	4675150	1987	4	103	32	38	12	3.0	110	630	527	598	78.6	54.6		33.5			192.0	160.6	182.3	170.7	1.8	23.8	21.9	43.0	29.8
21-04957		300	Sandwich South	338560	4675305	1987	5	122	41	45	40	3.0	122	620	498	579	261.8	181.8		37.2			189.0	151.8	176.5	162.8	1.2	24.7	23.5	214.8	149.1
21-04972		295	Sandwich South	343350	4675155	1987	5	118	36	41	50	2.0	118	630	512	594	327.3	227.3		36.0			192.0	156.1	181.1	168.6	1.5	25.0	23.5	214.8	149.1
21-04986		303	Sandwich South	336525	4676005	1987	4	122	32	70	3		122	620	498	588	19.6	13.6		37.2			189.0	151.8	179.2	157.9	11.6	27.4	15.8	1.7	1.2
21-05291	7	17	Sandwich South	338875	4680864	1993	2	6		26			11							3.4									-4.6		
21-05292	7	17	Sandwich South	338875	4680864	1993	2	6					12							3.7											
21-05293	7	17	Sandwich South	338875	4680864	1993	2	6					12							3.7											
21-05294	7	17	Sandwich South	338875	4680864	1993	2	6					12							3.7											
21-05295	7	17	Sandwich South	338875	4680864	1993	2	6					12							3.7											
21-05333			Windsor City	336736	4684469	1993	2	18	18	47		0.5	60							18.3							8.8	12.8	4.0		
21-05334			Windsor City	336736	4684469	1993	2	80	30	86		1.0	108							32.9							17.1	23.8	6.7		
21-05335			Windsor City	336736	4684469	1993	2	6	6	21	0	0.2	22							6.7							4.6	4.9	0.3		
21-05344			Windsor City	336736	4684469	1993																									
21-05400	7	5	Sandwich South	338004	4675168	1994	6	117	38			0.5	117						0.5	35.7								24.1			
21-05405	10	10	Sandwich South	342650	4676717	1994	6	111	30		10	2.0	111				65.5	45.5		33.8								24.7			
21-05449			Windsor City	336736	4684469	1996	6	150																							
21-05488		304	Sandwich South	336675	4676514	1997	8	153	37	150	0	1.0	155							47.2							34.4	36.0	1.5		
21-05535			Windsor City	336736	4684469	1999																									
21-05536			Windsor City	336736	4684469	1999																									
21-05537			Windsor City	336736	4684469	1999																									
21-05589	10	11	Sandwich South	342691	4677320	2001	6		29	50	10	1.0	142				65.5	45.5		43.3							6.4	34.4	28.0	10.2	7.1
21-05605			Windsor City	336736	4684469	2001	2						22							6.7											
21-05606			Windsor City	336736	4684469	2001	2						24							7.3											
21-05626	7	7	Sandwich South	338009	4675416	2001																									
21-05660		303	Sandwich South	338207	4676728	2002	6	130	52			1.0	130							39.6								23.8			
21-05688	8	14	Sandwich South	339513	4679687	2002							16							4.9											
21-05689		303	Sandwich South	338720	4677636	2003																									
23-04669	7	16	Sandwich South	338200	4680600	1981	5	153	35	88	5	5.0	153	620	467	585	32.7	22.7	5.0	46.6			189.0	142.3	178.3	151.5	16.2	36.0	19.8	2.0	1.4

Canadian Climate Normals 1981-2010 Station Data

▼ Temperature and Precipitation Graph

Temperature and Precipitation Graph for 1981 to 2010 Canadian Climate Normals
WINDSOR A



▼ Normals Data

The minimum number of years used to calculate these Normals is indicated by a code for each element. A "+" beside an extreme date indicates that this date is the first occurrence of the extreme value. Values and dates in bold indicate all-time extremes for the location.

Data used in the calculation of these Normals may be subject to further quality assurance checks. This may result in minor changes to some values presented here.

WINDSOR A *
ONTARIO

Latitude:	42°16'32.000" N	**Longitude**:	82°57'20.000" W	**Elevation**:	189.60 m
Climate ID:	6139525	**WMO ID**:	71538	**TC ID**:	YQG

* This station meets WMO standards for temperature and precipitation.

▼ Temperature

Temperature

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Daily Average (°C)	-3.8	-2.6	2.3	8.9	15.0	20.5	23.0	22.0	17.9	11.3	5.1	-1.2	9.9	A
Standard Deviation	2.9	2.3	1.8	1.5	2.0	1.3	1.3	1.4	1.4	1.6	1.7	2.8	0.8	A
Daily Maximum (°C)	-0.3	1.1	6.7	14.1	20.4	25.8	28.1	26.9	22.9	15.8	8.8	2.0	14.4	A
Daily Minimum (°C)	-7.3	-6.3	-2.2	3.7	9.5	15.3	17.9	17.1	12.8	6.7	1.4	-4.3	5.4	A
Extreme Maximum (°C)	17.8	20.4	26.6	31.1	34.0	**40.2**	38.3	37.7	37.2	32.2	26.1	19.6		
Date (yyyy/dd)	1950/ 25	2000/ 26	1986/ 30	1990/ 25	1988/ 31	**1988/ 25**	1941/ 27	1988/ 17	1953/ 02	1963/ 06	1950/ 01	1998/ 06		
Extreme Minimum (°C)	**-29.1**	-23.4	-19.7	-9.5	-2.8	2.8	5.6	5.2	-1.1	-5.0	-15.6	-23.4		
Date (yyyy/dd)	**1994/ 19**	1982/ 06	2003/ 03	1982/ 07	1966/ 10	1945/ 05	1945/ 11	1982/ 29	1942/ 29	1965/ 29	1958/ 30	1983/ 30		

▼ Precipitation

Precipitation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Rainfall (mm)	32.4	35.6	50.9	77.7	89.3	86.1	89.2	72.6	93.9	72.0	74.5	48.3	822.4	A
Snowfall (cm)	37.2	30.5	20.9	5.8	0.0	0.0	0.0	0.0	0.0	0.6	5.5	28.8	129.3	A
Precipitation (mm)	62.1	62.2	70.0	83.0	89.3	86.1	89.2	72.6	93.9	72.6	79.6	74.1	934.6	A
Average Snow Depth (cm)	5	4	1	0	0	0	0	0	0	0	0	2	1	A
Median Snow Depth (cm)	4	3	0	0	0	0	0	0	0	0	0	1	1	A
Snow Depth at Month-end (cm)	4	4	0	0	0	0	0	0	0	0	0	4	1	A

Precipitation														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Code
Extreme Daily Rainfall (mm)	43.0	70.6	46.4	**94.6**	54.9	78.0	82.0	79.4	89.0	71.6	48.4	72.6		
Date (yyyy/dd)	1993/ 04	1990/ 22	2007/ 01	**2000/ 20**	1953/ 30	1968/ 25	1983/ 29	1994/ 13	1981/ 30	1949/ 11	2001/ 30	1967/ 21		
Extreme Daily Snowfall (cm)	28.2	**36.8**	22.4	16.0	0.5	0.0	0.0	0.0	0.0	13.8	34.8	32.3		
Date (yyyy/dd)	1999/ 02	**1965/ 25**	1968/ 22	2005/ 23	1954/ 03	1941/ 01	1941/ 01	1940/ 01	1940/ 01	1989/ 19	1966/ 02	1974/ 01		
Extreme Daily Precipitation (mm)	43.0	70.6	47.4	**94.6**	54.9	78.0	82.0	79.4	89.0	71.6	51.1	72.6		
Date (yyyy/dd)	1993/ 04	1990/ 22	2007/ 01	**2000/ 20**	1953/ 30	1968/ 25	1983/ 29	1994/ 13	1981/ 30	1949/ 11	1951/ 06	1967/ 21		
Extreme Snow Depth (cm)	36	**42**	30	14	0	0	0	0	0	0	15	33		
Date (yyyy/dd)	1999/ 12	**1982/ 09**	1960/ 04	1982/ 06	1955/ 01	1955/ 01	1955/ 01	1955/ 01	1955/ 01	1955/ 01	1966/ 03	2000/ 31		

► Days with Maximum Temperature

► Days with Minimum Temperature

► Days with Rainfall

► Days With Snowfall

► Days with Precipitation

► Days with Snow Depth

► Wind

► Degree Days

► Humidex

► Wind Chill

► Humidity

► Pressure

► Visibility (hours with)

► Cloud Amount (hours with)

► Frost-Free

Legend

- A = WMO "3 and 5 rule" (i.e. no more than 3 consecutive and no more than 5 total missing for **either** temperature **or** precipitation)
- B = At least 25 years
- C = At least 20 years
- D = At least 15 years

▼ Station / Element Metadata

Statistics listed below are provided as a guide to determine the validity of Normals and Extremes calculations. For example, a station with 30 years of record between 1981 and 2010 with no missing years would be a more reliable normal than a station with 15 years of record and 2 missing years. Less than 100% possible observations indicates that out of the total number of observations used, some records were missing.

WINDSOR A

Province	ON	**Latitude (dd mm):**	42 16 N
Country	CAN	**Longitude (ddd mm):**	82 57 W
Time Zone	EST	**Latitude (decimal degrees):**	42.28 N
Climate ID:	6139525	**Longitude (decimal degrees):**	82.96 W
WMO ID:	71538	**Elevation (m):**	189.6
TC ID:	YQG		

▼ Temperature

Temperature						
	Begin Year	End Year	Total Number of Years	Missing Years	Total Count of Observations	% of Possible Observations
Daily Average (°C)	1981	2010	30	0	10956	100

Temperature						
	Begin Year	End Year	Total Number of Years	Missing Years	Total Count of Observations	% of Possible Observations
Standard Deviation	1981	2010	30	0	10956	100
Daily Maximum (°C)	1981	2010	30	0	10956	100
Daily Minimum (°C)	1981	2010	30	0	10956	100
Extreme Maximum (°C)	1940	2010			25718	100
Extreme Minimum (°C)	1940	2010			25719	100

▼ Precipitation

Precipitation						
	Begin Year	End Year	Total Number of Years	Missing Years	Total Count of Observations	% of Possible Observations
Rainfall (mm)	1981	2010	30	1	10926	99.7
Snowfall (cm)	1981	2010	30	1	10926	99.7
Precipitation (mm)	1981	2010	30	1	10926	99.7
Average Snow Depth (cm)	1981	2010	30	0	10955	100
Median Snow Depth (cm)	1981	2010	30	0	10955	100
Snow Depth at Month-end (cm)	1981	2010	30	1	359	99.7
Extreme Daily Rainfall (mm)	1940	2010			25719	100
Extreme Daily Snowfall (cm)	1940	2010			25719	100
Extreme Daily Precipitation (mm)	1940	2010			25719	100
Extreme Snow Depth (cm)	1955	2010			20452	100

► Days with Maximum Temperature

► Days with Minimum Temperature

► Days with Rainfall

► Days With Snowfall

► Days with Precipitation

► Days with Snow Depth

► Wind

► Degree Days

► Humidex

► Wind Chill

► Humidity

► Pressure

► Visibility (hours with)

► Cloud Amount (hours with)

► Frost-Free

▼ Calculation Information

"Climate averages", "climate means" or "climate normals" are all interchangeable terms. They refer to arithmetic calculations based on observed climate values for a given location over a specified time period. Climate normals are often used to classify a region's climate and make decisions for a wide variety of purposes involving basic habitability, agriculture and natural vegetation, energy use, transportation, tourism, and research in many environmental fields. Normals are also used as a reference for seasonal monitoring of climate temperature and precipitation for basic public interest, and for monitoring drought or forest fires risk. Real-time values, such as daily temperature, are often compared to a location's "climate normal" to determine how unusual or how great the departure from "average" they are.

The World Meteorological Organization (WMO) recommends that countries prepare climate normals for the official 30-year normals periods ending in 1930, 1960 and 1990, for which the WMO World Climate Normals are published. In addition, WMO recommends the updating of climate normals at the end of every decade as provided here for 1981 to 2010.

► Calculation Method

► Normals Code

► Uncertainty due to shorter period

► Standard Deviation Calculations

► Climate Extremes

▸ **Support Information**

▸ **Data Adjustments**

▸ **Data and Observing Stations**

▸ **Temperature**

▸ **Rainfall, Snowfall, and Precipitation**

▸ **Snow Depth**

▸ **Number of Days With Specified Parameters**

▸ **Degree-Days**

▸ **Soil Temperature**

▸ **Evaporation**

▸ **Frost and Freezing-Free Period**

▸ **Hourly Data**

▸ **Wind**

▸ **Bright Sunshine**

▸ **Humidex**

▸ **Wind Chill**

▸ **Humidity**

▸ **Pressure**

▸ **Solar Radiation**

▸ **Visibility (km)**

▸ **Cloud Amount**

▸ **APPENDIX A**

Date modified:
2016-06-22

APPENDIX H

Hydrology

1603-11265 - ULR
Model Parameters

			Proposed Land Use (%)												
Area Description	Catchment Number	Area	Residential (Low Density)	Residential (Medium Density)	Open Space/ Parks	Institutional	Commercial	Mixed Use	Employment	Industrial	Stormwater Management	Existing Urban	Total	Total Imperviousness	Total Impervious Area
		(ha)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(ha)
Existing Urban	2000	91.38	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	54.8
Existing Urban	2002	156.40	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	93.8
Existing Urban	2005	48.04	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	28.8
Existing Urban	2007	20.71	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	12.4
Existing Urban	2010	40.96	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	24.6
Existing Urban	2015	10.55	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	6.3
Proposed Development	2020	66.13	30%	5%	5%	25%	30%	0%	0%	0%	5%	0%	100%	67%	44.1
Existing Urban	2025	12.64	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	7.6
Existing Urban	2027	59.42	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	35.7
Proposed Development	2030	117.58	45%	5%	10%	0%	0%	0%	0%	0%	5%	35%	100%	49%	57.9
Proposed Development	2035	81.42	40%	0%	0%	20%	20%	10%	0%	0%	10%	0%	100%	63%	51.3
Existing Urban	2040	25.60	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	15.4
Proposed Development	2045	63.81	40%	0%	15%	0%	0%	0%	0%	0%	10%	35%	100%	43%	27.4
Proposed Development	2050	97.34	20%	0%	15%	0%	0%	0%	55%	0%	10%	0%	100%	47%	45.5
Proposed Development	2055	65.11	65%	20%	5%	0%	0%	0%	0%	0%	10%	0%	100%	50%	32.4
Proposed Development	2060	112.73	15%	5%	0%	0%	0%	0%	70%	0%	10%	0%	100%	57%	64.5
Proposed Development	2065	116.33	0%	0%	0%	0%	45%	0%	0%	45%	10%	0%	100%	77%	89.0
Existing Agriculutral	2070	94.85	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0.0
Existing Urban	2072	42.27	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	25.4
Existing Agriculutral	2073	80.41	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0.0
Proposed Development and Agri	2075	117.69	0%	0%	40%	0%	30%	30%	0%	0%	0%	0%	100%	47%	54.7
Proposed Development and Agri	2080	69.76	20%	0%	80%	0%	0%	0%	0%	0%	0%	0%	100%	11%	7.7
Proposed Development and Agri	2085	100.90	0%	0%	50%	0%	0%	50%	0%	0%	0%	0%	100%	35%	35.3
Existing Agriculutral	2087	133.74	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0.0
Proposed Development	2090	72.83	25%	0%	30%	0%	20%	0%	0%	0%	25%	0%	100%	31%	22.4
Proposed Development	2095	117.98	0%	0%	20%	0%	30%	30%	0%	0%	20%	0%	100%	47%	54.9
Proposed Development	2100	50.57	45%	45%	0%	0%	0%	0%	0%	0%	10%	0%	100%	56%	28.4
Proposed Development	2105	60.91	90%	0%	0%	0%	0%	0%	0%	0%	10%	0%	100%	50%	30.2
Proposed Development	2110	49.79	95%	0%	5%	0%	0%	0%	0%	0%	0%	0%	100%	52%	26.0
Proposed Development	2115	113.58	20%	0%	20%	0%	0%	0%	40%	0%	20%	0%	100%	37%	42.0
Proposed Development	2125	93.38	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	55%	51.4
Proposed Development	2130	80.55	0%	0%	0%	0%	75%	0%	25%	0%	0%	0%	100%	80%	64.4
Proposed Development	2133	93.08	0%	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%	65%	60.5
Proposed Development	2135	22.82	90%	0%	0%	0%	0%	0%	0%	0%	10%	0%	100%	50%	11.3
Proposed Development	2140	82.10	60%	0%	30%	0%	0%	0%	0%	0%	10%	0%	100%	33%	27.1
Existing Agriculutral	2145	104.35	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	55%	57.4
Proposed Development	2155	77.27	90%	0%	0%	0%	0%	0%	0%	0%	10%	0%	100%	50%	38.2
Proposed Development	2165	179.12	20%	20%	15%	10%	5%	0%	0%	0%	5%	25%	100%	53%	94.5
Proposed Development	2175	47.30	10%	0%	0%	0%	40%	0%	40%	0%	10%	0%	100%	66%	31.0
Existing Urban	2180	102.00	0%	0%	0%	0%	0%	0%	0%	0%	5%	95%	100%	57%	58.1
Proposed Development	2185	65.40	0%	0%	0%	0%	0%	0%	85%	0%	15%	0%	100%	55%	36.1
Proposed Development	2190	84.96	30%	10%	5%	0%	0%	0%	0%	0%	5%	50%	100%	54%	45.5
Proposed Development	2200	784.14	0%	0%	50%	0%	0%	0%	10%	35%	5%	0%	100%	36%	284.3
Proposed Development	2210	58.24	0%	0%	0%	0%	30%	0%	30%	0%	10%	30%	100%	63%	36.7
Proposed Development	2215	106.67	15%	10%	5%	0%	10%	5%	0%	0%	5%	50%	100%	57%	61.1
Existing Urban	2220	144.51	0%	0%	0%	0%	0%	0%	5%	5%	0%	90%	100%	62%	88.9
Existing Urban	2225	42.22	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	60%	25.3
Total		4459.54													2090.3
Average		94.88	23%	3%	15%	1%	7%	3%	10%	2%	5%	32%	100%	50%	44.5

Notes:

Impervious Standards	% Impervious
Residential (Low Density)	0.55
Residential (Medium Density)	0.70
Open Space/Parks	0.00
Institutional	0.85
Commercial	0.85
Mixed Use	0.70
Employment	0.65
Industrial	0.85
Stormwater Management	0.00
Existing Urban	0.60

Typical Pond Characteristics
Average pond cross section

Top of PP width	65	m
Bottom of PP width	50	m
PP Depth	1.5	m
PP cross sectional area	86	m^2
Active Depth	2	m
Top of Active Depth (5:1 slopes)	85	m
Active cross section area	150	m^2

1603-11265 - ULR
Model Parameters

	Water Quality Requirements						SWM Corridor Sizing Calculations													
Catchment Number	Water Quality Volume Required	Permanent Pool Volume Required	Extended Detention Volume Required	Total Water Quality Volume Required	Permanent Pool Volume Required	Extended Detention Volume Required	Average SWM Area Permanent Pool Cross Section	Length Required at Permanent Pool Elevation- Assume x6 Permanent pool storage requirements	Active Storage Length - 5:1 side slopes with 2 m depth	Assigned Corridor Length	Surface Area at Permanent Pool Elevation	Extended Detention Surface Area	Weir Elevation Surface Area	Active Storage Surface Area	Extended Detention Volume	Weir Elevation Volume	Total Available Storage Volume (2m depth)	Max Storage Volume / unit area	Permanent Pool Surface Area per ha of Drainage Area	Active Storage Surface Area per ha of Drainage Area
	(m^3/ha)	(m^3/ha)	(m^3/ha)	(m^3)	(m^3)	(m^3)	(m^2)	(m)	(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3/ha)	(m^2/ha)	(m^2/ha)
2000																				
2002																				
2005																				
2007																				
2010																				
2015																				
2020	126	86	40	8,310	5,665	2,645	86	394	414	600	25,616	26,538	35,198	35,198	5,215	60,814	60,814	920	97	532
2025																				
2027																				
2030	104	64	40	12,258	7,555	4,703	86	526	546	1400	34,160	35,345	46,370	46,370	6,950	80,530	80,530	685	73	394
2035	121	81	40	9,825	6,568	3,257	86	457	477	600	29,698	30,746	40,536	40,536	6,044	70,234	70,234	863	91	498
2040																				
2045	98	58	40	6,253	3,701	2,552	86	257	277	600	16,735	17,384	23,584	23,584	3,412	40,319	40,319	632	66	370
2050	102	62	40	9,904	6,011	3,894	86	418	438	600	27,179	28,149	37,242	37,242	5,533	64,421	64,421	662	70	383
2055	105	65	40	6,820	4,216	2,604	86	293	313	600	19,063	19,784	26,629	26,629	3,885	45,692	45,692	702	73	409
2060	113	73	40	12,738	8,229	4,509	86	572	592	700	37,211	38,490	50,360	50,360	7,570	87,571	87,571	777	83	447
2065	139	99	40	16,131	11,478	4,653	86	798	818	1000	51,900	53,631	69,569	69,569	10,553	121,469	121,469	1044	112	598
2070																				
2072																				
2073																				
2075	102	62	40	11,946	7,238	4,708	86	504	524	1000	32,728	33,869	44,498	44,498	6,660	77,226	77,226	656	70	378
2080	66	26	40	4,604	1,814	2,790	86	126	146	700	8,201	8,588	12,425	12,425	1,679	20,626	20,626	296	29	178
2085	90	50	40	9,081	5,045	4,036	86	351	371	700	22,812	23,648	31,531	31,531	4,646	54,343	54,343	539	57	313
2087																				
2090	86	46	40	6,245	3,332	2,913	86	232	252	600	15,066	15,664	21,402	21,402	3,073	36,468	36,468	501	52	294
2095	102	62	40	11,975	7,256	4,719	86	505	525	1000	32,809	33,952	44,604	44,604	6,676	77,412	77,412	656	70	378
2100	112	72	40	5,647	3,624	2,023	86	252	272	600	16,388	17,026	23,130	23,130	3,341	39,518	39,518	781	81	457
2105	105	65	40	6,365	3,929	2,436	86	273	293	600	17,765	18,445	24,931	24,931	3,621	42,695	42,695	701	73	409
2110	107	67	40	5,340	3,348	1,992	86	233	253	600	15,140	15,740	21,499	21,499	3,088	36,640	36,640	736	76	432
2115	92	52	40	10,449	5,906	4,543	86	411	431	600	26,706	27,662	36,623	36,623	5,437	63,329	63,329	558	59	322
2125	110	70	40	10,272	6,537	3,735	86	455	475	600	29,557	30,600	40,351	40,351	6,016	69,908	69,908	749	79	432
2130	143	103	40	11,546	8,324	3,222	86	579	599	700	37,637	38,929	50,917	50,917	7,657	88,554	88,554	1099	117	632
2133	123	83	40	11,480	7,757	3,723	86	540	560	600	35,074	36,287	47,566	47,566	7,136	82,639	82,639	888	94	511
2135	105	65	40	2,385	1,472	913	86	102	122	600	6,656	6,994	10,403	10,403	1,365	17,059	17,059	748	73	456
2140	88	48	40	7,225	3,941	3,284	86	274	294	1000	17,819	18,502	25,002	25,002	3,632	42,821	42,821	522	54	305
2145																				
2155	105	65	40	8,075	4,984	3,091	86	347	367	600	22,536	23,363	31,170	31,170	4,590	53,706	53,706	695	73	403
2165	108	68	40	19,300	12,135	7,165	86	844	864	1100	54,873	56,695	73,457	73,457	11,157	128,330	128,330	716	77	410
2175	124	84	40	5,865	3,973	1,892	86	276	296	700	17,966	18,653	25,194	25,194	3,662	43,159	43,159	912	95	533
2180																				
2185	110	70	40	7,216	4,600	2,616	86	320	340	600	20,799	21,573	28,899	28,899	4,237	49,698	49,698	760	80	442
2190	109	69	40	9,218	5,820	3,398	86	405	425	900	26,315	27,259	36,112	36,112	5,357	62,428	62,428	735	77	425
2200	91	51	40	71,553	40,187	31,366	86	2796	2816		181,716	187,441	239,329	239,329	36,916	421,044	421,044	537	58	305
2210	121	81	40	7,028	4,698	2,330	86	327	347	1000	21,243	22,031	29,480	29,480	4,327	50,723	50,723	871	91	506
2215	113	73	40	12,054	7,787	4,267	86	542	562	600	35,210	36,428	47,744	47,744	7,164	82,955	82,955	778	83	448
2220																				
2225																				
				337,107	207,128	129,980		14,409			936,578	969,416	1,275,756	1,275,756	190,599	2,212,333	2,212,333			
	107	67	40	11237	6904	4333	86											724	76	420

1603-11265 - ULR
Model Parameters

	SWM Corridor Elevations						Depth of Pond Check			SWM Outlet Configuration						Storm Sewer Depth Calculations					
Catchment Number	Estimated Outlet Channel Invert	Permanent Pool Offset From Channel	Permanent Pool Elevation	Low Orifice Invert Elevation	High Orifice Invert Elevation	Overflow Weir Elevation	Approximate Ground Elevation	Permanent Pool Elevation	Depth of pond	Low Orifice Average Flow for 36 hour drawdown	Low Orifice Cross Section Area	Low Orifice Diameter	High Orifice Average Flow	High Orifice Area	High Orifice Diameter	Permanent Pool Elevation	Estimate Pipe Length from Pond to Upstream Limit	Upstream Invert Elevation at 0.35% slope	Upstream Ground Elevation	Cover available with 1.2 m Diameter Pipe	Estimated depth of storm sewer
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m^3/s)	(m^2)	(m)	(m^3/s)	(m^2)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
2000																					
2002																					
2005																					
2007																					
2010																					
2015																					
2020	186.40	0.50	186.90	186.90	187.10	188.90	190.0	186.90	3.1	0.020	0.034	0.200	0.384	0.102	0.360	186.90	500	188.65	190.6	0.8	1.9
2025																					
2027																					
2030	184.80	0.50	185.30	185.30	185.50	187.30	188.5	185.30	3.2	0.036	0.061	0.270	0.682	0.181	0.480	185.30	1400	190.20	189.3	-2.1	-0.9
2035	185.40	0.50	185.90	185.90	186.10	187.90	188.0	185.90	2.1	0.025	0.042	0.230	0.472	0.125	0.390	185.90	700	188.35	190	0.5	1.7
2040																					
2045	183.20	0.50	183.70	183.70	183.90	185.70	186.5	183.70	2.8	0.020	0.033	0.200	0.370	0.098	0.350	183.70	800	186.50	186.7	-1.0	0.2
2050	184.40	0.50	184.90	184.90	185.10	186.90	187.0	184.90	2.1	0.030	0.051	0.250	0.565	0.150	0.430	184.90	1000	188.40	190	0.4	1.6
2055	182.20	0.50	182.70	182.70	182.90	184.70	185.0	182.70	2.3	0.020	0.034	0.200	0.378	0.100	0.350	182.70	800	185.50	186.4	-0.3	0.9
2060	183.40	0.50	183.90	183.90	184.10	185.90	186.0	183.90	2.1	0.035	0.059	0.270	0.654	0.174	0.470	183.90	1400	188.80	190	0.0	1.2
2065	185.72	0.50	186.22	186.22	186.42	188.22	189.0	186.22	2.8	0.036	0.060	0.270	0.675	0.179	0.470	186.22	1300	190.77	190	-2.0	-0.8
2070	185.72	0.50	186.22	186.22	186.42	188.22	189.0	186.22					0.550	0.154	0.440	186.22	1400	191.12	190	-2.3	-1.1
2072																					
2073	185.72	0.50	186.22	186.22	186.42	188.22	189.0	186.22	2.8					0.000	0.000	186.22	1800	192.52	190	-3.7	-2.5
2075	187.00	0.50	187.50	187.50	187.70	189.50	192.0	187.50	4.5	0.036	0.061	0.270	0.683	0.181	0.480	187.50	1800	193.80	190	-5.0	-3.8
2080	187.00	0.50	187.50	187.50	187.70	189.50	191.0	187.50	3.5	0.022	0.036	0.210	0.405	0.107	0.360	187.50	900	190.65	190	-1.8	-0.7
2085	187.25	0.50	187.75	187.75	187.95	189.75	191.0	187.75	3.3	0.031	0.052	0.250	0.585	0.155	0.440	187.75	1900	194.40	190	-5.6	-4.4
2087																					
2090	180.92	1.50	182.42	182.42	182.62	184.42	184.5	182.42	2.1	0.022	0.038	0.210	0.422	0.112	0.370	182.42	1000	185.92	185.5	-1.6	-0.4
2095	182.40	0.50	182.90	182.90	183.10	184.90	185.5	182.90	2.6	0.036	0.061	0.270	0.684	0.182	0.480	182.90	1300	187.45	190	1.3	2.5
2100	180.92	1.00	181.92	181.92	182.12	183.92	185.0	181.92	3.1	0.016	0.026	0.180	0.293	0.078	0.310	181.92	1000	185.42	185.3	-1.3	-0.1
2105	181.90	0.50	182.40	182.40	182.60	184.40	185.0	182.40	2.6	0.019	0.032	0.200	0.353	0.094	0.340	182.40	900	185.55	185.5	-1.3	-0.1
2110	180.06	1.50	181.56	181.56	181.76	183.56	185.0	181.56	3.4	0.015	0.026	0.180	0.289	0.077	0.310	181.56	900	184.71	184.1	-1.8	-0.6
2115	180.06	1.50	181.56	181.56	181.76	183.56	183.5	181.56	1.9	0.035	0.059	0.270	0.659	0.175	0.470	181.56	2300	189.61	186.1	-4.7	-3.5
2125	179.10	1.50	180.60	180.60	180.80	182.60	184.5	180.60	3.9	0.029	0.048	0.240	0.542	0.144	0.420	180.60	1250	184.98	184.3	-1.9	-0.7
2130	182.40	0.50	182.90	182.90	183.10	184.90	186.0	182.90	3.1	0.025	0.042	0.230	0.467	0.124	0.390	182.90	1200	187.10	187.5	-0.8	0.4
2133	183.40	0.50	183.90	183.90	184.10	185.90	186.0	183.90	2.1	0.029	0.048	0.240	0.540	0.143	0.420	183.90	1200	188.10	187.5	-1.8	-0.6
2135	178.67	1.50	180.17	180.17	180.37	182.17	182.0	180.17	1.8	0.007	0.012	0.120	0.132	0.035	0.210	180.17	1100	184.02	182.3	-2.9	-1.7
2140	178.70	1.00	179.70	179.70	179.90	181.70	183.0	179.70	3.3	0.025	0.043	0.230	0.476	0.126	0.400	179.70	750	182.33	182.5	-1.0	0.2
2145																					
2155	178.68	1.50	180.18	180.18	180.38	182.18	183.5	180.18	3.3	0.024	0.040	0.220	0.448	0.119	0.380	180.18	1500	185.43	182.5	-4.1	-2.9
2165	179.40	0.50	179.90	179.90	180.10	181.90	183.0	179.90	3.1	0.055	0.093	0.340	1.039	0.276	0.590	179.90	1400	184.80	185	-1.0	0.2
2175	178.30	0.50	178.80	178.80	179.00	180.80	182.0	178.80	3.2	0.015	0.025	0.170	0.274	0.073	0.300	178.80	700	181.25	183.5	1.1	2.3
2180																					
2185	178.00	1.50	179.50	179.50	179.70	181.50	182.0	179.50	2.5	0.020	0.034	0.200	0.379	0.101	0.350	179.50	700	181.95	182.5	-0.6	0.6
2190	178.75	0.50	179.25	179.25	179.45	181.25	182.5	179.25	3.3	0.026	0.044	0.230	0.493	0.131	0.400	179.25	1000	182.75	184.5	0.6	1.8
2200	178.95	0.50	179.45	179.45	179.65	181.45	183.0	179.45	3.6	0.242	0.407	0.720	4.548	1.208	1.240	179.45	3600	192.05	189.1	-4.1	-2.9
2210	178.40	0.50	178.90	178.90	179.10	180.90	183.0	178.90	4.1	0.018	0.030	0.190	0.338	0.090	0.330	178.90	700	181.35	183.5	1.0	2.2
2215	179.00	0.50	179.50	179.50	179.70	181.50	182.5	179.50	3.0	0.033	0.055	0.260	0.619	0.164	0.450	179.50	1200	183.70	185	0.1	1.3
2220																					
2225																					
										1.003			19.397								
										0.033	0.056	0.244	0.626	0.161	0.412						

[AS]	[AT]	[AU]	[AV]	[AW]	[AX]
C	0.60		C	0.60	
$height_{inv}$	0.0		$height_{inv}$	0.2	
$\Delta height_{max}$	0.2		$\Delta height_{max}$	1.8	
drawdown (hr)	36		drawdown (hr	12	

[AS] Extended Detention Volume / Drawdown time

[AT] ([AS] * 2) / (C*(2*g*Δh)$^{0.5}$)

[AU] 2*([AT]/π)$^{0.5}$

[AV] 0.116*Area*0.05 = municipal drain capacity or 50 mm of runoff over 24 hours

[AW] ([AV] * 2) / (C*(2*g*Δh)$^{0.5}$)

[AX] 2*([AW]/π)$^{0.5}$

Little River
Single Station Frequency Analysis

Station ID	Year	Peak Flow (m^3/s)	Log of the Peak Flow
02GH011	1983	26.6	1.42
02GH011	1984	21.1	1.32
02GH011	1985	21.1	1.32
02GH011	1988	7.3	0.86
02GH011	1989	15.7	1.20
02GH011	1990	42.6	1.63
02GH011	1991	17.6	1.25
02GH011	1992	18.4	1.26
02GH011	1993	25.0	1.40
02GH011	1994	19.8	1.30
02GH011	1995	27.0	1.43
02GH011	1996	26.6	1.42
02GH011	1999	34.3	1.54
02GH011	2000	42.0	1.62
02GH011	2003	16.0	1.20
02GH011	2004	29.0	1.46
02GH011	2005	38.4	1.58
02GH011	2006	34.9	1.54
02GH011	2007	31.5	1.50
02GH011	2008	40.0	1.60
02GH011	2009	27.4	1.44
02GH011	2010	38.9	1.59
02GH011	2011	34.8	1.54
02GH011	2012	14.6	1.16
02GH011	2013	25.3	1.40
02GH011	2014	21.5	1.33

avg = average flow	1.40
s_y = standard deviation	0.177
C_S = Coefficient of Skew	-1.182

A1 - Little River at Windsor	50.5	km^2
A2 - Little River at EC Row Expressway	44.9	km^3

Return Period	Probability	z	K	Log Q	Flow (m3/s)	Transposed Flow (m3/s)
2	0.5	0.00	0.19	1.43	27.0	24.7
5	0.2	0.84	0.84	1.55	35.2	32.2
10	0.1	1.28	1.09	1.59	39.0	35.7
25	0.04	1.75	1.30	1.63	42.4	38.8
50	0.02	2.05	1.40	1.65	44.2	40.5
100	0.01	2.33	1.48	1.66	45.6	41.8
200	0.005	2.58	1.53	1.67	46.7	42.8

Log Pearson Type III Distribution

$$\boxed{K = \frac{2}{C_S}\left\{\left[\left(z - \frac{C_S}{6}\right)\frac{C_S}{6} + 1\right]^3 - 1\right\}}$$

$$\boxed{Q = avg + K * s_y}$$

Where C_S = Coefficient of Skew
avg = average flow
s_y = standard deviation
Q = flow
z = frequency factor

Transposition of Flood Discharges
As per Equation 8.31 in MTO Drainage Manual (1997)

$$\boxed{Q_2 = Q_1\left(\frac{A_2}{A_1}\right)^{0.75}}$$

where Q_1= known peak discharge
Q_2= unknown peak discharge
A_1= known basin area
A_2= unknown basin area

Modified Index Flood Method
Southern Ontario Type Basin
Upper Little River

Watershed Area - A	44.9	km^2	
Water Storage Area - A_d	2	km^2	
Storage (%) - A_d/A	4.5	%	
CN	82		
Slope	0.15	%	
	0.0015	m/m	
Base Watershed Class	10.1	From Design Chart 1.17	
Slope adjustment	-0.82	From Design Chart 1.18	
Storage adjustment	-0.50	From Design Chart 1.19	
Net adjustment	-1.32		
Net Watershed Class	8.73		
Class Coefficient	2.38	From Design Chart 1.15	
$Q_{2.33} = Q_{25} * 0.46$	19.0	m^3/s	From Design Chart C5-10b
$Q_5 = Q_{25} * 0.65$	26.9	m^3/s	From Design Chart C5-10b
$Q_{10} = Q_{25} * 0.80$	33.1	m^3/s	From Design Chart C5-10b
$Q_{25} = CxA^{0.75}$	41.3	m^3/s	
$Q_{50} = Q_{25} * 1.15$	47.5	m^3/s	From Design Chart C5-10b
$Q_{100} = Q_{25} * 1.29$	53.3	m^3/s	From Design Chart C5-10b

Notes:

Based on Example 8.8 of the MTO Drainage Management Manual 1995-1997
Design Chart C5-10b from MTC Drainage Manual Volume 1 Chapter C

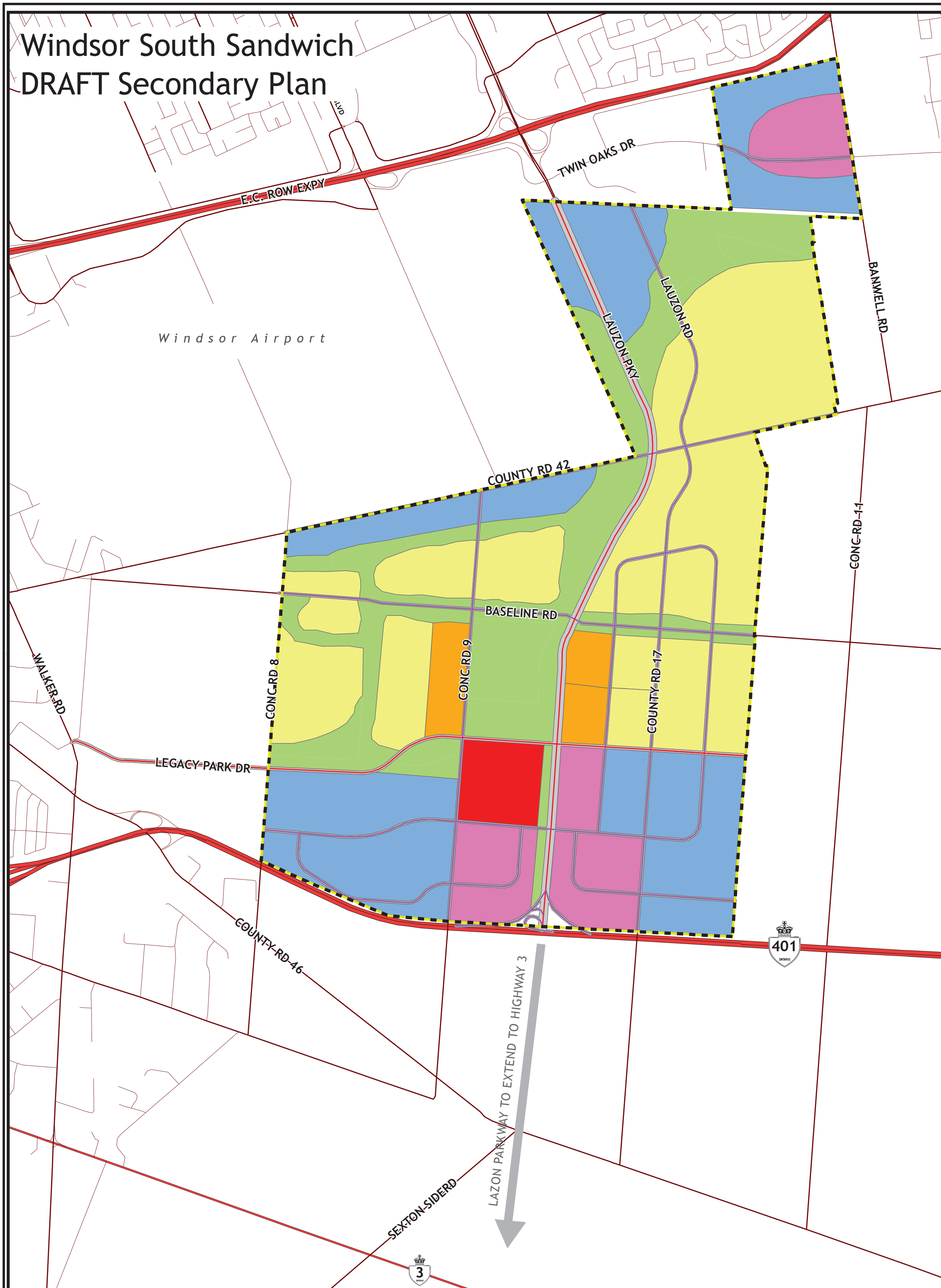
Existing Condition Flows

		24-hour Chicago Flow from PC-SWMM			Municipal Drain Capacity
Catchment	Area	2-year (m^3/s)	5-year (m^3/s)	100 year (m^3/s)	(m^3/s)
1000	96.4	5.00	7.24	14.22	0.559
1002	158.4	6.23	8.95	17.76	0.919
1005	51.6	4.41	6.32	12.26	0.299
1007	21.0	1.09	1.57	3.09	0.122
1010	38.4	2.47	3.52	6.77	0.223
1015	14.3	1.36	1.89	3.46	0.083
1020	92.9	1.26	1.74	3.29	0.539
1025	13.9	0.63	0.88	1.63	0.081
1027	56.5	3.97	5.68	11.32	0.328
1030	33.4	3.14	4.48	8.60	0.194
1035	105.2	1.44	2.00	3.80	0.610
1040	27.4	2.05	2.98	5.94	0.159
1045	26.7	0.39	0.55	1.07	0.155
1050	122.6	2.73	3.76	6.89	0.711
1055	32.0	0.45	0.62	1.19	0.185
1060	115.3	1.50	2.07	3.88	0.669
1065	29.0	1.19	1.65	3.02	0.168
1070	88.0	1.03	1.41	2.60	0.510
1072	53.6	3.41	4.92	9.55	0.311
1075	38.6	0.60	0.86	1.71	0.224
1080	279.4	5.14	7.17	13.28	1.621
1085	135.0	1.66	2.29	4.23	0.783
1090	24.8	0.37	0.52	1.02	0.144
1095	161.2	1.96	2.70	4.97	0.935
1100	53.8	0.66	0.91	1.69	0.312
1105	138.2	4.21	6.01	11.65	0.802
1110	59.5	0.81	1.13	2.14	0.345
1115	113.7	2.92	4.03	7.49	0.660
1120	142.0	1.96	2.72	5.18	0.824
1125	87.3	1.20	1.66	3.16	0.506
1130	226.5	2.69	3.71	6.82	1.314
1133	35.3	0.55	0.78	1.56	0.205
1135	24.4	0.35	0.49	0.94	0.142
1140	25.8	1.43	1.97	3.60	0.150
1145	161.9	3.02	4.21	7.78	0.939
1150	13.2	0.61	0.85	1.57	0.077
1155	110.5	1.43	1.98	3.69	0.641
1160	7.8	0.12	0.17	0.33	0.045
1165	188.4	2.40	3.31	6.16	1.093
1170	4.7	0.08	0.12	0.25	0.027
1175	145.0	3.11	4.30	7.87	0.841
1180	43.8	1.77	2.60	5.28	0.254
1185	131.5	4.11	5.87	11.34	0.762
1190	107.8	1.51	2.10	4.01	0.625
1195	147.8	1.98	2.74	5.16	0.857
1200	198.5	6.95	10.06	19.79	1.151
1205	59.6	2.38	3.50	7.11	0.346
1210	161.8	5.08	7.16	13.47	0.939
1215	127.9	4.46	6.24	11.60	0.742
1220	117.7	4.74	6.96	14.14	0.683
1225	40.5	4.89	6.85	12.71	0.235
total	4490.76				
average		2.33	3.30	6.31	0.511

Proposed Data from PC-SWMM

Catchment	Area (ha)	Municipal Drain Capacity (m^3/s)	Flow - 2yr (m^3/s)	Flow - 5yr (m^3/s)	Flow - 100 yr (m^3/s)	Flow - 2yr (L/ha)	Flow - 5yr (L/ha)	Flow - 100 yr (L/ha)		Runoff - 2yr (ML)	Runoff - 5yr (ML)	Runoff - 100yr (ML)	Runoff - 2yr (m^3/ha)	Runoff - 5yr (m^3/ha)	Runoff - 100yr (m^3/ha)		Max Vol - 2yr (ML)	Max Vol - 5yr (ML)	Max Vol - 100yr (ML)	Max Vol - 2yr (m^3/ha)	Max Vol - 5yr (m^3/ha)	Max Vol - 100yr (m^3/ha)		Max. Pond Depth - 2yr (m)	Max. Pond Depth - 5yr (m)	Max. Pond Depth - 100yr (m)
S2020	66.13	0.384	0.226	0.286	0.409	3.4	4.3	6.2		28	37	64	420	559	962		20	27	49	302.1	410.8	739.5		0.73	0.97	1.65
S2030	117.58	0.682	0.396	0.512	0.742	3.4	4.4	6.3		41	56	99	349	475	844		29	40	72	247.4	341.2	613.3		0.80	1.07	1.82
S2035	81.42	0.472	0.274	0.348	0.498	3.4	4.3	6.1		33	44	77	403	540	940		23	32	58	287.7	393.5	716.0		0.74	0.99	1.70
S2045	63.81	0.370	0.209	0.274	0.413	3.3	4.3	6.5		20	28	53	312	440	828		12	18	36	194.8	277.6	562.3		0.69	0.96	1.81
S2050	97.34	0.565	0.310	0.410	0.615	3.2	4.2	6.3		32	44	82	326	456	845		21	29	56	211.7	297.3	579.0		0.71	0.98	1.78
S2055	65.11	0.378	0.233	0.294	0.399	3.6	4.5	6.1		24	32	56	362	493	866		18	24	44	269.8	374.8	679.0		0.85	1.15	1.94
S2060	112.73	0.654	0.331	0.441	0.667	2.9	3.9	5.9		40	54	98	352	482	870		26	36	67	232.7	316.5	592.9		0.67	0.89	1.58
S2065	116.33	0.675	0.326	0.417	0.603	2.8	3.6	5.2		51	67	114	439	578	984		36	49	89	313.6	420.1	769.0		0.67	0.88	1.53
S2075	117.69	0.683	0.320	0.426	0.668	2.7	3.6	5.7		37	52	97	314	439	823		24	33	63	203.1	276.3	535.0		0.69	0.92	1.67
S2080	69.76	0.405	0.151	0.246	0.686	2.2	3.5	9.8		12	20	46	176	289	654		7	10	22	96.8	145.3	312.7		0.75	1.08	2.09
S2085	100.9	0.585	0.189	0.294	0.532	1.9	2.9	5.3		26	38	75	258	375	746		17	24	46	171.7	233.2	456.4		0.71	0.95	1.73
S2090	72.83	0.422	0.195	0.265	0.424	2.7	3.6	5.8		18	26	53	241	357	725		10	14	30	133.2	190.5	407.5		0.61	0.85	1.68
S2095	117.98	0.684	0.308	0.410	0.618	2.6	3.5	5.2		36	50	95	305	426	802		24	33	65	200.0	277.3	549.7		0.68	0.92	1.71
S2100	50.57	0.293	0.194	0.231	0.299	3.8	4.6	5.9		19	26	46	372	512	903		14	20	37	275.7	395.9	737.6		0.79	1.10	1.90
S2105	60.91	0.353	0.198	0.254	0.371	3.3	4.2	6.1		20	28	52	335	465	855		13	19	38	212.5	305.9	623.7		0.68	0.96	1.81
S2110	49.79	0.289	0.174	0.221	0.313	3.5	4.4	6.3		18	24	44	357	490	886		12	16	32	234.9	329.3	636.6		0.72	0.98	1.77
S2115	113.58	0.659	0.289	0.418	0.673	2.5	3.7	5.9		29	42	84	258	373	739		17	23	48	151.3	205.7	420.2		0.61	0.81	1.56
S2125	93.38	0.542	0.273	0.349	0.505	2.9	3.7	5.4		32	44	80	345	474	862		21	28	55	222.2	304.5	592.1		0.66	0.89	1.63
S2130	80.55	0.467	0.242	0.307	0.426	3.0	3.8	5.3		37	48	80	453	593	997		26	36	64	328.9	443.2	794.3		0.66	0.88	1.50
S2133	93.08	0.540	0.271	0.353	0.528	2.9	3.8	5.7		36	49	85	388	522	917		24	33	60	261.4	352.2	645.3		0.66	0.87	1.51
S2135	22.82	0.132	0.087	0.108	0.151	3.8	4.7	6.6		8	11	20	351	485	879		5	7	15	224.7	325.2	640.7		0.70	0.98	1.76
S2140	82.1	0.476	0.234	0.315	0.482	2.9	3.8	5.9		22	32	63	265	387	766		13	19	41	156.6	232.6	497.8		0.68	0.98	1.92
S2155	77.27	0.448	0.238	0.303	0.436	3.1	3.9	5.6		26	36	66	338	469	860		17	24	47	219.4	308.5	610.3		0.70	0.97	1.79
S2165	179.12	1.039	0.442	0.635	0.952	2.5	3.5	5.3		61	83	153	338	466	853		41	55	106	227.1	305.4	589.5		0.70	0.92	1.68
S2175	47.3	0.274	0.149	0.184	0.254	3.2	3.9	5.4		22	29	47	471	614	994		19	26	42	411.8	544.1	884.5		0.99	1.27	1.95
S2185	65.4	0.379	0.204	0.260	0.374	3.1	4.0	5.7		23	32	57	354	486	878		15	22	42	230.3	330.1	648.2		0.68	0.95	1.74
S2190	84.96	0.493	0.087	0.200	0.377	1.0	2.4	4.4		30	41	74	350	481	872		25	32	58	299.1	380.4	677.5		0.89	1.11	1.86
S2200	784.14	4.548	1.018	1.599	3.142	1.3	2.0	4.0		176	252	511	225	321	652		119	157	287	151.5	199.7	365.8		0.62	0.81	1.42
S2210	58.24	0.338	0.040	0.085	0.205	0.7	1.5	3.5		23	31	54	402	527	925		23	27	44	391.8	470.1	754.0		0.98	1.16	1.77
S2215	106.67	0.619	0.146	0.256	0.499	1.4	2.4	4.7		38	52	94	357	487	878		31	39	68	290.2	370.0	641.8		0.82	1.03	1.69
Total	3351.49									1058	1465	2712					723	979	1825							
Average		0.63	0.26	0.36	0.58	3	4	6		34	47	87	341	469	853		23	32	59	238	325	609		0.73	0.98	1.73

Windsor South Sandwich DRAFT Secondary Plan



Legend

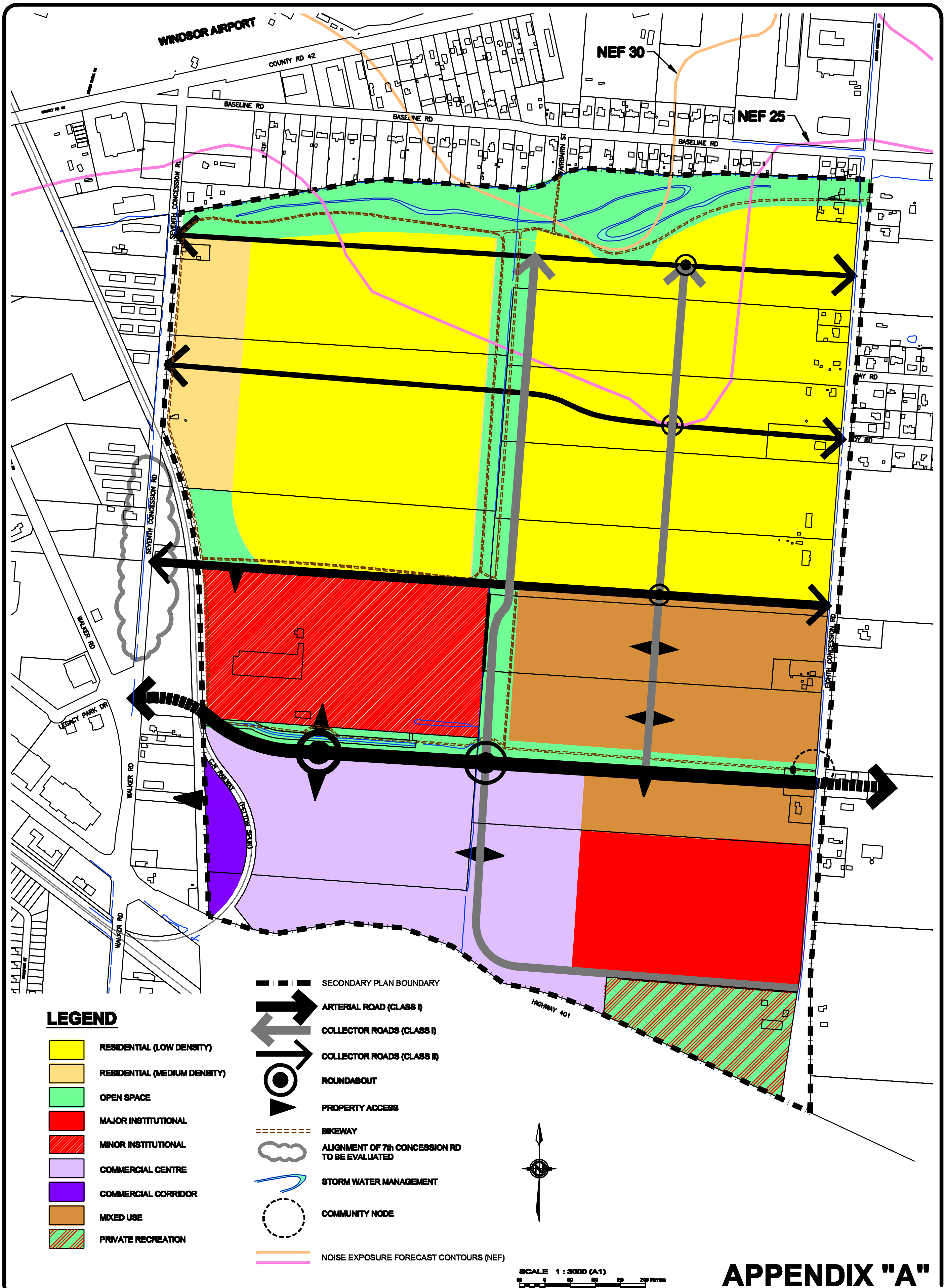
- Study Area
- Proposed Collector Road
- Proposed Arterial Road
- Business Park
- Community Core
- Employment
- Low Density Residential
- Medium/High Density Residential
- Open Space / Natural Heritage; EP

N

0 1,000 2,000 3,000 Metres

MERIDIAN

Aug 2011



WINDSOR AIRPORT
COUNTY RD 42
BASELINE RD
NEF 30
NEF 25
FAIRBAIRN ST
SEVENTH CONCESSION RD
EIGHTH CONCESSION RD
WALKER RD
LEGACY PARK DR
CN RAILWAY (PELTON SPUR)
HIGHWAY 401
LEGEND
RESIDENTIAL (LOW DENSITY)
RESIDENTIAL (MEDIUM DENSITY)
OPEN SPACE
MAJOR INSTITUTIONAL
MINOR INSTITUTIONAL
COMMERCIAL CENTRE
COMMERCIAL CORRIDOR
MIXED USE
PRIVATE RECREATION
SECONDARY PLAN BOUNDARY
ARTERIAL ROAD (CLASS I)
COLLECTOR ROADS (CLASS I)
COLLECTOR ROADS (CLASS II)
ROUNDABOUT
PROPERTY ACCESS
BIKEWAY
ALIGNMENT OF 7th CONCESSION RD TO BE EVALUATED
STORM WATER MANAGEMENT
COMMUNITY NODE
NOISE EXPOSURE FORECAST CONTOURS (NEF)
SCALE 1 : 3000 (A1)

APPENDIX "A"

WINDSOR AIRPORT
MASTER PLAN

FIGURE 7-1 - RECOMMENDED LAND USE PLAN

COMMUNICATIONS RESERVE
AIRPORT EMPLOYMENT
AIRFIELD RESERVE
GENERAL AVIATION
AIR TERMINAL RESERVE
EMPLOYMENT LANDS
AIRPORT TERMINAL BUILDING
OPEN SPACE/NATURAL HERITAGE
EXISTING AIRCRAFT PAVEMENT
FUTURE AIRCRAFT PAVEMENT
PROPOSED LAND ACQUISITIONS
TOWER LINE OF SIGHT
EXISTING PAVEMENT (ROAD)
DRAIN

YQG YOUR QUICK GATEWAY
WINDSOR INTERNATIONAL AIRPORT

DILLON CONSULTING

LPS AVIA CONSULTING

Base data provided by City of Windsor
Map created by Paddy Kennedy
Map checked by FRF

0 100m 500m 1km
SCALE

Map Projection: n/a
Project #: 09-2665
Status: n/a
Date: December 2010

N W E S

File Location: \\20dillon.dillon.ca\toronto data\PROJECTS\DRAFT\09\092665 Windsor Airport Master Plan

TOWN OF TECUMSEH
TECUMSEH HAMLET SECONDARY PLAN

TECUMSEH HAMLET POTENTIAL FUTURE LAND USES AND COMMUNITY DESIGN

DESIGNING FUTURE URBAN DEVELOPMENT FOR:

- settlement patterns, built forms and transportation systems that create a more sustainable, efficient, healthy and livable communities
- mixed use, compact, pedestrian-oriented communities
- neighbourhoods designed for people, not just cars
- places of work, play and shopping located close to where people live
- neighbourhoods should be diverse in land use and population
- broad range of housing choices
- public places and corridors that foster a sense of community
- schools should be sized and located within neighbourhoods to alllow children to safely bike and walk to and from home
- shorter block lengths, sidewalks, trails, bike paths and the "5 minute walk rule" should be provided to encourage a healthy lifestyle
- provide greater opportunities to interact and move about in a community for those who cannot or choose not to drive automobiles (ie. seniors, youth)
- mixed-use areas where residential units locate above commercial shops are important in creating a community that is not divided into "sections"

LEGEND

URBAN AREA BOUNDARY
STUDY_AREA
POTENTIAL ROAD LINKAGES
POTENTIAL RECREATIONAL TRAIL LINAKGES
POTENTIAL RESIDENTIAL
POTENTIAL RECREATIONAL
POTENTIAL INSTITUTIONAL
POTENTIAL COMMERCIAL

Residential
Commercial
Institutional
Industrial
Recreational
Ontario Hydro ROW
Public Utility

0 0.5 1
Kilometre

N

PREPARED BY:
TECUMSEH PLANNING & GIS DEPARTMENT
May 2011

WINDSOR SOLAR PROJECT

FIGURE 2
PROJECT LOCATION - NATURAL FEATURES AND SETBACKS

- Gate
- Communication Tower
- Point of Common Coupling
- Fence
- Solar Panel Row
- Access Road
- Operations & Maintenance Building
- MV Station
- Substation Transformer
- Substation Yard
- Temporary Laydown Area
- Railway
- Permanent / Intermittent Stream
- Ephemeral Drain
- Project Location
- Project Location 50 m Setback
- Project Location 120 m Setback
- Project Location 300 m Setback
- Parcel Boundary
- Provincially Significant Wetland
- Woodland

1:10,000

0 50 100 200 300 m

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR, ERCA

MAP CREATED BY: GM
MAP CHECKED BY: JP
MAP PROJECTION: NAD 1983 UTM Zone 17N

FILE LOCATION: I:\GIS\149152 - Samsung Windsor\mxd\Water Assessment\

DILLON CONSULTING

PROJECT: 149152

STATUS: DRAFT

DATE: 11/13/2014

Town of Tecumseh Consolidated Official Plan
Land Use Designations

LEGEND

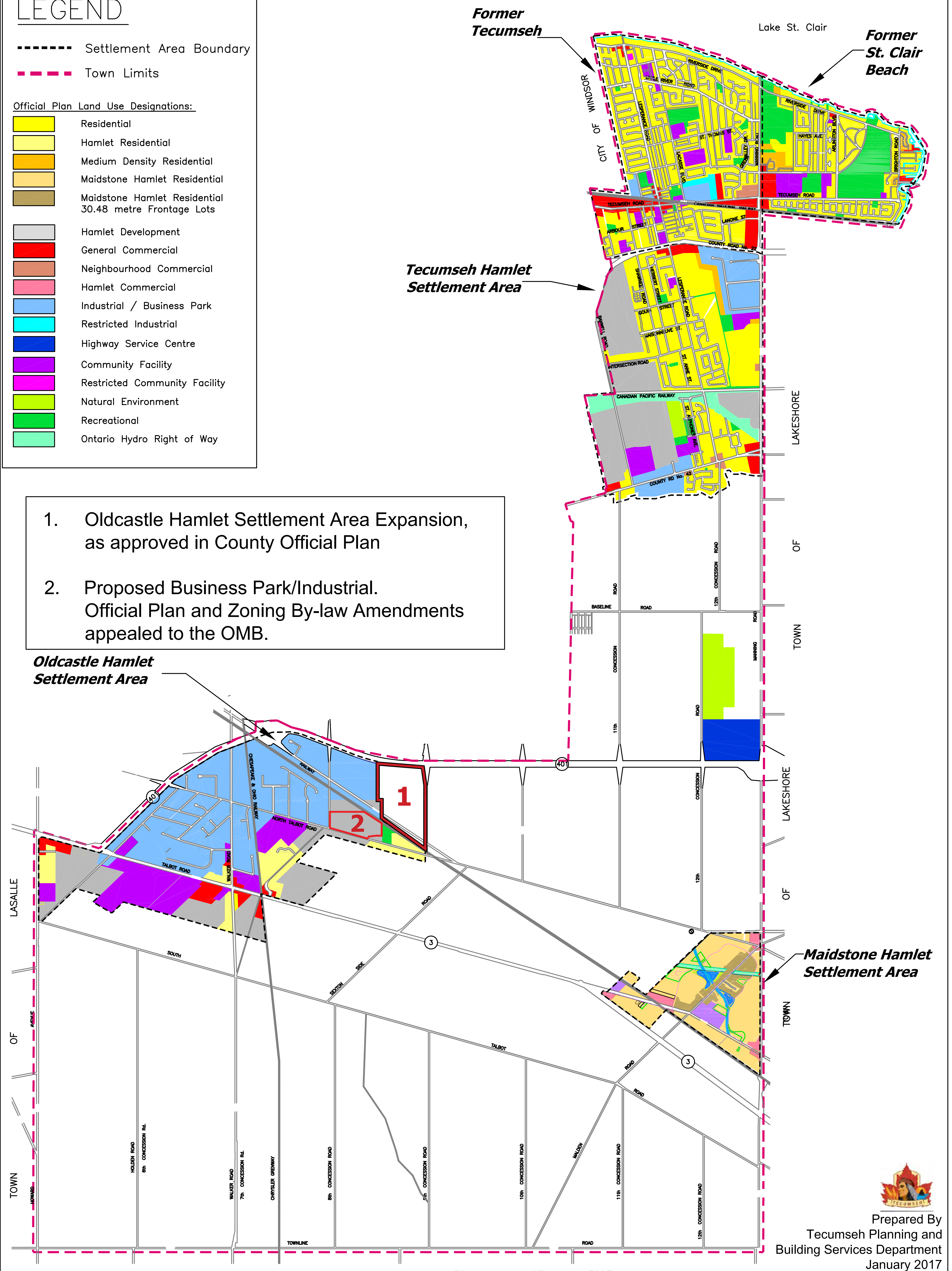
Settlement Area Boundary
Town Limits

Official Plan Land Use Designations:

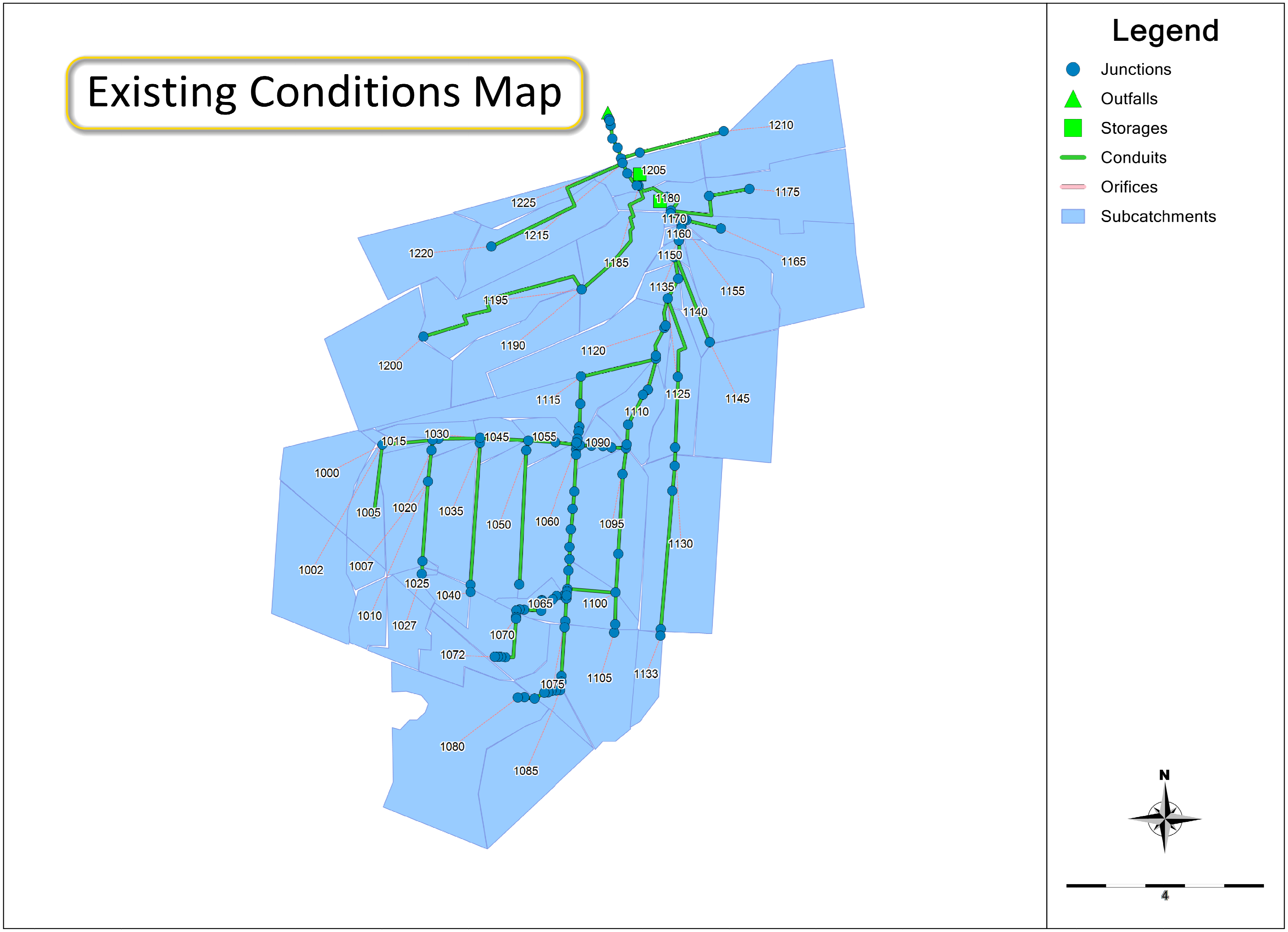
- Residential
- Hamlet Residential
- Medium Density Residential
- Maidstone Hamlet Residential
- Maidstone Hamlet Residential 30.48 metre Frontage Lots
- Hamlet Development
- General Commercial
- Neighbourhood Commercial
- Hamlet Commercial
- Industrial / Business Park
- Restricted Industrial
- Highway Service Centre
- Community Facility
- Restricted Community Facility
- Natural Environment
- Recreational
- Ontario Hydro Right of Way

1. Oldcastle Hamlet Settlement Area Expansion, as approved in County Official Plan

2. Proposed Business Park/Industrial. Official Plan and Zoning By-law Amendments appealed to the OMB.



Prepared By
Tecumseh Planning and
Building Services Department
January 2017


Existing Conditions Map
Legend
Junctions
Outfalls
Storages
Conduits
Orifices
Subcatchments
N
4
1210
1205
1175
1225
1180
1170
1160
1215
1220
1150
1185
1165
1135
1155
1195
1140
1190
1120
1200
1115
1125
1145
1110
1015
1030
1045
1055
1090
1000
1005
1020
1035
1050
1060
1095
1130
1002
1007
1025
1040
1065
1100
1010
1027
1070
1072
1075
1105
1133
1080
1085

```
[TITLE]
Upper Little River Model.


[OPTIONS]
;;Options            Value
;;------------------ ------------
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
START_DATE           12/14/2011
START_TIME           00:00:00
REPORT_START_DATE    12/14/2011
REPORT_START_TIME    00:00:00
END_DATE             12/17/2011
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:05:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         30
ALLOW_PONDING        YES
INERTIAL_DAMPING     FULL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0

[EVAPORATION]
;;Type          Parameters
;;------------- ----------
CONSTANT     0.0
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
24HR             INTENSITY 0:10   1.0    TIMESERIES 100yr_24hr-chi
;Continous Simulation
Cont             INTENSITY 1:00   1.0    FILE       "W:\active\160311265\design\analysis\PCSWMM\windsor-hly03-123_26012012_151422
;48 hour Regional Storm event; 285 mm total precipitation
Hurricane_Hazel  INTENSITY 0:15   1.0    TIMESERIES Hazel

[SUBCATCHMENTS]
;;                                                 Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
;6th Conc Road Drain North of 401
1000             24HR             j29              96.43    75       1000     0.15     0
;6th Conc including south of 401
1002             24HR             j29              158.41   50       1400     0.15     0
;East of 6th Conc Drain, between Baseline and Division Rd
1005             24HR             j6               51.55    75       1300     0.15     0
;East of 6th Conc Drain, north of 401
1007             24HR             j58.5            21.04    50       300      0.15     0
;East of 6th Conc Drain, south of 401
1010             24HR             j58.5            38.43    50       800      0.15     0
;Drains to 7th Conc Road Drain
1015             24HR             J5015            14.34    50       700      0.15     0
;7th Conc Drain north of 401
1020             24HR             J58              92.94    5        1500     0.15     0
;To 7th Conc drain; at 401 and Provincial Rd
1025             24HR             J58.7            13.92    25       300      0.15     0
;7th Conc Drain south of 401
1027             24HR             J58.7            56.51    90       900      0.15     0
;8th Conc Drain, along Baseline
1030             24HR             J5030            33.41    75       1000     0.15     0
;8th Conc Drain, north of 401
1035             24HR             J55              105.23   5        1800     0.15     0
;8th Conc Drain, between 401 and Division Rd.
1040             24HR             J25              27.35    90       500      0.15     0
;Hayes Drain at Baseline
1045             24HR             J5045            26.73    5        600      0.15     0
;To Hayes Drain, north of 401
1050             24HR             J53              122.6    10       1900     0.15     0
;9th Conc Drain, at Baseline
1055             24HR             J5055            31.97    5        600      0.15     0
;9th Conc Drain, north of 401
1060             24HR             J5055            115.34   5        1600     0.15     0
;Hurley Drain, north of 401
;No information available on culvert under 401
1065             24HR             J5060            29.03    20       700      0.15     0
;9th Conc Drain south of 401
1070             24HR             J72              87.98    5        800      0.15     0
;To Hurley Drain (?), south of 401
1072             24HR             J74              53.57    90       700      0.15     0
;To Little River, south of 401
1075             24HR             J5075            38.55    5        1100     0.15     0
;Large catchment to 9th Conc Drain south of Division Rd.
1080             24HR             J90              279.42   10       2500     0.15     0
;To Little River Drain, south of North Talbot Rd.
1085             24HR             J81              134.98   5        1500     0.15     0
;Little River, at Baseline
1090             24HR             J5090            24.78    5        600      0.15     0
;Large catchment draining to Little River, north of 401
1095             24HR             J5090            161.18   5        1700     0.15     0
;To Little River, north of 401, south of catchment 1095
1100             24HR             J20              53.81    5        600      0.15     0
;To Little River, south of 401
1105             24HR             J5100            138.19   25       1300     0.15     0
;To Little River, south of County Rd 42, north of Baseline
1110             24HR             J5110            59.53    5        1000     0.15     0
;To Little River, south of County Rd 42
1115             24HR             J30              113.74   10       3000     0.15     0
;To Little River, north of County Rd 42
1120             24HR             J12              142      5        2500     0.15     0
;Lower Watson Drain, north of 401
1125             24HR             J5120            87.31    5        1500     0.15     0
;To Watson Drain, north of 401
1130             24HR             J103             226.54   5        2200     0.15     0
;To Watson Drain, south of 401
1133             24HR             J11              35.33    5        1000     0.15     0
;Little River, between Lauzon Pkwy and Lauzon Rd
1135             24HR             J9               24.41    5        500      0.15     0
;To Little River, Lauzon Rd
1140             24HR             J23              25.79    25       1000     0.15     0
;To Little River; south of County Rd 42
;Outlet to J8; 10th Concession Drain
1145             24HR             J8               161.89   10       1500     0.15     0
;To Little River, at junction of Soulliere and Little River
1150             24HR             J5135            13.24    25       300      0.15     0
;To Little River, Soulliere drain
1155             24HR             J5150            110.49   5        1500     0.15     0
1160             24HR             J5160            7.83     5        200      0.15     0
;Desjardeins Drain
1165             24HR             J4.5             188.42   5        2400     0.15     0
;To Little River, south of CP line
1170             24HR             J24              4.65     5        200      0.15     0
;Lachance Drain
1175             24HR             J0.9             144.97   10       2000     0.15     0
;To Little River; d/s end of Lachance drain
1180             24HR             s5180            43.8     75       300      0.15     0
1185             24HR             J46102           131.45   25       1300     0.15     0
;To Little River; u/s of 1185
1190             24HR             J5190            107.84   5        2000     0.15     0
;To Little River; drains to 1185
1195             24HR             J5190            147.79   5        2300     0.15     0
;To Little River, furthest catchment west
1200             24HR             J13              198.52   50       1400     0.15     0
;To Little River; intersection of Hwy 2 and Lauzon Pkwy; furthest upstream section
;White Oaks Buisness Parl
1205             24HR             s5205            59.57    75       400      0.15     0
;Gouin Drain
1210             24HR             J0.75            161.84   20       2000     0.15     0
;To Little River; at intersection of Hwy 2 and Lauzon Pkwy
1215             24HR             J17              127.92   20       2000     0.15     0
;To Little River; just south of Hwy 2
1220             24HR             J3               117.69   75       800      0.15     0
;To Little River; at intersection of Hwy 2 and Lauzon Pkwy
1225             24HR             J17              40.51    75       2000     0.15     0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
1000             0.013      0.25       1          2.5        0          OUTLET
1002             0.013      0.25       1          2.5        0          OUTLET
1005             0.013      0.25       1          2.5        0          OUTLET
1007             0.013      0.25       1          2.5        0          OUTLET
1010             0.013      0.25       1          2.5        0          OUTLET
1015             0.013      0.25       1          2.5        0          OUTLET
1020             0.013      0.25       1          2.5        0          OUTLET
1025             0.013      0.25       1          2.5        0          OUTLET
1027             0.013      0.25       1          2.5        0          OUTLET
1030             0.013      0.25       1          2.5        0          OUTLET
1035             0.013      0.25       1          2.5        0          OUTLET
1040             0.013      0.25       1          2.5        0          OUTLET
1045             0.013      0.25       1          2.5        0          OUTLET
1050             0.013      0.25       1          2.5        0          OUTLET
1055             0.013      0.25       1          2.5        0          OUTLET
1060             0.013      0.25       1          2.5        0          OUTLET
1065             0.013      0.25       1          2.5        0          OUTLET
1070             0.013      0.25       1          2.5        0          OUTLET
1072             0.013      0.25       1          2.5        0          OUTLET
1075             0.013      0.25       1          2.5        0          OUTLET
1080             0.013      0.25       1          2.5        0          OUTLET
1085             0.013      0.25       1          2.5        0          OUTLET
1090             0.013      0.25       1          2.5        0          OUTLET
```

```
1095            0.013      0.25       1          2.5        0          OUTLET
1100            0.013      0.25       1          2.5        0          OUTLET
1105            0.013      0.25       1          2.5        0          OUTLET
1110            0.013      0.25       1          2.5        0          OUTLET
1115            0.013      0.25       1          2.5        0          OUTLET
1120            0.013      0.25       1          2.5        0          OUTLET
1125            0.013      0.25       1          2.5        0          OUTLET
1130            0.013      0.25       1          2.5        0          OUTLET
1133            0.013      0.25       1          2.5        0          OUTLET
1135            0.013      0.25       1          2.5        0          OUTLET
1140            0.013      0.25       1          2.5        0          OUTLET
1145            0.013      0.25       1          2.5        0          OUTLET
1150            0.013      0.25       1          2.5        0          OUTLET
1155            0.013      0.25       1          2.5        0          OUTLET
1160            0.013      0.25       1          2.5        0          OUTLET
1165            0.013      0.25       1          2.5        0          OUTLET
1170            0.013      0.25       1          2.5        0          OUTLET
1175            0.013      0.25       1          2.5        0          OUTLET
1180            0.013      0.25       1          2.5        0          OUTLET
1185            0.013      0.25       1          2.5        0          OUTLET
1190            0.013      0.25       1          2.5        0          OUTLET
1195            0.013      0.25       1          2.5        0          OUTLET
1200            0.013      0.25       1          2.5        0          OUTLET
1205            0.013      0.25       1          2.5        0          OUTLET
1210            0.013      0.25       1          2.5        0          OUTLET
1215            0.013      0.25       1          2.5        0          OUTLET
1220            0.013      0.25       1          2.5        0          OUTLET
1225            0.013      0.25       1          2.5        0          OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
1000            320        0.254      0.265
1002            320        0.254      0.265
1005            320        0.254      0.265
1007            320        0.254      0.265
1010            320        0.254      0.265
1015            320        0.254      0.265
1020            320        0.254      0.265
1025            320        0.254      0.265
1027            320        0.254      0.265
1030            320        0.254      0.265
1035            320        0.254      0.265
1040            320        0.254      0.265
1045            320        0.254      0.265
1050            320        0.254      0.265
1055            320        0.254      0.265
1060            320        0.254      0.265
1065            320        0.254      0.265
1070            320        0.254      0.265
1072            320        0.254      0.265
1075            320        0.254      0.265
1080            320        0.254      0.265
1085            320        0.254      0.265
1090            320        0.254      0.265
1095            320        0.254      0.265
1100            320        0.254      0.265
1105            320        0.254      0.265
1110            320        0.254      0.265
1115            320        0.254      0.265
1120            320        0.254      0.265
1125            320        0.254      0.265
1130            320        0.254      0.265
1133            320        0.254      0.265
1135            320        0.254      0.265
1140            320        0.254      0.265
1145            320        0.254      0.265
1150            320        0.254      0.265
1155            320        0.254      0.265
1160            320        0.254      0.265
1165            320        0.254      0.265
1170            320        0.254      0.265
1175            320        0.254      0.265
1180            320        0.254      0.265
1185            320        0.254      0.265
1190            320        0.254      0.265
1195            320        0.254      0.265
1200            320        0.254      0.265
1205            320        0.254      0.265
1210            320        0.254      0.265
1215            320        0.254      0.265
1220            320        0.254      0.265
1225            320        0.254      0.265

[JUNCTIONS]
;;              Invert     Max.       Init.      Surcharge  Ponded
;;Name          Elev.      Depth      Depth      Depth      Area
;;-------------- ---------- ---------- ---------- ---------- ----------
;River: Gouin
;Reach: Gouin
;Transect: 0.5
J0.5            177.9      3.6        0          5          0
;River: Gouin
;Reach: Gouin
;Transect: 0.75
J0.75           178.4      3.6        0          5          0
;River: Lachance
;Reach: Lachance
;Transect: 0.8
J0.8            178.1      3.6        0          5          0
;River: Lachance
;Reach: Lachance
;Transect: 0.9
J0.9            178.6      3.6        0          5          0
J1              185        2.7        0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 10
J10             178.819    5          0          5          0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 102
J102            180.729    2.1        0          5          0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 103
J103            181.937    2.7        0          5          0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 105
J105            182.202    2.1        0          5          0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 106
J106            182.812    1.739      0          5          0
;River: Watson Drain
;Reach: Watson Drain
;Transect: 107
J107            184.192    2.055      0          5          0
;Upstream end of Watson Drain underpass culvert
;Information from SWMHYMO model (MTO)
J11             184.2      2          0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 12
J12             179.1      5.2        0          5          0
J13             182.998    2          0          5          0
;River: Little River
;Reach: Baseline to Wats
;Transect: 14
J14             180.062    4.238      0          5          0
;River: Little River
;Reach: Baseline to Wats
;Transect: 15
J15             180.175    4.238      0          5          0
;River: Little River
;Reach: Baseline to Wats
;Transect: 16
J16             180.509    4.291      0          5          0
J17             177.208    5.7        0          5          0
;River: Little River
;Reach: Little River
;Transect: 18
J18             181.636    2.8        0          5          0
;River: Little River
;Reach: Little River
;Transect: 19
J19             183.2      2.1        0          5          0
;River: Little River
;Reach: Desjardeins to Lachance
;Transect: 2
;Junction of Desjardeins and Little River
J2              177.865    6          0          5          0
;River: Little River
;Reach: Little River
;Transect: 20
J20             184        2.7        0          5          0
J21             179.754    4.246      0          5          0
J22             179.1      5.2        0          5          0
J23             178.684    5.4        0          5          0
J24             177.865    6          0          5          0
;Created to include culvert d/s of 1040
J25             187.154    2          0          5          0
J26             180.916    4          0          5          0
J27             177.1      5.6        0          5          0
J28             182.2      4          0          5          0
J29             186.6      5          0          5          0
J3              180.95     2          0          5          0
J30             182.5      3          0          0          0
J31             182.8      3          0          5          0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 32
J32             182.219    3.381      0          5          0
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;River: 9th Concession
;Reach: 9th Concession
;Transect: 33
J33             182.74     2.67       0          5          0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 34
J34             183.49     2.45       0          5          0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 35
J35             183.81     2.38       0          5          0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 36
J36             184.19     2.46       0          5          0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 37
J37             184.29     2.35       0          5          0
;River: Little River
;Reach: Gouin to DS end
;Transect: 37500
J37500          176.8      5.1        0          5          0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 38
J38             184.45     2.49       0          5          0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 39
J39             184.53     2.69       0          5          0
;River: Little River
;Reach: Gouin to DS end
;Transect: 39001
J39001          176.9      7.9        0          5          0
;River: Desjardeins
;Reach: Desjardeins
;Transect: 4
J4              178.1      3.6        0          5          0
;River: Desjardeins
;Reach: Desjardeins
;Transect: 4.5
J4.5            178.7      3.4        0          5          0
;River: 9th Concession
;Reach: 9th Concession
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;Transect: 40
J40             184.637    2.817      0          5          0
;River: Little River
;Reach: Gouin to DS end
;Transect: 40323
J40323          177        5.3        0          5          0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 41
J41             184.838    2.262      0          5          0
;River: Little River
;Reach: Lachance to Goui
;Transect: 41106
J41106          177.1      5.7        0          5          0
J42             183        3          0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 43
J43             184.9      2.451      0          5          0
;River: Little River
;Reach: Lachance to Goui
;Transect: 43501
J43501          176.9      5.5        0          5          0
J44             183.1      3          0          5          0
J45             183.5      3          0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 46
J46             185.72     2.9        0          5          0
;River: Little River
;Reach: Lachance to Goui
;Transect: 46102
J46102          177.1      5.6        0          5          0
;River: Little River
;Reach: Lachance to Goui
;Transect: 46203
J46203          177.7      5.6        0          5          0
;River: 6th Concession D
;Reach: 9th to Little Ri
;Transect: 47
J47             181.22     3.77       0          5          0
;River: 6th Concession D
;Reach: 9th to Little Ri
;Transect: 48
J48             181.43     3.52       0          5          0
;River: 6th Concession D
```

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;Reach: 9th to Little Ri
;Transect: 49
J49             181.69     3.77       0          5          0
J5              176.8      5.1        0          5          0
J50             183.5      2          0          5          0
;River: 6th Concession D
;Reach: 7th to 8th
;Transect: 57
J5015           186.55     1.555      0          5          0
J5025           190.33     2          0          5          0
;River: 6th Concession D
;Reach: 8th to 9th
;Transect: 54
J5030           184.8      2.3        0          5          0
;River: Baseline Drain
;Reach: Hayes to 9th
;Transect: 52
J5045           184.25     2.15       0          5          0
;River: 6th Concession D
;Reach: 9th to Little River
;Transect: 50
;Junction of 9th Concession Drain and 6th Concession Drain
;Slope of 9th Concession Drain (C6060a-k) updated to reflect survey information, 0.16%
J5055           182.2      4          0          5          0
;River: 9th Concession
;Reach: 9th Concession
;Transect: 42
;Junction of Hurley Relief Drain and southern portion of 9th Concession
;Channels assumed to be at same elevation
J5060           184.846    2.354      0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 77
;Outlet of catchments 1065, 1070, and 1072
J5065           187.6      1.5        0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 44
J5075           185.582    2.6        0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 79
J5080           186.5      2          0          5          0
;River: Little River
;Reach: Baseline to Wats
;Transect: 17
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;Junction of upper reach of Little River and 6th Concession
;Slope of 6th Concession (C6055a-d) updated to reflect survey information-0.11%
J5090           180.916    4.084      0          5          0
;River: Baseline Drain
;Reach: Hayes to 9th
;Transect: 51
J51             183.2      3.6        0          5          0
;River: Little River
;Reach: Little River
;Transect: 21
J5100           185        2.7        0          5          0
;River: Little River
;Reach: Baseline to Watson
;Transect: 13
;County Road 42
;Junction of catchments 1110,1115
J5110           179.754    4.246      0          5          0
;River: Little River
;Reach: Watson to Desjardeins
;Transect: 11
;Junction of Watson Drain and Little River
J5120           178.67     5.329      0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 8
;Junction of catchments 1135 and 1140
J5135           178.8      4.6        0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 5
J5150           178.261    5          0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 3
J5160           178        7          0          5          0
;River: Little River
;Reach: Lachance to Goui
;Transect: 42000
;Junction of McGill Drain and Little River (Node 5180 in Stantec SWMHYMO model)
J5180           177.208    5.7        0          5          0
J5190           178.948    2          0          5          0
;River: Hayes Drain
;Reach: Hayes DrainTransect: 53
J53             184.55     2.167      0          5          0
;River: Hayes Drain
;Reach: Hayes Drain
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;Transect: 53.5
J53.5            186.831    2.167      0          5          0
;River: 8th Concession D
;Reach: 8th Concession
;Transect: 55
J55              184.5      2.8        0          5          0
;River: 8th Concession D
;Reach: 8th Concession
;Transect: 55.5
;Invert from topo - approximate
J55.5            187.104    2.8        0          5          0
;River: 6th Concession D
;Reach: 7th to 8th
;Transect: 56
J56              186.09     2.31       0          5          0
J58              187.7      1.26       0          5          0
;River: 7th Concession D
;Reach: 7th Concession
;Transect: 58.5
J58.5            188.2      1.26       0          5          0
;River: 7th Concession D
;Reach: 7th Concession
;Transect: 58.7
J58.7            190.27     5.31       0          5          0
J6               187.18     5          0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 62
J62              185.013    2.257      0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 63
J63              185.1      2.3        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 64
J64              185.1      2.2        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 65
J65              185.4      2.3        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 66
J66              185.4      2.4        0          5          0
;River: Hurley Drain
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;Reach: Hurley Drain
;Transect: 67
J67              186.2      1.9        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 68
J68              185.8      2.3        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 69
J69              186.1      2.3        0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 7
J7               178.8      4.6        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 70
J70              186.2      2.3        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 71
J71              186.3      1.8        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 72
J72              186.6      1.5        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 73
J73              186.6      1.5        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 74
J74              187        2.3        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 75
J75              187.7      1.3        0          5          0
;River: Hurley Drain
;Reach: Hurley Drain
;Transect: 76
J76              187.7      1.3        0          5          0
J8               179.557    2          0          5          0
;River: Washbrooke
;Reach: Washbrooke
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;Transect: 80
J80              186.5      2          0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 81
J81              186.5      1.5        0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 84
J84              186.5      1.3        0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 85
J85              186.6      2.3        0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 86
J86              187        2.11       0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 87
J87              186.791    1.949      0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 88
J88              187.546    1.454      0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 89
J89              187.555    2.095      0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 9
J9               178.684    5.4        0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 90
J90              187.777    1.713      0          5          0

[OUTFALLS]
;;               Invert     Outfall      Stage/Table      Tide
;;Name           Elev.      Type         Time Series      Gate
;;-------------- ---------- ------------ ---------------- ----
;River: Little River
;Reach: Gouin to DS end
;Transect: 36000
```

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J5205            176.7      NORMAL                        NO

[STORAGE]
;;               Invert   Max.     Init.    Storage    Curve                        Ponded   Evap.
;;Name           Elev.    Depth    Depth    Curve      Params                       Area     Frac.    Infiltration parameters
;;-------------- -------- -------- -------- ---------- -------- -------- -------- -------- -------- -----------------------
S5180            178.7    5        0        TABULAR    5180                         0        0
S5205            177.9    5        0        TABULAR    5205                         0        0

[CONDUITS]
;;               Inlet            Outlet                      Manning    Inlet      Outlet     Init.      Max.
;;Name           Node             Node             Length     N          Offset     Offset     Flow       Flow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
;Forest Glade Crossing
C1               J5               J37500           18.1       0.015      176.8      176.8      0          0
C10              J9               J23              14         0.015      178.684    178.684    0          0
C11              J17              J5180            50         0.015      181.4      181.4      0          0
C12              J24              J2               10         0.015      177.865    177.865    0          0
C13              J5               J37500           18.1       0.015      180.5      180.5      0          0
C14              J1               J20              450        0.045      184        185        0          0
C15              J40              J20              660        0.045      185.14     184.4      0          0
C16              J5090            J26              10         0.015      184.5      184.5      0          0
C17              J5090            J26              10         0.015      180.916    180.916    0          0
C18              J46102           J27              10         0.015      177.1      177.1      0          0
C19              J46102           J27              10         0.015      180.8      180.8      0          0
C2               J5110            J21              14         0.015      183.1      183.1      0          0
C20              J5055            J28              10         0.015      182.2      182.2      0          0
C21              J5055            J28              10         0.015      184.8      184.8      0          0
C22              J30              J5110            1050       0.045      182.5      181.24     0          0
C23              J50              J45              130        0.01       183.5      183.5      0          0
C24              J44              J42              90         0.01       183.1      183        0          0
C25              J31              J30              320        0.01       182.8      182.5      0          0
C26              J42              J31              280        0.01       183        182.8      0          0
C27              J45              J44              190        0.01       183.5      183.1      0          0
C28              J5055            J50              6          0.015      183.5      183.5      0          0
C3               J55              J5030            20         0.045      184.5      184.8      0          0
C4               J17              J5180            50         0.015      177.208    177.208    0          0
C5               J12              J22              19         0.015      182.4      182.4      0          0
C6               J5110            J21              14         0.015      179.754    179.754    0          0
C6000            J29              J5015            700        0.045      186.6      186.55     0          0
;7th Street Drain; transect copied from 6th Concession drain
;Slope, Length, Manning's n from SWMHYMO
C6007            J6               j29              835        0.045      187.18     186.6      0          0
;River: 6th Concession D
;Reach: 7th to 8th
C6015a           J5015            J56              100        0.045      186.55     186.09     0          0
```

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;River: 6th Concession D
;Reach: 7th to 8th
C6015b          J56             J5030           580        0.045      186.09     184.8      0          0
;River: 7th Concession D
;Reach: 7th Concession
;COPIED SECTION FROM SEC 58
;Slope, Length, Manning's n from SWMHYMO
C6025a          J5025           J58.5           1380       0.045      190.27     188.2      0          0
;River: 7th Concession D
;Reach: 7th Concession
;COPIED SECTION FROM SEC 58
C6025b          J58.5           J58             390        0.045      188.2      187.7      0          0
C6025c          J58             J5015           110        0.045      187.7      186.55     0          0
;River: 6th Concession D
;Reach: 8th to 9th
C6030           J5030           J5045           750        0.045      184.8      184.25     0          0
;River: 8th Concession D
;Reach: 8th Concession
;COPIED SECTION FROM SEC 55
;Slope, Length, Manning's n from SWMHYMO
C6040           J55.5           J55             1860       0.045      187.104    184.5      0          0
;River: Baseline Drain
;Reach: Hayes to 9th
C6045a          J5045           J51             520        0.045      184.25     183.2      0          0
;River: Baseline Drain
;Reach: Hayes to 9th
C6045b          J51             J5055           150        0.045      183.2      182.2      0          0
;River: 6th Concession D
;Reach: 9th to Little Ri
C6055a          J28             J49             115        0.045      181.7      181.69     0          0
;River: 6th Concession D
;Reach: 9th to Little Ri
C6055b          J49             J48             180        0.045      181.69     181.43     0          0
;River: 6th Concession D
;Reach: 9th to Little Ri
C6055c          J48             J47             180        0.045      181.43     181.22     0          0
;River: 6th Concession D
;Reach: 9th to Little Ri
;Upstream of Little River and Baseline junction (J17) Outlet set to invert of Junction 17; length adjusted correctly.
C6055d          J47             J5090           250        0.045      181.22     180.916    0          0
C6060a          J5060           J41             30         0.045      184.846    184.838    0          0
;River: 9th Concession
;Reach: 9th Concession
C6060b          J41             J40             60         0.045      184.838    184.637    0          0
;River: 9th Concession
;Reach: 9th Concession

C6060c          J40             J39             230        0.045      184.637    184.53     0          0
;River: 9th Concession
;Reach: 9th Concession
C6060d          J39             J38             150        0.045      184.53     184.45     0          0
;River: 9th Concession
;Reach: 9th Concession
C6060e          J38             J37             150        0.045      184.45     184.29     0          0
;River: 9th Concession
;Reach: 9th Concession
C6060f          J37             J36             205        0.045      184.29     184.19     0          0
;River: 9th Concession
;Reach: 9th Concession
C6060g          J36             J35             240        0.045      184.19     183.81     0          0
;River: 9th Concession
;Reach: 9th Concession
C6060h          J35             J34             230        0.045      183.81     183.49     0          0
;River: 9th Concession
;Reach: 9th Concession
C6060i          J34             J33             505        0.045      183.49     182.74     0          0
;River: 9th Concession
;Reach: 9th Concession
C6060j          J33             J32             80         0.045      182.74     182.219    0          0
;River: 9th Concession
;Reach: 9th Concession
;Adjusted from HEC-RAS import; automatically created junction deleted and lengths adjusted accordingly.
;Outlet set to invert of J50
C6060k          J32             J5055           45         0.045      182.219    181.7      0          0
;River: Washbrooke
;Reach: Washbrooke
;Channel length longer than SWMHYMO model based on available surveyed cross section information.
C6075a          J5075           J43             455        0.045      185.582    184.9      0          0
;River: Washbrooke
;Reach: Washbrooke
C6075b          J43             J5060           35         0.045      184.9      184.846    0          0
;River: Washbrooke
;Reach: Washbrooke
C6080           J5080           J46             650        0.045      186.5      185.72     0          0
;River: Little River
;Reach: Baseline to Wats
;Bridge: Little River
C6090a          J26             J16             310        0.045      180.916    180.509    0          0
;River: Little River
;Reach: Baseline to Wats
C6090b          J16             J15             340        0.045      180.509    180.175    0          0
;River: Little River
;Reach: Baseline to Watson

;2 elevation points changed to reflect more accurate values (2996.5 and 3004.5).
C6090c          J15             J14             135        0.045      180.175    180.062    0          0
;River: Little River
;Reach: Baseline to Wats
C6090d          J14             J5110           320        0.045      180.062    179.754    0          0
;River: Little River
;Reach: Little River
C6100a          J20             J19             545        0.045      184        183.2      0          0
;River: Little River
;Reach: Little River
C6100b          J19             J18             850        0.045      183.2      181.636    0          0
;River: Little River
;Reach: Little River
;Outlet set to invert of Junction 17
C6100c          J18             J5090           450        0.045      181.636    180.916    0          0
;River: Little River
;Reach: Baseline to Wats
C6110a          J21             J12             470        0.045      179.754    179.1      0          0
;River: Little River
;Reach: Watson to Desjar
;Bridge: Little River, Lauzon Pkwy Bridge
C6110b          J22             J5120           320        0.045      179.1      178.67     0          0
;River: Little River
;Reach: Watson to Desjar
C6120a          J5120           J10             280        0.045      178.67     178.819    0          0
;River: Little River
;Reach: Watson to Desjar
C6120b          J10             J9              150        0.045      178.819    178.684    0          0
;River: Little River
;Reach: Watson to Desjar
C6120c          J23             J5135           170        0.045      178.684    178.8      0          0
;River: Watson Drain
;Reach: Watson Drain
;COPY OF SEC 20 FROM LITTLE RIVER DRAIN
C6130b          J103            J102            805        0.045      181.937    180.729    0          0
;River: Watson Drain
;Reach: Watson Drain
;COPY OF SEC 19 FROM LITTLE RIVER DRAIN
C6130c          J102            J5120           1105       0.045      180.729    178.67     0          0
;River: Watson Drain
;Reach: Watson Drain
;COPY OF SEC 24 FROM LITTLE RIVER DRAIN
;Length, Slope, Manning's n from SWMHYMO
C6133a          J107            J106            1380       0.045      184.192    182.812    0          0
;River: Watson Drain
;Reach: Watson Drain

;COPY OF SEC 23 FROM LITTLE RIVER DRAIN
;Length, Slope, Manning's n from SWMHYMO
C6133b          J106            J105            610        0.045      182.812    182.202    0          0
;River: Watson Drain
;Reach: Watson Drain
;COPY OF SEC 22 FROM LITTLE RIVER DRAIN
;Length, Slope, Manning's n from SWMHYMO
C6133c          J105            J103            250        0.045      182.202    181.937    0          0
;River: Little River
;Reach: Watson to Soulliere
C6135a          J5135           J7              215        0.045      178.8      178.8      0          0
;River: Little River
;Reach: Watson to Soulliere
C6135b          J7              J5150           85         0.045      178.8      178.261    0          0
;10th Concession Drain
;Transect copied from Transect 102 from adjacent Watson Drain
;Conduit copied to provide outlet for Catchment 1145
;Slope, Length, Manning's n from SWMHYMO
C6145           J8              J23             1140       0.045      181.557    180.684    0          0
;River: Little River
;Reach: Watson to Desjardeins
;Copy of Transect 7; survey info for transect 5 not good
C6150           J5150           J5160           160        0.045      178.261    178        0          0
;River: Little River
;Reach: Desjardeins to Little River
;Adjusted from HEC-RAS import; automatically created junction deleted and lengths adjusted accordingly.
C6160a          J5160           J24             270        0.045      178        177.865    0          0
;River: Little River
;Reach: Desjardeins to L
C6160b          J2              J46203          410        0.045      177.865    177.7      0          0
;River: Little River
;Reach: Lachance to Goui
;This is a REPEATED section.
C6170e          J46203          J46102          426        0.045      177.7      177.1      0          0
;River: Little River
;Reach: Lachance to Goui
C6170f          J27             J43501          194        0.045      177.1      176.9      0          0
;River: Little River
;Reach: Lachance to Goui
C61701          J43501          J17             122        0.045      176.9      177.208    0          0
;River: Little River
;Reach: Lachance to Goui
C6180a          J5180           J41106          90         0.045      177.2      177.1      0          0
;River: Little River
;Reach: Lachance to Goui
C6180b          J41106          J40323          78.2       0.045      177.1      177        0          0
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;River: Little River
;Reach: Gouin to DS end
;This is a REPEATED section.
C6180c          J40323          J39001          132        0.045      177        176.9      0          0
;River: Little River
;Reach: Gouin to DS end
C6180d          J39001          J5              150        0.045      176.9      176.8      0          0
;River: Little River
;Reach: Gouin to DS end
;This is a REPEATED section.
C6180e          J37500          J5205           150        0.045      176.8      176.7      0          0
;McGill Drain downstream of junction with Lappan Drain
;Transect copied from Desjardeins Drain
;Elevations adjusted to match SWMHYMO channel slope
C6190           J5190           J46102          2060       0.045      179.948    178.208    0          0
;Lappan Drain to junction with McGill Drain
;No information on cross sections, transect copied from Desjardeins Drain
;Upstream reach of Lappan Drain is in the Windsor Airport property
;Elevations adjusted to match SWMHYMO channel slope
C6200           J13             J5190           2700       0.045      184.998    179.948    0          0
;Russette Drain
;No information available, transect copied from Desjardeins Drain,
;all other details copied from McGill drain info from SWMHYMO model
C6220           J3              J17             2700       0.045      179.5      178        0          0
C7              J9              J23             14         0.015      181.8      181.8      0          0
;MTO Plate No. 118-401/A05-0; WP No. 170-99-00; STA 12+065 to STA 13+055, 2002
C7025           J58.7           J5025           30.29      0.015      190.33     190.27     0          0
;From 8th Concession North and Demonte Branch; Drainage Area Plan - Sheet 2
C7040           J25             J55.5           55         0.015      187.154    187.104    0          0
;From MTO, Engineering and Plans Office, Surveys; Kings Hwy 401-Twp of Sandwich South, County of Essex, from file 401SAS WP 60-00
C7075           J46             J5075           50.6       0.015      185.72     185.582    0          0
;River: Little River, Reach: Little River: Culvert under 401; from MTO Engineering and Plans Office-Surveys; Kings Hwy 401, Twp o
C7105           J5100           J1              50.54      0.015      184        183.988    0          0
;From MTO, Engineering and Plans Office, Surveys; Kings Hwy 401-Twp of Sandwich South, County of Essex, from file 401SAS WP 60-00
C7133           J11             J107            50.69      0.015      184.2      184.192    0          0
C8              J12             J22             19         0.015      179.1      179.1      0          0
C9              J24             J2              10         0.015      182.5      182.5      0          0
;River: Gouin
;Reach: Gouin
;COPY OF DESJARDEINS DRAIN SECTION 4
CJ0.5           J0.5            J5180           10         0.045      178.9      178.7      0          0
;River: Gouin
;Reach: Gouin
;COPY OF DESJARDEINS DRAIN SECTION 4
;Slope, Length, Manning's n from SWMHYMO
CJ0.75          J0.75           J0.5            500        0.045      179.4      178.9      0          0
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;River: Lachance
;Reach: Lachance
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope
CJ0.8           J0.8            J2              500        0.045      178.1      177.879    0          0
;River: Lachance
;Reach: Lachance
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope
CJ0.9           J0.9            J0.8            500        0.045      178.6      178.1      0          0
;River: Desjardeins
;Reach: Desjardeins
CJ4             J4              J5160           35         0.045      178.1      178        0          0
;River: Desjardeins
;Reach: Desjardeins
CJ4.5           J4.5            J4              500        0.045      178.7      178.2      0          0
;River: Hayes Drain
;Reach: Hayes Drain
CJ53            J53             J5045           120        0.045      184.55     184.25     0          0
;River: Hayes Drain
;Reach: Hayes Drain
;THIS IS A COPIED SECTION OF 53
;Slope, Length, Manning's n from SWMHYMO
CJ53.5          J53.5           J53             1720       0.045      186.831    184.55     0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ62            J62             J5060           55         0.045      185.013    184.846    0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ63            J63             J62             110        0.045      185.1      185.013    0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ64            J64             J63             80         0.045      185.1      185.1      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ65            J65             J64             150        0.045      185.4      185.1      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ66            J66             J65             20         0.045      185.4      185.4      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ67            J67             J66             100        0.045      186.2      185.4      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ68            J68             J67             60         0.045      185.8      186.2      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ69            J69             J68             275        0.045      187.1      185.8      0          0
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;River: Hurley Drain
;Reach: Hurley Drain
CJ70            J70             J69             40         0.045      186.2      186.1      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ71            J71             J70             50         0.045      186.3      186.2      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ72            J72             J71             55         0.045      186.6      186.3      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ73            J73             J72             20         0.045      186.6      186.6      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ74            J74             J73             650        0.045      187        186.6      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ75            J75             J74             30         0.045      187.7      187        0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ76            J76             J75             30         0.045      187.7      187.7      0          0
;River: Hurley Drain
;Reach: Hurley Drain
CJ77            J5065           J76             10         0.045      187.6      187.7      0          0
;River: Washbrooke
;Reach: Washbrooke
CJ80            J80             J5080           55         0.045      186.5      186.5      0          0
;River: Washbrooke
;Reach: Washbrooke
CJ81            J81             J80             90         0.045      186.5      186.5      0          0
;River: Washbrooke
;Reach: Washbrooke
CJ84            J84             J81             30         0.045      186.5      186.5      0          0
;River: Washbrooke
;Reach: Washbrooke
CJ85            J85             J84             30         0.045      186.6      186.5      0          0
;River: Washbrooke
;Reach: Washbrooke
CJ86            J86             J85             80         0.045      187        186.6      0          0
;River: Washbrooke
;Reach: Washbrooke
CJ87            J87             J86             90         0.045      186.79     187        0          0
;River: Washbrooke
;Reach: Washbrooke
CJ88            J88             J87             170        0.045      187.546    186.79     0          0
;River: Washbrooke
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;Reach: Washbrooke
CJ89            J89             J88             215        0.045      187.555    187.546    0          0
;River: Washbrooke
;Reach: Washbrooke
CJ90            J90             J89             30         0.045      187.777    187.555    0          0

[ORIFICES]
;;              Inlet           Outlet          Orifice      Crest      Disch.     Flap Open/Close
;;Name          Node            Node            Type         Height     Coeff.     Gate Time
;;-------------- ---------------- ---------------- ------------ ---------- ---------- ---- ----------
OR1180-1        S5180           J46203          SIDE         0          0.6        NO   0
OR1205-1        S5205           J43501          SIDE         0          0.6        NO   0

[XSECTIONS]
;;Link          Shape        Geom1            Geom2      Geom3      Geom4      Barrels
;;-------------- ------------ ---------------- ---------- ---------- ---------- ----------
C1              RECT_CLOSED  3.25             14.8       0          0          1          15
C10             RECT_CLOSED  2.5              11         0          0          1          15
C11             IRREGULAR    ECRow@LR         0          0          0          1
C12             RECT_CLOSED  3.7              14.9       0          0          1          15
C13             IRREGULAR    ForestGlenDR     0          0          0          1
C14             Irregular    22               0          0          0          1
C15             IRREGULAR    61               0          0          0          1
C16             Irregular    LR@baseline      0          0          0          1
C17             RECT_CLOSED  2.7              6.2        0          0          1          15
C18             RECT_CLOSED  3                20         0          0          1          15
C19             IRREGULAR    LR@Twinoaks      0          0          0          1
C2              IRREGULAR    LittleRiver@42   0          0          0          1
C20             RECT_CLOSED  2.1              3          0          0          1
C21             IRREGULAR    6th@9th          0          0          0          1
C22             IRREGULAR    Townline         0          0          0          1
C23             IRREGULAR    31               0          0          0          1
C24             IRREGULAR    30               0          0          0          1
C25             IRREGULAR    25               0          0          0          1
C26             IRREGULAR    29               0          0          0          1
C27             IRREGULAR    31               0          0          0          1
C28             RECT_CLOSED  1.2              1.8        0          0          1
C3              Irregular    55               0          0          0          1
C4              RECT_CLOSED  5.2              12.3       0          0          1          15
C5              IRREGULAR    Lauzonpky@LR     0          0          0          1
C6              RECT_CLOSED  2.5              7.1        0          0          1          15
C6000           IRREGULAR    59               0          0          0          1
C6007           IRREGULAR    59               0          0          0          1
C6015a          IRREGULAR    57               0          0          0          1
C6015b          IRREGULAR    56               0          0          0          1
C6025a          IRREGULAR    58.7             0          0          0          1
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C6025b          IRREGULAR    58.5            0          0          0          1
C6025c          Irregular    58.5            0          0          0          1
C6030           IRREGULAR    54              0          0          0          1
C6040           IRREGULAR    55.5            0          0          0          1
C6045a          IRREGULAR    52              0          0          0          1
C6045b          IRREGULAR    51              0          0          0          1
C6055a          IRREGULAR    50              0          0          0          1
C6055b          IRREGULAR    49              0          0          0          1
C6055c          IRREGULAR    48              0          0          0          1
C6055d          IRREGULAR    47              0          0          0          1
C6060a          Irregular    42              0          0          0          1
C6060b          IRREGULAR    41              0          0          0          1
C6060c          IRREGULAR    40              0          0          0          1
C6060d          IRREGULAR    39              0          0          0          1
C6060e          IRREGULAR    38              0          0          0          1
C6060f          IRREGULAR    37              0          0          0          1
C6060g          IRREGULAR    36              0          0          0          1
C6060h          IRREGULAR    35              0          0          0          1
C6060i          IRREGULAR    34              0          0          0          1
C6060j          IRREGULAR    33              0          0          0          1
C6060k          IRREGULAR    32              0          0          0          1
C6075a          IRREGULAR    44              0          0          0          1
C6075b          IRREGULAR    43              0          0          0          1
C6080           IRREGULAR    46              0          0          0          1
C6090a          Irregular    17              0          0          0          1
C6090b          IRREGULAR    16              0          0          0          1
C6090c          Irregular    15              0          0          0          1
C6090d          IRREGULAR    14              0          0          0          1
C6100a          IRREGULAR    20              0          0          0          1
C6100b          IRREGULAR    19              0          0          0          1
C6100c          IRREGULAR    18              0          0          0          1
C6110a          IRREGULAR    12              0          0          0          1
C6110b          IRREGULAR    12              0          0          0          1
C6120a          IRREGULAR    10              0          0          0          1
C6120b          IRREGULAR    9               0          0          0          1
C6120c          IRREGULAR    8A              0          0          0          1
C6130b          IRREGULAR    112             0          0          0          1
C6130c          IRREGULAR    111             0          0          0          1
C6133a          IRREGULAR    112             0          0          0          1
C6133b          IRREGULAR    112             0          0          0          1
C6133c          IRREGULAR    112             0          0          0          1
C6135a          Irregular    8A              0          0          0          1
C6135b          Irregular    7               0          0          0          1
C6145           IRREGULAR    110             0          0          0          1
C6150           Irregular    7               0          0          0          1
C6160a          IRREGULAR    2               0          0          0          1
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C6160b          IRREGULAR    TwinOaks742     0          0          0          1
C6170e          Irregular    TwinOaks742     0          0          0          1
C6170f          IRREGULAR    TwinOaks316     0          0          0          1
C61701          IRREGULAR    TwinOaks122     0          0          0          1
C6180a          IRREGULAR    40323           0          0          0          1
C6180b          IRREGULAR    39001           0          0          0          1
C6180c          IRREGULAR    37500           0          0          0          1
C6180d          IRREGULAR    36000           0          0          0          1
C6180e          Irregular    35002           0          0          0          1
C6190           Irregular    115             0          0          0          1
C6200           Irregular    116             0          0          0          1
C6220           IRREGULAR    113             0          0          0          1
C7              IRREGULAR    Lauzonrd@LR     0          0          0          1
C7025           RECT_CLOSED  1.52            1.52       0          0          1          15
C7040           RECT_CLOSED  1.22            1.52       0          0          1          15
C7075           RECT_CLOSED  1.55            2.45       0          0          1          15
C7105           RECT_CLOSED  1.52            1.83       0          0          1          15
C7133           RECT_CLOSED  1.52            1.52       0          0          1          15
C8              RECT_CLOSED  3.5             10.9       0          0          1          15
C9              IRREGULAR    Rail@LR         0          0          0          1
CJ0.5           IRREGULAR    117             0          0          0          1
CJ0.75          IRREGULAR    117             0          0          0          1
CJ0.8           IRREGULAR    114             0          0          0          1
CJ0.9           IRREGULAR    114             0          0          0          1
CJ4             IRREGULAR    4               0          0          0          1
CJ4.5           IRREGULAR    113             0          0          0          1
CJ53            IRREGULAR    53              0          0          0          1
CJ53.5          IRREGULAR    53.5            0          0          0          1
CJ62            IRREGULAR    62              0          0          0          1
CJ63            IRREGULAR    63              0          0          0          1
CJ64            IRREGULAR    64              0          0          0          1
CJ65            IRREGULAR    65              0          0          0          1
CJ66            IRREGULAR    66              0          0          0          1
CJ67            IRREGULAR    67              0          0          0          1
CJ68            IRREGULAR    68              0          0          0          1
CJ69            IRREGULAR    69              0          0          0          1
CJ70            IRREGULAR    70              0          0          0          1
CJ71            IRREGULAR    71              0          0          0          1
CJ72            IRREGULAR    72              0          0          0          1
CJ73            IRREGULAR    73              0          0          0          1
CJ74            IRREGULAR    74              0          0          0          1
CJ75            IRREGULAR    75              0          0          0          1
CJ76            IRREGULAR    76              0          0          0          1
CJ77            IRREGULAR    77              0          0          0          1
CJ80            IRREGULAR    46              0          0          0          1
CJ81            IRREGULAR    46              0          0          0          1
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CJ84            IRREGULAR    79              0          0          0          1
CJ85            IRREGULAR    80              0          0          0          1
CJ86            IRREGULAR    86              0          0          0          1
CJ87            IRREGULAR    87              0          0          0          1
CJ88            Irregular    88              0          0          0          1
CJ89            IRREGULAR    89              0          0          0          1
CJ90            IRREGULAR    89              0          0          0          1
OR1180-1        CIRCULAR     1               0          0          0
OR1205-1        CIRCULAR     1               0          0          0

[TRANSECTS]

;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
X1 0.3               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 180.9    2605     180.5    3005.457 177.8    3009.33  177.6    3014.085 177.7    3017.186
GR 180.7    3024.75  180.8    3038.397 181.2    3438

;High-chord transect for bridge 0.35 (River: Gouin; Reach: Gouin).
;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
X1 0.35_HC           3        0        0        0.0       0.0       0        0        0
GR 181.505  2605     181.9    3018     181.502  3438

;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
X1 0.4               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181      2605     180.6    3005.457 177.9    3009.33  177.7    3014.085 177.8    3017.186
GR 180.8    3024.75  180.9    3038.397 181.3    3438

;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
X1 0.5               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.2    2605     180.8    3005.457 178.1    3009.33  177.9    3014.085 178      3017.186
GR 181      3024.75  181.1    3038.397 181.5    3438

;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
X1 0.75              8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.7    2605     181.3    3005.457 178.6    3009.33  178.4    3014.085 178.5    3017.186
GR 181.5    3024.75  181.6    3038.397 182      3438

;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope
NC 0.1      0.1      0.045
X1 0.8               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.4    2605     181      3005.457 178.3    3009.33  178.1    3014.085 178.2    3017.186
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GR 181.2    3024.75  181.3    3038.397 181.7    3438

;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope
NC 0.1      0.1      0.045
X1 0.9               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.9    2605     181.5    3005.457 178.8    3009.33  178.6    3014.085 178.7    3017.186
GR 181.7    3024.75  181.8    3038.397 182.2    3438

NC 0.1      0.1      0.045
X1 1                 22       2993     3012.47  0.0       0.0       0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2990.2   180.5    2991.5   180.5    2992
GR 181.5    2993     179.6    2994.91  179.3    2995.65  178.5    2997.625 178.1    3000.09
GR 178.6    3002.54  181.9    3012.47  181.4    3140     181.5    3250     181.6    3450
GR 181.7    3650     182      4000

;High-chord transect for bridge 1.5 (River: Little River; Reach: Desjardeins to L).
NC 0.1      0.1      0.045
X1 1.5_HC            7        0        0        0.0       0.0       0        0        0
GR 184      2295     182.5    2300     182.5    2991     183.4    2991.1   183.4    3009.1
GR 182.5    3009.2   182.5    3140

NC 0.1      0.1      0.045
X1 1.6               19       2993     3012.47  0.0       0.0       0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2990.2   180.5    2991.5   180.5    2992
GR 181.5    2993     179.6    2994.91  179.3    2995.65  178.5    2997.625 178.1    3000.09
GR 178.6    3002.54  181.9    3012.47  181.4    3140     181.5    3250

NC 0.1      0.1      0.045
X1 10                21       2994     3017.014 0.0       0.0       0        0        0
GR 184      1900     184      1940     184      2000     184      2300     184      2630
GR 184      2800     184      2875     184      2949.9   182      2950     181.6    2994
GR 179.8    3001.004 179      3005.344 179.7    3010.779 181.6    3017.014 182      3050
GR 184      3050.1   184      3150     184      3300     184      3500     184      3750
GR 184      4300

;[LE: 2950][RE: 3050]
NC 0.045    0.045    0.03
X1 10(orig)          19       2994     3017.014 0.0       0.0       0        0        0
GR 184      1900     182      1940     182      2000     182      2300     182      2630
GR 182      2800     182      2875     182      2950     181.6    2994     179.8    3001.004
GR 179      3005.344 179.7    3010.779 181.6    3017.014 182      3050     182      3150
GR 182      3300     182.5    3500     182.9    3750     184      4300

;COPY OF SEC 18 FROM LITTLE RIVER DRAIN
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NC 0.1      0.1      0.045
X1 101               9        2994     3003.494 0.0      0.0       0        0        0
GR 185      2530     184.5    2800     184.3    2994     182.4    2997.988 182.4    3000.058
GR 182.5    3002.045 185.2    3003.494 184.5    3300     185      4000

;COPY OF SEC 20 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 103               7        2994     3001.563 0.0      0.0       0        0        0
GR 186.5    2594     186.1    2994     185.3    2995.615 184      2997.731 185      2999.748
GR 186.3    3001.563 186.7    3401

;COPY OF SEC 21 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 104               7        2994     3001.563 0.0      0.0       0        0        0
GR 186.5    2594     186.1    2994     185.3    2995.615 184      2997.731 185      2999.748
GR 186.3    3001.563 186.7    3401

;COPY OF SEC 22 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 105               8        2994     3005.278 0.0      0.0       0        0        0
GR 186.7    2594     186.3    2994     184.9    2998.669 184.6    3001.978 185.1    3004.914
GR 186.2    3005.278 186.3    3006     186.6    3406

;COPY OF SEC 23 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 106               7        3015.126 3025.443 0.0      0.0       0        0        0
GR 186.85   2615     186.455  3015.126 185.3    3019.358 185.111  3021.732 185.3    3023.129
GR 186.4    3025.443 186.8    3425

;COPY OF SEC 24 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 107               7        2994     3005.566 0.0      0.0       0        0        0
GR 187.28   2594     186.88   2994     185.555  2996.426 185.225  2998.403 185.666  3001.084
GR 186.75   3005.566 187.15   3405

NC 0.1      0.1      0.045
X1 11                21       2994     3006.235 0.0      0.0       0        0        0
GR 184      1900     184      1940     184      2000     184      2300     184      2630
GR 184      2800     184      2875     184      2949.9   182.5    2950     182.159  2994
GR 179.562  2998.875 178.671  3000.754 179.666  3003.937 182.09   3006.235 182.5    3050
GR 184      3050.1   184      3150     184      3300     184      3500     184      3750
GR 184      4300

;[LE: 2950][RE: 3050]
NC 0.045    0.045    0.03
X1 11(orig)          19       2994     3006.235 0.0      0.0       0        0        0
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GR 184      1900     182.5    1940     182.5    2000     182.5    2300     182.5    2630
GR 182.5    2800     182.5    2875     182.5    2950     182.159  2994     179.562  2998.875
GR 178.671  3000.754 179.666  3003.937 182.09   3006.235 182.5    3050     182.5    3150
GR 182.5    3300     182.5    3500     182.9    3750     184      4300

;High-chord transect for bridge 11.5 (River: Little River; Reach: Watson to Desjar).
NC 0.1      0.1      0.045
X1 11.5_HC           20       0        0        0.0      0.0       0        0        0
GR 184.3    1900     182.3    1940     181.4    2000     181.9    2300     182.2    2630
GR 182.3    2800     182.3    2875     182.3    2950     183      2994     180.1    3003.342
GR 180      3006.565 179.1    3009.925 180.1    3014.217 180.4    3015.716 183.2    3023.947
GR 182.3    3050     182.3    3150     182.3    3300     182.8    3500     183.2    3750

;From Little Tenth Concession Drain Plan and Profile Drawing
NC 0.1      0.1      0.045
X1 110               8        3001     3006.5   0.0      0.0       0        0        0
GR 186.4    2900     186.2    3000     186      3001     184.5    3003.25  184.5    3004.25
GR 186      3006.5   186.2    3007     186.4    3107

;From Plan and Profile of the Watson Drain
NC 0.1      0.1      0.045
X1 111               6        3000     3007.1   0.0      0.0       0        0        0
GR 185.2    2900     185      3000     182.5    3003.1   182.5    3004.1   185      3007.1
GR 185.2    3107

;From Watson Drain PLan and Profile Drawing
NC 0.1      0.1      0.045
X1 112               6        3000     3004.8   0.0      0.0       0        0        0
GR 185.2    2900     185      3000     183.5    3001.9   183.5    3002.9   185      3004.8
GR 185.2    3105

;From Desjardin Drain Plan and Profile
NC 0.1      0.1      0.045
X1 113               6        3000     30010.5  0.0      0.0       0        0        0
GR 185.2    2900     185      3000     182      3004.5   182      3006     185      3010.5
GR 185.2    3110

;From Twin Oaks Buisness Park SWM Report
NC 0.1      0.1      0.045
X1 114               6        3000     3013     0.0      0.0       0        0        0
GR 185.2    2900     185      3000     182      3006     182      3007     185      3013
GR 185.2    3113

;From Profile Drawing of the Lappan Drain and McGill Outlet
NC 0.1      0.1      0.045
X1 115               6        3000     3007.5   0.0      0.0       0        0        0
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GR 185.2    2900     185      3000     183      3003     185      3004.5   185      3007.5
GR 185.2    3108

;From Profile Drawing of the Lappan Drain and McGill Outlet
NC 0.1      0.1      0.045
X1 116               6        3000     3005.9   0.0      0.0       0        0        0
GR 185.2    2900     185      3000     183.5    3002.2   183.5    3003.7   185      3005.9
GR 185.2    3106

;From Plan, Profile, and Cross Section of the Gouin Drain
NC 0.1      0.1      0.045
X1 117               6        3000     3007     0.0      0.0       0        0        0
GR 185.2    2900     185      3000     183      3003     183      3004     185      3007
GR 185.2    3107

NC 0.1      0.1      0.045
X1 12                20       2994     3023.947 0.0      0.0       0        0        0
GR 184.3    1900     183      1940     183      2000     183      2300     183      2630
GR 183      2800     183      2875     183      2950     183      2994     180.1    3003.342
GR 180      3006.565 179.1    3009.925 180.1    3014.217 180.4    3015.716 183.2    3023.947
GR 183      3050     183      3150     183      3300     183      3500     183.2    3750

NC 0.1      0.1      0.045
X1 13                18       2994     3017.137 0.0      0.0       0        0        0
GR 183.9    2250     183.4    2350     183.7    2480     183.1    2620     183      2675
GR 183      2830     183      2890     183      2950     182.835  2994     180.583  3003.421
GR 179.754  3007.359 180.617  3010.645 182.914  3017.137 183      3040     183      3240
GR 183.2    3270     183.4    3350     184      4000

;High-chord transect for bridge 13.25 (River: Little River; Reach: Baseline to Wats).
NC 0.1      0.1      0.045
X1 13.25_HC          10       0        0        0.0      0.0       0        0        0
GR 183.9    2250     183.6    2830     183.4    2950     183.895  2994     183.9    2994.4
GR 183.9    3006     183.1    3040     183.2    3270     183.4    3350     184      4000

NC 0.1      0.1      0.045
X1 13.5              18       2994     3017.137 0.0      0.0       0        0        0
GR 183.9    2250     183.4    2350     183.7    2480     183.1    2620     183      2675
GR 183      2830     182.5    2890     182.5    2950     182.835  2994     180.583  3003.421
GR 179.754  3007.359 180.617  3010.645 182.914  3017.137 182.5    3040     182.5    3240
GR 183.2    3270     183.4    3350     184      4000

NC 0.1      0.1      0.045
X1 14                19       2994     3015.242 0.0      0.0       0        0        0
GR 184.2    2250     183.7    2350     184      2480     183.4    2620     183.3    2675
GR 183.3    2830     183.3    2890     183.3    2950     183.268  2994     180.87   3001.339
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GR 180.062  3004.032 180.699  3006.356 183.031  3009.792 183.047  3015.242 183.3    3040
GR 183.3    3240     183.5    3270     183.7    3350     184.3    4000

;High-chord transect for bridge 14.5 (River: Little River; Reach: Baseline to Wats).
NC 0.1      0.1      0.045
X1 14.5_HC           27       2994.2   3009.792 0.0      0.0       0        0        0
GR 184.2    2250     183.7    2350     184      2480     183.4    2620     183.3    2675
GR 183.3    2775     183.4    2850     183.1    2950     183.01   2969.787 183.268  2994
GR 183.203  2994.2   183.073  2994.597 182.9    2996.5   182.9    3004.5   182.9    3006.8
GR 182.907  3009.609 183.031  3009.792 183.047  3015.242 182.944  3025.612 183      3050
GR 183      3100     183.5    3105     183.8    3180     184.1    3370     184.4    3900
GR 184.208  3900     184.3    4000

NC 0.1      0.1      0.045
X1 15                19       2994     3015.242 0.0      0.0       0        0        0
GR 184.2    2250     183.7    2350     184      2480     183.4    2620     183.3    2675
GR 183.3    2830     183.3    2890     183.3    2950     183.268  2994     180.87   3001.339
GR 180.062  3004.032 180.699  3006.356 183.031  3009.792 183.047  3015.242 183.3    3040
GR 183.3    3240     183.5    3270     183.7    3350     184.3    4000

NC 0.1      0.1      0.045
X1 16                18       2993     3007.155 0.0      0.0       0        0        0
GR 183.8    2380     183.7    2575     183.6    2720     183.6    2825     183.5    2925
GR 183.5    2975     183.477  2993     181.681  2997.937 180.509  3001.337 180.512  3002.636
GR 183.126  3007.155 183.5    3010     183.6    3025     183.8    3075     184      3130
GR 184      3210     184.8    3260     184.8    3450

;High-chord transect for bridge 16.5 (River: Little River; Reach: Baseline to Wats).
NC 0.1      0.1      0.045
X1 16.5_HC           12       0        0        0.0      0.0       0        0        0
GR 186.2    1000     185.2    2000     185.2    2300     184.6    2710     184.6    3003.1
GR 184.5    3006     184.6    3050     184.5    3170     184.6    3225     184.6    3700
GR 185      4000     186      5000

NC 0.1      0.1      0.045
X1 17                16       2993     3050     0.0      0.0       0        0        0
GR 185      2000     184.7    2300     184.5    2550     184.2    2710     184      2880
GR 183.7    2950     183.938  2993     180.916  2997.879 180.961  2999.52  180.944  3001.733
GR 183.6    3050     183.9    3170     184.1    3225     184.3    3425     184.6    3700
GR 185      4000

NC 0.1      0.1      0.045
X1 18                7        2999     3009.5   0.0      0.0       0        0        0
GR 185.5    2990     185.2    2999     184.3    3000     182.4    3004     181.6    3006.1
GR 182.5    3008     185.2    3009.5
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NC 0.1      0.1      0.045
X1 19               9        2994     3008.988 0.0       0.0       0        0        0
GR 186.4    2899     186.2    2993     185.7    2994     185      2996.861 184.2    2999.958
GR 185      3003.863 185.9    3008.988 186.2    3009     186.4    3100

NC 0.1      0.1      0.045
X1 2                14       2925     2944.65  0.0      0.0       0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     178.6    2928.98  178      2932.22  178.5    2935.995
GR 181.6    2944.65  181.2    3075     181.4    3140     181.5    3250

NC 0.1      0.1      0.045
X1 20               8        2994     3001.563 0.0       0.0       0        0        0
GR 186.5    2893     186.3    2993     186.1    2994     185.3    2995.615 184      2997.731
GR 185      2999.748 186.3    3001.563 186.5    3101

NC 0.1      0.1      0.045
X1 21               7        2994     3001.563 0.0       0.0       0        0        0
GR 186.5    2594     186.1    2994     185.3    2995.615 184      2997.731 185      2999.748
GR 186.3    3001.563 186.7    3401

NC 0.1      0.1      0.045
X1 22               8        2994     3005.278 0.0       0.0       0        0        0
GR 186.5    2894     186.3    2994     184.9    2998.669 184.6    3001.978 185.1    3004.914
GR 186.2    3005.278 186.3    3006     186.5    3106

NC 0.1      0.1      0.045
X1 23               7        3015.126 3025.443 0.0       0.0       0        0        0
GR 186.85   2615     186.455  3015.126 185.3    3019.358 185.111  3021.732 185.3    3023.129
GR 186.4    3025.443 186.8    3425

NC 0.1      0.1      0.045
X1 24               7        2994     3005.566 0.0       0.0       0        0        0
GR 187.28   2594     186.88   2994     185.555  2996.426 185.225  2998.403 185.666  3001.084
GR 186.75   3005.566 187.15   3405

NC 0.1      0.1      0.045
X1 25               11       1018.177 1030.765 0.0       0.0       0.0      0.0      0.0
GR 184.7    915      184.5    1015     184.5    1018.177 184.4    1021.782 184.2    1025.144
GR 183.5    1026.474 182.8    1027.867 183.3    1029.23  184      1030.765 184.5    1033
GR 184.7    1131

NC 0.1      0.1      0.045
X1 29               9        1000     1006.161 0.0       0.0       0.0      0.0      0.0
GR 184.9    900      184.7    995      184.3    1000     183.3    1001.694 183      1002.91
GR 183.1    1003.83  184.4    1006.161 184.7    1010     184.9    1106
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;Upstream of Desjardins junction
NC 0.1      0.1      0.045
X1 3                18       2950     2981.62  0.0       0.0       0        0        0
GR 185      2280     182      2290     181.2    2300     181.1    2550     181      2750
GR 181      2850     181      2950     180.4    2950     178      2955.12  178      2964.396
GR 178      2977.105 181.2    2981.62  181.3    3250     181.6    3450     181.9    3750
GR 182      4000     182.4    4650     182.9    5500

NC 0.1      0.1      0.045
X1 30               10       1034.29  1048.1   0.0       0.0       0.0      0.0      0.0
GR 185      900      184.8    1034.29  184.7    1037.75  184.4    1041.42  183.3    1043.37
GR 183.1    1044.95  183.5    1046.18  184.3    1048.1   184.8    1050     185      1150

NC 0.1      0.1      0.045
X1 31               7        1000     1008.977 0.0       0.0       0.0      0.0      0.0
GR 184.9    900      184.7    1000     183.6    1002.587 183.5    1004.149 183.8    1005.655
GR 184.7    1008.977 184.9    1109

NC 0.1      0.1      0.045
X1 32               13       2994     3010.776 0.0       0.0       0        0        0
GR 185.5    2893     185.3    2993     185      2994     184.726  2996.364 182.329  2999.636
GR 182.219  3000.193 183.425  3000.857 184.746  3004.58  184.978  3005.949 185.093  3007.195
GR 185.209  3010.776 185.3    3011     185.5    3111

NC 0.1      0.1      0.045
X1 33               12       2994     3007.807 0.0       0.0       0        0        0
GR 185.9    2893     185.7    2993     184.69   2994     184.46   2995.61  182.81   2999.114
GR 182.74   3000.114 182.76   3001.067 184.75   3004.397 184.92   3005.992 185.01   3007.807
GR 185.7    3008     185.9    3108

NC 0.1      0.1      0.045
X1 34               13       2994     3008.898 0.0       0.0       0        0        0
GR 185.8    2893     185.6    2993     185.21   2994     185.08   2995.761 183.56   2998.015
GR 183.49   2998.82  183.76   2999.824 185.12   3001.947 185.38   3004.25  185.48   3005.229
GR 185.54   3008.898 185.6    3009     185.8    3109

NC 0.1      0.1      0.045
X1 34001            15       2990     3010     0.0       0.0       0        0        0
GR 182      2590     181      2600     180.8    2700     180.6    2830     180      2900
GR 179.9    2990     176.7    2998     176.7    3002     179.9    3010     179.5    3018
GR 179.5    3065     180      3085     180.5    3145     180.7    3275     181      3430

NC 0.1      0.1      0.045
X1 35               14       2994     3008.799 0.0       0.0       0        0        0
GR 186      2893     185.8    2993     185.54   2994     184.41   2996.028 183.85   2996.871
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GR 183.81   2997.366 184.08   2997.831 184.35   2998.831 185.41   3000.464 185.63   3003.071
GR 185.72   3005.411 185.79   3008.799 185.8    3009     186      3109

NC 0.1      0.1      0.045
X1 35002            19       2990     3010     0.0       0.0       0        0        0
GR 183      2500     182      2590     181      2600     180.8    2700     180.6    2830
GR 180      2900     179.9    2990     176.7    2998     176.7    3002     179.9    3010
GR 179.5    3018     179.5    3065     180      3085     180.5    3145     180.7    3275
GR 181      3430     181.5    4000     182      4750     182.9    5500

;High-chord transect for bridge 35092.5 (River: Little River; Reach: Gouin to DS end).
;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 35092.5_HC       13       0        0        0.0       0.0       0        0        0
GR 183      2500     180.6    2630     180.5    2830     181      2950     181.4    2983
GR 181.4    2989.2   182      2989.3   182      3013.9   181.4    3014     181.4    3018
GR 181      3065     180.9    3085     180.6    3170

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 35183            23       2992.7   3007.5   0.0       0.0       0        0        0
GR 183      2500     180.6    2630     180.5    2830     180      2900     179.4    2950
GR 179.9    2983     177.9    2989.2   177.9    2989.3   176.8    2992.7   177.4    2992.8
GR 176.8    2994.6   176.8    3000     176.8    3007.4   176.8    3007.5   179.3    3013.9
GR 179.3    3014     179.9    3015.3   179.5    3018     179.5    3065     180      3085
GR 180.5    3145     180.6    3170     180.7    3275

NC 0.1      0.1      0.045
X1 35404            11       2991     3009     0.0       0.0       0        0        0
GR 181.9    2640     180.4    2665     180.4    2800     180.4    2920     179.9    2991
GR 176.8    2996     176.8    3004     179.4    3009     179.9    3035     180.4    3175
GR 180.9    3370

NC 0.1      0.1      0.045
X1 36               12       2994     3007.976 0.0       0.0       0        0        0
GR 186.5    2893     186.3    2993     185.85   2994     184.35   2996.702 184.19   2997.51
GR 184.33   2998.331 185.76   3000.603 186.01   3002.265 186.18   3004.351 186.25   3007.976
GR 186.3    3008     186.5    3108

NC 0.1      0.1      0.045
X1 36000            11       2991     3009     0.0       0.0       0        0        0
GR 182      2640     180.5    2665     180.5    2800     180.5    2920     180      2991
GR 176.9    2996     176.9    3004     179.5    3009     180      3035     180.5    3175
GR 181      3370

NC 0.1      0.1      0.045
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X1 37               10       2994     3007.845 0.0       0.0       0        0        0
GR 186.44   2894     186.24   2994     184.35   2996.135 184.29   2996.867 184.4    2997.792
GR 185.74   2999.714 186.01   3002.317 186.16   3004.275 186.24   3007.845 186.44   3108

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 37500            11       2920.8   2956     0.0       0.0       0        0        0
GR 182.1    2640     180.6    2660     180.6    2768     180.6    2864     180.1    2920.8
GR 177      2924.8   177      2931.2   179.6    2935.2   180.1    2956     180.6    3068
GR 181.1    3224

NC 0.1      0.1      0.045
X1 38               10       2994     3007.657 0.0       0.0       0        0        0
GR 186.74   2894     186.54   2994     184.48   2996.273 184.45   2996.733 184.49   2997.226
GR 186.15   2999.756 186.35   3002.261 186.47   3004.185 186.54   3007.657 186.74   3108

NC 0.1      0.1      0.045
X1 39               9        2994     3007.859 0.0       0.0       0        0        0
GR 187.02   2894     186.82   2994     184.61   2996.225 184.53   2996.573 186.41   3000.479
GR 186.57   3002.393 186.76   3004.342 186.82   3007.859 187.02   3108

NC 0.1      0.1      0.045
X1 39001            11       2994.3   3005.8   0.0       0.0       0        0        0
GR 185      2710     180.5    2750     180.5    2825     180.5    2920     179.9    2994.3
GR 177.1    2997.3   177.1    3002.8   179.9    3005.8   180.5    3060     181      3210
GR 181      3450

NC 0.1      0.1      0.045
X1 4                9        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.7    2604     181.3    3004     181      3005.457 178.3    3009.33  178.1    3014.085
GR 178.2    3017.186 181.2    3024.75  181.3    3038.397 181.7    3438

NC 0.1      0.1      0.045
X1 4.5              9        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.7    2604     181.3    3004     181      3005.457 178.3    3009.33  178.1    3014.085
GR 178.2    3017.186 181.2    3024.75  181.3    3038.397 181.6    3300

NC 0.1      0.1      0.045
X1 40               10       2994     3014.272 0.0       0.0       0        0        0
GR 186.9    2893     186.7    2993     186.457  2994     185.294  2994.891 184.637  2996.625
GR 185.546  2997.316 186.637  2999.988 186.637  3014.272 186.7    3015     186.9    3115

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 40323            19       2993.9   3006.2   0.0       0.0       0        0        0
GR 182.5    2730     180.5    2750     180.5    2825     180.5    2920     179.9    2991
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GR 178.1    2993     178.1    2993.1   177.2    2993.9   177.2    2994     177.2    3000
GR 177.2    3006.1   177.2    3006.2   178      3007     178      3007.1   179.9    3009
GR 180.5    3060     181      3220     181      3300     181.5    3450

;High-chord transect for bridge 40573.5 (River: Little River; Reach: Gouin to DS end).
;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 40573.5_HC       12       0        0        0.0      0.0      0        0        0
GR 182.5    2730     182.6    2750     183      2920     183      2993     183.8    2993.1
GR 183.8    2994     183      3000     183.8    3006.1   183.8    3007     183      3007.1
GR 183      3009     181.4    3220

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 40824            18       2993.9   3006.2   0.0      0.0      0        0        0
GR 182.5    2730     180.5    2750     180.5    2825     180.5    2920     179.9    2991
GR 178.1    2993     178.1    2993.1   177.2    2993.9   177.2    2994     177.2    3000
GR 177.2    3006.1   177.2    3006.2   178      3007     178      3007.1   179.9    3009
GR 180.5    3060     181      3220     181      3300

NC 0.1      0.1      0.045
X1 41               9        2994     3001.712 0.0      0.0      0        0        0
GR 187.1    2893     186.9    2993     186.575  2994     185.38   2996.371 184.838  2996.838
GR 185.186  2999.93  186.677  3001.712 186.9    3002     187.1    3102

NC 0.1      0.1      0.045
X1 41106            16       2950.3   2965.7   0.0      0.0      0        0        0
GR 183      2860     181.5    2874     180.7    2923     181.3    2946.1   179.4    2950.3
GR 177.3    2954.36  177.3    2961.64  179.4    2965.7   181      3000     181      3045.5
GR 181      3112     181.1    3203     181.2    3308     181.5    3413     181.8    3658
GR 182.3    4148

NC 0.1      0.1      0.045
X1 42               9        2994     3002.342 0.0      0.0      0        0        0
GR 187.1    2893     186.9    2993     186.75   2994     185.322  2995.817 184.846  2997.942
GR 185.148  2999.934 186.801  3002.342 186.9    3003     187.1    3103

NC 0.1      0.1      0.045
X1 42000            16       2989     3011     0.0      0.0      0        0        0
GR 183      2860     181.5    2880     180.7    2950     181.3    2983     179.4    2989
GR 177.3    2994.8   177.3    3005.2   179.4    3011     181      3060     181      3125
GR 181      3220     181.1    3350     181.2    3500     181.5    3650     181.8    4000
GR 182.3    4700

NC 0.1      0.1      0.045
X1 43               8        2994     3001.123 0.0      0.0      0        0        0
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GR 187.2    2893     187      2993     186.941  2994     184.889  2995.821 185.528  2998.6
GR 186.865  3001.123 187      3002     187.2    3102

NC 0.1      0.1      0.045
X1 44               8        2994     3003.375 0.0      0.0      0        0        0
GR 188      2893     187.8    2993     187.6    2994     186.2    2997.03  185.6    2998.694
GR 186.2    2999.884 187.8    3003.375 188      3103

;Location of Twin Oaks Drive Structure
NC 0.1      0.1      0.045
X1 44302            20       2989.8   3010.4   0.0      0.0      0        0        0
GR 183      2660     182      2680     181      2790     180.5    2820     180.5    2840
GR 181      2860     181      2950     180      2989.8   178.9    2991.5   177.5    2993.6
GR 177.5    3006.2   178.9    3008.5   180.1    3010.4   181      3060     181      3150
GR 181.2    3250     181.2    3350     181.4    3600     181.7    4000     182.2    4600

;Location of Twin Oaks Drive Structure
;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 44323            20       2989.8   3010.4   0.0      0.0      0        0        0
GR 183      2660     182      2680     181      2790     180.5    2820     180.5    2840
GR 181      2860     181      2950     180      2989.8   178.9    2991.5   177.5    2993.6
GR 177.5    3006.2   178.9    3008.5   180.1    3010.4   181      3060     181      3150
GR 181.2    3250     181.2    3350     181.4    3600     181.7    4000     182.2    4600

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 44704            20       2989.8   3010.4   0.0      0.0      0        0        0
GR 183.2    2660     182.2    2680     181.2    2790     180.7    2820     180.7    2840
GR 181.2    2860     181.2    2950     180.2    2989.8   179.1    2991.5   177.7    2993.6
GR 177.7    3006.2   179.1    3008.5   180.3    3010.4   181.2    3060     181.2    3150
GR 181.4    3250     181.4    3350     181.6    3600     181.9    4000     182.4    4600

NC 0.1      0.1      0.045
X1 45               7        2994     2999.9   0.0      0.0      0        0        0
GR 187.7    2894     187.5    2994     185.8    2997.66  185.6    2998.61  185.8    2999.9
GR 187.5    3000     187.7    3100

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 45100            20       2989.8   3010.4   0.0      0.0      0        0        0
GR 183.4    2660     182.4    2680     181.4    2790     180.9    2820     180.9    2840
GR 181.4    2860     181.4    2950     180.4    2989.8   179.3    2991.5   177.9    2993.6
GR 177.9    3006.2   179.3    3008.5   180.5    3010.4   181.4    3060     181.4    3150
GR 181.6    3250     181.6    3350     181.8    3600     182.1    4000     182.6    4600
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NC 0.1      0.1      0.045
X1 45601            20       2989.8   3010.4   0.0      0.0      0        0        0
GR 183      2200     182      2250     181      2300     181      2825     181      2840
GR 181      2860     181      2950     180      2989.8   178.9    2991.5   178.2    2993.6
GR 178.2    3006.2   178.9    3008.5   180.1    3010.4   181      3060     181      3150
GR 181.2    3250     181.2    3350     181.4    3600     181.7    4000     182.2    4600

NC 0.1      0.1      0.045
X1 46               8        2994     3001.45  0.0      0.0      0        0        0
GR 188.3    2894     188.1    2994     186      2996.006 185.6    2996.766 185.7    2998.427
GR 187.8    3001.45  188.1    3008.62  188.3    3109

NC 0.1      0.1      0.045
X1 46102            18       2995     3005.7   0.0      0.0      0        0        0
GR 184      2240     181      2250     181      2500     181      2700     181      2850
GR 181      2992     181      2992.1   178.9    2995     178.9    2995.1   178.4    3000
GR 178.4    3005.6   178.4    3005.7   181      3008     181      3008.1   181      3025
GR 181      3200     181      3600     182      4250

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 46203            18       2995     3005.7   0.0      0.0      0        0        0
GR 184      2240     181      2250     181      2500     181      2700     181      2850
GR 181      2992     181      2992.1   178.9    2995     178.9    2995.1   178.4    3000
GR 178.4    3005.6   178.4    3005.7   181      3008     181      3008.1   181      3025
GR 181      3200     181      3600     182      4250

NC 0.1      0.1      0.045
X1 46304            18       2992.1   3008     0.0      0.0      0        0        0
GR 184      2240     181      2250     181      2500     181      2700     181      2850
GR 181      2992     181      2992.1   178.9    2995     178.9    2995.1   178.4    3000
GR 178.4    3005.6   178.4    3005.7   181      3008     181      3008.1   181      3025
GR 181      3200     181      3600     182      4250

;Upstream of Little River and Baseline junction
NC 0.1      0.1      0.045
X1 47               12       2994     3011.01  0.0      0.0      0        0        0
GR 184.79   2894     184.59   2994     184.41   2997.573 184.23   2998.34  182.32   3002
GR 181.23   3003.576 181.24   3004.4   181.22   3005.132 182.32   3006.611 184.39   3011.01
GR 184.59   3011.5   184.79   3111

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 47100            18       2766.47  2777.6   0.0      0.0      0        0        0
GR 183.9    2240     180.9    2247     180.9    2422     180.9    2562     180.9    2667
GR 180.9    2766.4   180.9    2766.47  178.8    2768.5   178.8    2768.57  178.3    2772
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GR 178.3    2775.92  178.3    2775.99  180.9    2777.6   180.9    2777.67  180.9    2789.5
GR 180.9    2912     180.9    3192     181.9    3647

NC 0.1      0.1      0.045
X1 48               11       2994     3008.902 0.0      0.0      0        0        0
GR 184.75   2894     184.55   2994     184.4    2995.178 182.28   2999.297 181.47   3001.13
GR 181.43   3001.905 181.57   3002.728 184.31   3006.35  184.41   3008.902 184.55   3009
GR 184.75   3109

NC 0.1      0.1      0.045
X1 48500            14       2992     3008     0.0      0.0      0        0        0
GR 184.9    2300     181.4    2310     181.4    2650     181.4    2810     181.2    2850
GR 180.9    2980     180.7    2992     178.2    2997     178.2    3003     180.7    3008
GR 180.9    3035     181.1    3150     181.5    3500     181.9    4000

NC 0.1      0.1      0.045
X1 49               11       2994     3016.678 0.0      0.0      0        0        0
GR 185.26   2894     185.06   2994     184.94   2997.328 184.76   2997.913 181.84   3004.357
GR 181.69   3004.762 181.81   3005.941 184.42   3008.955 184.6    3016.678 185.06   3017
GR 185.26   3117

NC 0.1      0.1      0.045
X1 49000            16       2991     3009     0.0      0.0      0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2991     178.2    2996.7   178.2    3003.3
GR 181      3009     181.2    3075     181.4    3140     181.5    3250     181.6    3450
GR 182      4000

NC 0.1      0.1      0.045
X1 5                20       2952     2971.34  0.0      0.0      0        0        0
GR 185      2280     182      2290     181.2    2300     181.1    2550     181      2750
GR 181      2850     181      2950     181.3    2952     180.1    2959.032 180      2961.837
GR 180.1    2964.914 181.2    2971.34  181      3050     181.1    3150     181.3    3250
GR 181.6    3450     181.9    3750     182      4000     182.4    4650     182.9    5500

NC 0.1      0.1      0.045
X1 50               10       2998.084 3009.343 0.0      0.0      0        0        0
GR 185.5    2894     185.3    2994     185.2    2997.059 184.9    2998.084 182.8    3003.172
GR 182.3    3004.059 181.7    3007.922 184.8    3009.343 185.3    3010     185.5    3109

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 50350            16       2991     3009     0.0      0.0      0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2991     178.2    2996.7   178.2    3003.3
GR 181      3009     181.2    3075     181.4    3140     181.5    3250     181.6    3450
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GR 182      4000

NC 0.1      0.1      0.045
X1 51                9        2994     3009.177 0.0      0.0       0        0        0
GR 185.6    2894     185.4    2994     185.3    2997.858 183.2    3001.878 182.2    3003.71
GR 183.4    3005.171 185.1    3009.177 185.4    3010     185.6    3110

NC 0.1      0.1      0.045
X1 51701             16       2991     3009     0.0      0.0       0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2991     178.2    2996.7   178.2    3003.3
GR 181      3009     181.2    3075     181.4    3140     181.5    3250     181.6    3450
GR 182      4000

NC 0.1      0.1      0.045
X1 52                9        2994     3002.636 0.0      0.0       0        0        0
GR 186.7    2893     186.5    2993     185.908  2994     184.55   2996.693 184.25   2997.187
GR 184.45   2999.299 186      3002.636 186.5    3003     186.7    3103

NC 0.1      0.1      0.045
X1 53                9        100      108.721  0.0      0.0       0        0        0
GR 186.5    -1       186.3    99       185.907  100      184.55   103.803  184.331  103.804
GR 184.666  106.431  185.998  108.721  186.3    109      186.5    209

;THIS IS A COPIED SECTION OF 53
NC 0.1      0.1      0.045
X1 53.5              7        100      108.721  0.0      0.0       0        0        0
GR 188.607  0        188.407  100      187.05   103.803  186.831  103.804  187.166  106.431
GR 188.498  108.721  188.698  208.721

NC 0.1      0.1      0.045
X1 54                8        2994     3005.29  0.0      0.0       0        0        0
GR 187.5    2893     187.3    2993     186.7    2994     184.8    2996.638 184.9    3003.237
GR 186.7    3005.29  187.3    3006     187.5    3106

NC 0.1      0.1      0.045
X1 54.5              6        2994     3005.29  0.0      0.0       0        0        0
GR 188.68   2594     188.28   2994     186.58   2996.638 186.68   3003.237 188.48   3005.29
GR 188.88   3405

NC 0.1      0.1      0.045
X1 55                8        2994     3001.572 0.0      0.0       0        0        0
GR 187.1    2894     186.9    2994     184.8    2995.71  184.5    2996.6   184.7    2997.64
GR 186.7    3001.572 186.9    3002     187.1    3102

;COPIED SECTION FROM SEC 55
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NC 0.1      0.1      0.045
X1 55.5              8        2994     3001.572 0.0      0.0       0        0        0
GR 187.6    2894     187.4    2994     185.3    2995.71  185      2996.6   185.2    2997.64
GR 187.2    3001.572 187.4    3002     187.6    3102

NC 0.1      0.1      0.045
X1 56                9        2994     3001.675 0.0      0.0       0        0        0
GR 188.7    2893     188.5    2993     187.66   2994     186.555  2996.174 186.09   2998.433
GR 186.66   2999.644 187.999  3001.675 188.5    3002     188.7    3102

NC 0.1      0.1      0.045
X1 57                9        2994     3008.541 0.0      0.0       0        0        0
GR 188.9    2893     188.7    2993     187.8    2994     187.088  2998.621 186.755  2999.555
GR 187      3001.32  187.911  3008.541 188.7    3010     188.9    3110

NC 0.1      0.1      0.045
X1 58                7        2994     3008.551 0.0      0.0       0        0        0
GR 188.95   2594     188.555  2994     187.7    2998.05  187.701  2999.828 187.8    3002.522
GR 188.565  3008.551 188.96   3408

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.5              9        2994     3008.551 0.0      0.0       0        0        0
GR 189.5    2894     189.3    2993     189.055  2994     188.2    2998.05  188.201  2999.828
GR 188.3    3002.522 189.065  3008.551 189.3    3009     189.5    3109

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.7              7        2994     3008.551 0.0      0.0       0        0        0
GR 194.1    2894     193.905  2994     189      2998.05  193.051  2999.828 193.15   3002.522
GR 193.915  3008.551 194.11   3108

;High-chord transect for bridge 58.74 (River: 7th Concession D; Reach: 7th Concession).
;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.74_HC          3        0        0        0.0      0.0       0        0        0
GR 194.45   2594     194.4    3347.324 194.46   3408

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.745            7        2994     3008.551 0.0      0.0       0        0        0
GR 194.45   2594     194.055  2994     189      2998.05  193.201  2999.828 193.3    3002.522
GR 194.065  3008.551 194.46   3408

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
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X1 58.75             7        2994     3008.551 0.0      0.0       0        0        0
GR 194.45   2594     194.055  2994     189      2998.05  193.201  2999.828 193.3    3002.522
GR 194.065  3008.551 194.46   3408

;High-chord transect for bridge 58.76 (River: 7th Concession D; Reach: 7th Concession).
;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.76_HC          3        0        0        0.0      0.0       0        0        0
GR 194.75   2594     194.6    3246.198 194.76   3408

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.8              7        2994     3008.551 0.0      0.0       0        0        0
GR 194.75   2594     194.355  2994     189      2998.05  193.501  2999.828 193.6    3002.522
GR 194.365  3008.551 194.76   3408

NC 0.1      0.1      0.045
X1 59                9        2994     2999.957 0.0      0.0       0        0        0
GR 189.4    2794     189      2993     188.333  2994     186.811  2995.149 186.666  2996.75
GR 186.788  2997.321 188.456  2999.957 189      3000     189.4    3200

NC 0.1      0.1      0.045
X1 59.5              7        2994     2999.957 0.0      0.0       0        0        0
GR 189.23   2594     188.833  2994     187.311  2995.149 187.166  2996.75  187.288  2997.321
GR 188.956  2999.957 189.36   3400

NC 0.1      0.1      0.045
X1 61                10       3.3      7.8      0.0      0.0       0        0        0
GR 187.6    -101     187.5    -1       186.65   0        185.45   3.3      185.14   4.3
GR 185.24   6.1      186.36   7.8      186.65   10       187.5    11       187.6    111

NC 0.1      0.1      0.045
X1 62                9        2994     3001.735 0.0      0.0       0        0        0
GR 187.1    2893     186.9    2993     186.869  2994     185.364  2996.285 185.013  2998.603
GR 185.033  2999.523 186.729  3001.735 186.9    3002     187.1    3102

NC 0.1      0.1      0.045
X1 63                8        2994     3001.767 0.0      0.0       0        0        0
GR 187.2    2893     187      2993     186.8    2994     185.7    2995.663 185.1    2996.67
GR 186      2999.277 187      3001.767 187.1    3102

NC 0.1      0.1      0.045
X1 64                11       2995.257 3009.048 0.0      0.0       0        0        0
GR 187.1    2894     186.9    2994     186.6    2995.257 187.1    2997.217 187.1    3000.509
GR 187.1    3003.395 185.7    3005.348 185.1    3006.053 186      3007.491 186.9    3009.048
GR 187.1    3109
```

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NC 0.1      0.1      0.045
X1 65                7        2994     2997.22  0.0      0.0       0        0        0
GR 187.7    2894     187.5    2994     186.1    2995.73  185.6    2996.45  186.1    2996.97
GR 187.5    2997.22  187.7    3100

NC 0.1      0.1      0.045
X1 66                7        2994     3000.208 0.0      0.0       0        0        0
GR 187.6    2894     187.4    2994     186      2996.55  185.4    2997.568 185.6    2998.625
GR 187.4    3000.208 187.6    3100

NC 0.1      0.1      0.045
X1 67                8        2994     3000.472 0.0      0.0       0        0        0
GR 187.9    2894     187.7    2994     186.4    2994.948 186.3    2995.615 186.2    2997.818
GR 186.5    2998.54  187.7    3000.472 187.9    3100

NC 0.1      0.1      0.045
X1 68                9        2994     3001.43  0.0      0.0       0        0        0
GR 187.9    2894     187.7    2994     186.5    2996.165 185.8    2997.276 186      2998.469
GR 186.4    2999.253 187.5    3001.43  187.7    3002     187.9    3102

NC 0.1      0.1      0.045
X1 69                7        2994     3001.454 0.0      0.0       0        0        0
GR 188.2    2894     188      2994     186.4    2996.488 186.1    2998.293 186.6    3000.357
GR 188      3001.454 188.2    3101

;^th Conc Drain at 9th Conc Road
NC 0.015    0.015    0.015
X1 6th@9th           4        0        0        0.0      0.0       0        0        0
GR 185.1    0        184.8    30       184.8    70       185      130

NC 0.1      0.1      0.045
X1 7                 22       2952     2968     0.0      0.0       0        0        0
GR 185      2010     185      2020     185      2499.9   182.8    2500     181.8    2675
GR 181.8    2790     181.7    2880     181.6    2950     181.3    2952     179.3    2958.017
GR 178.8    2960.989 179.7    2963.107 180.8    2967.952 181.3    2968     181.6    2975
GR 181.8    3050     182.2    3110     185      3110.1   185      3200     185      3350
GR 185      3600     185      4000

;[LE: 2500][RE: 3110]
NC 0.045    0.045    0.03
X1 7(orig)           20       2952     2968     0.0      0.0       0        0        0
GR 185      2010     182.2    2020     182.8    2500     181.8    2675     181.8    2790
GR 181.7    2880     181.6    2950     181.3    2952     179.3    2958.017 178.8    2960.989
GR 179.7    2963.107 180.8    2967.952 181.3    2968     181.6    2975     181.8    3050
GR 182.2    3110     181.8    3200     181.7    3350     181.7    3600     182.1    4000
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```
NC 0.1      0.1      0.045
X1 70               6        2994     3002.143 0.0       0.0       0        0        0
GR 188.3    2894     188.1    2994     186.2    2997.78  186.5    2998.886 188.1    3002.143
GR 188.3    3102

NC 0.1      0.1      0.045
X1 71               7        2994     3003.477 0.0       0.0       0        0        0
GR 188.5    2893     188.3    2993     187.7    2994     186.3    2998.576 187.7    3003.477
GR 188.3    3004     188.5    3103

NC 0.1      0.1      0.045
X1 72               9        2994     3002.905 0.0       0.0       0        0        0
GR 188.8    2893     188.6    2993     187.7    2994     186.7    2997.097 186.6    2998.564
GR 186.9    3000.554 187.7    3002.905 188.6    3003     188.8    3103

NC 0.1      0.1      0.045
X1 73               9        2994     3003.75  0.0       0.0       0        0        0
GR 188.8    2893     188.6    2993     187.7    2994     186.8    2995.924 186.6    2997.34
GR 187      3000.72  187.7    3003.75  188.6    3004     188.8    3104

NC 0.1      0.1      0.045
X1 74               8        2990.574 2995.317 0.0       0.0       0        0        0
GR 189.1    2890     188.9    2990     188.6    2990.574 187.6    2991.996 187      2993.222
GR 187.6    2994     188.9    2995.317 189.1    3095

NC 0.1      0.1      0.045
X1 75               10       2994     2997.53  0.0       0.0       0        0        0
GR 189.9    2893     189.7    2993     188.6    2994     187.8    2994.993 187.7    2995.466
GR 187.7    2995.627 187.9    2996.195 188.6    2997.53  189.7    2998     189.9    3097

NC 0.1      0.1      0.045
X1 76               9        2994     2997.74  0.0       0.0       0        0        0
GR 189.9    2893     189.7    2993     188.6    2994     187.9    2995.14  187.7    2996.1
GR 187.8    2996.67  188.6    2997.74  189.7    2998     189.9    3098

NC 0.1      0.1      0.045
X1 77               9        2994     2997.89  0.0       0.0       0        0        0
GR 189.8    2893     189.6    2993     188.7    2994     187.6    2996.208 187.8    2997.425
GR 187.9    2997.477 188.7    2997.89  189.6    2998     189.8    3098

NC 0.1      0.1      0.045
X1 79               10       2994     3000.879 0.0       0.0       0        0        0
GR 189      2893     188.8    2993     188.1    2994     186.9    2997.613 186.5    2998.752
GR 186.9    2999.409 188.2    3000.308 188.1    3000.879 188.8    3001     189      3101
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NC 0.1      0.1      0.045
X1 8                19       2994     3015.8   0.0       0.0       0        0        0
GR 184.2    2000     182      2035     181.5    2250     181.5    2500     181.7    2700
GR 181.9    2850     181.6    2950     181.6    2994     179.6    3001.177 179.8    3007.135
GR 179.8    3009.548 181.4    3015.8   181.5    3050     181.5    3100     182      3105
GR 182.3    3180     182.6    3370     182.7    3600     182.9    3900

NC 0.1      0.1      0.045
X1 80               9        2994     3000.407 0.0       0.0       0        0        0
GR 189      2893     188.8    2993     188.1    2994     187.1    2996.175 186.5    2997.781
GR 187.1    2998.638 188.1    3000.407 188.8    3001     189      3101

NC 0.1      0.1      0.045
X1 81               7        2994     2999.293 0.0       0.0       0        0        0
GR 188.9    2594     188.5    2994     187.7    2996.045 187.4    2996.891 187.6    2997.571
GR 188.5    2999.293 188.9    3399

NC 0.1      0.1      0.045
X1 84               7        2994     2998.552 0.0       0.0       0        0        0
GR 188.8    2594     188.4    2994     187.7    2995.499 187.5    2995.925 187.6    2996.651
GR 188.4    2998.552 188.8    3398

NC 0.1      0.1      0.045
X1 85               7        2994     3001.561 0.0       0.0       0        0        0
GR 188.9    2594     188.5    2994     186.6    2994.908 187.1    2997.794 187.6    2998.696
GR 188.5    3001.561 188.9    3401

NC 0.1      0.1      0.045
X1 86               9        2994     2999.067 0.0       0.0       0        0        0
GR 189.5    2893     189.2    2993     188.711  2994     187      2994.034 187.255  2994.987
GR 188.45   2996.398 188.711  2999.067 189.2    3000     189.5    3100

NC 0.1      0.1      0.045
X1 87               12       2994     2997.967 0.0       0.0       0        0        0
GR 189.3    2893     189.1    2993     188.336  2994     188.366  2994.583 187.525  2995.032
GR 187.401  2995.783 186.791  2995.793 187.611  2997.225 188.362  2997.446 188.35   2997.967
GR 189.1    2999     189.3    3099

NC 0.1      0.1      0.045
X1 88               9        2994     2998.364 0.0       0.0       0        0        0
GR 190      2893     189.8    2993     188.599  2994     187.755  2995.171 187.546  2996.074
GR 187.711  2996.87  188.535  2998.364 189.8    2999     190      3098

NC 0.1      0.1      0.045
X1 89               9        2994     3000.356 0.0       0.0       0        0        0
GR 190.2    2893     190      2993     189.09   2994     187.888  2995.606 187.555  2996.413
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GR 187.75   2998.017 189.25   3000.356 190      3001     190.2    3101

;High-chord transect for bridge 7.5 (River: Little River; Reach: Watson to Desjar).
NC 0.1      0.1      0.045
X1 8A               21       2994     3015.8   0.0       0.0       0        0        0
GR 184.2    2000     184.2    2035     184.2    2250     184.2    2500     184.2    2700
GR 184.2    2850     184.2    2984.9   182.5    2985     181.6    2994     179.6    3001.177
GR 179.8    3007.135 179.8    3009.548 181.4    3015.8   182.5    3020     184.2    3020.1
GR 184.2    3100     184.2    3105     184.2    3180     184.2    3370     184.2    3600
GR 184.2    3900

;[LE: 2985][RE: 3020]
NC 0.045    0.045    0.03
X1 8A(orig)         19       2994     3015.8   0.0       0.0       0        0        0
GR 184.2    2000     182.5    2035     182.5    2250     182.5    2500     182.5    2700
GR 182.5    2850     182.5    2985     181.6    2994     179.6    3001.177 179.8    3007.135
GR 179.8    3009.548 181.4    3015.8   182.5    3020     182.5    3100     182.5    3105
GR 182.5    3180     182.6    3370     182.7    3600     182.9    3900

NC 0.1      0.1      0.045
X1 9                21       2994     3015.387 0.0       0.0       0        0        0
GR 184.2    2000     184.2    2035     184.2    2250     184.2    2500     184.2    2700
GR 184.2    2850     184.2    2949.9   182      2950     181.7    2994     179.6    3000.144
GR 178.8    3003.25  180.4    3009.303 181.6    3015.387 182      3050     184.2    3050.1
GR 184.2    3100     184.2    3105     184.2    3180     184.2    3370     184.2    3600
GR 184.2    3900

;[LE: 2950][RE: 3050]
NC 0.045    0.045    0.03
X1 9(orig)          19       2994     3015.387 0.0       0.0       0        0        0
GR 184.2    2000     182      2035     182      2250     182      2500     182      2700
GR 182      2850     182      2950     181.7    2994     179.6    3000.144 178.8    3003.25
GR 180.4    3009.303 181.6    3015.387 182      3050     182      3100     182      3105
GR 182.3    3180     182.6    3370     182.7    3600     182.9    3900

NC 0.1      0.1      0.045
X1 90               10       2994     3000.348 0.0       0.0       0        0        0
GR 190.5    1594     189.99   2094     189.49   2594     189.087  2994     187.777  2995.854
GR 187.9    2998.618 189.001  3000.348 189.4    3400     189.9    3900     190.4    4400

;EC Row at Little River
NC 0.015    0.015    0.015
X1 ECRow@LR         22       0.0      0.0      0.0      0.0       0.0      0.0      0.0
GR 182.5    2730     182.6    2750     182.8    2825     183      2920     183      2991
GR 183      2993     183      2993.1   183      2993.9   183      2994     183      3000
GR 183      3006.1   183      3006.2   183      3007     183      3007.1   183      3009
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GR 182.6    3060     181.4    3220     182      3300     182      3450     182      4000
GR 182.1    4700     182.9    5500

;Forest Glen Drive
NC 0.015    0.015    0.015
X1 ForestGlenDR     27       0.0      0.0      0.0      0.0       0.0      0.0      0.0
GR 183      2500     180.6    2630     180.5    2830     180.8    2900     181      2950
GR 181.4    2983     181.4    2989.2   182      2989.3   182      2992.7   182      2992.8
GR 182      2994.6   182      3000     182      3007.4   182      3007.5   182      3013.9
GR 181.4    3014     181.4    3015.3   181.4    3018     181      3065     180.9    3085
GR 180.7    3145     180.6    3170     180.7    3275     181      3430     181.5    4000
GR 182      4750     182.9    5500

;Lauzon Parkway at Little River
NC 0.015    0.015    0.015
X1 Lauzonpky@LR     28       0.0      0.0      0.0      0.0       0.0      0.0      0.0
GR 183      1350     183      1760     182.4    1840     182.5    2230     182.7    2500
GR 182.7    2700     182.9    2880     183      2920     183.3    2950     183.9    2984.4
GR 185.1    2984.5   185.1    2988     185.1    2994.6   185.1    2994.7   185.1    2996.8
GR 185.1    3000     185.1    3003.8   185.1    3005.4   185.1    3005.5   185.1    3012
GR 185.1    3015.9   183.9    3016     183.4    3050     182.8    3150     182.7    3200
GR 183      3290     183.2    3330     183.4    3400

;Little River at Lauzon road
NC 0.015    0.015    0.015
X1 Lauzonrd@LR      26       0.0      0.0      0.0      0.0       0.0      0.0      0.0
GR 185      2010     182      2020     182      2500     181.8    2530     181.9    2675
GR 181.9    2790     181.9    2880     182      2950     182      2992.4   182.2    2992.5
GR 182.2    2995     182.2    2995.1   182.2    2996.1   182.2    3000.4   182.2    3003.9
GR 182.2    3005.9   182.2    3006     182.2    3007.8   182      3008.4   182      3050
GR 182      3110     182.1    3200     182.3    3275     182.3    3430     182.6    3600
GR 181.9    4100

;Little River at County road 42
NC 0.015    0.015    0.015
X1 LittleRiver@42   19       0.0      0.0      0.0      0.0       0.0      0.0      0.0
GR 183.9    2250     183.9    2350     183.8    2480     183.7    2620     183.7    2675
GR 183.6    2830     183.5    2890     183.4    2950     183.9    2994.4   183.9    2996
GR 183.9    2996.1   183.9    3003     183.9    3003.1   183.9    3006     183.1    3040
GR 183.2    3240     183.2    3270     183.4    3350     184      4000

;Little River at Baseline Road
NC 0.015    0.015    0.015
X1 LR@baseline      19       0.0      0.0      0.0      0.0       0.0      0.0      0.0
GR 185.2    2000     185.2    2300     184.8    2550     184.6    2710     184.6    2880
GR 184.6    2950     184.6    2994.3   184.6    2996.9   184.6    2997     184.6    3000
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GR 184.6    3003      184.6    3003.1   184.5    3006      184.6    3050      184.5    3170
GR 184.6    3225      184.6    3425     184.6    3700      185      4000

;Little RIver at Twin Oaks
NC 0.015    0.015     0.015
X1 LR@Twinoaks       4        0.0      0.0      0.0        0.0       0.0       0.0       0.0
GR 181      0         180.8     60       180.8    80        181      160

;Rail Line at Little River
NC 0.015    0.015     0.015
X1 Rail@LR           28       0.0      0.0      0.0        0.0       0.0       0.0       0.0
GR 184      2295      182.5    2300     182.5    2525      182.5    2700      182.5    2800
GR 182.5    2850      182.5    2925     182.5    2990.2    182.5    2991      183.4    2991.1
GR 183.4    2992.6    183.4    2992.7   183.4    2996.6    183.4    3002.1    183.4    3003.4
GR 183.4    3007.4    183.4    3007.5   183.4    3008.3    183.4    3009.1    182.5    3009.2
GR 182.5    3075      182.5    3140     182.5    3250      182.6    3450      182.9    3650
GR 183      4000      183      4650     183      5500

NC 0.1      0.1       0.045
X1 Townline          6        1000     1006.5   0.0        0.0       0.0       0.0       0.0
GR 100.2    900       100      1000      98.3    1002.5    98.3     1004      100      1006.5
GR 100.2    1106

;Cross Section from Twin Oak Buisness Park Station 0+122
NC 0.1      0.1       0.045
X1 TwinOaks122       17       38       39.5     0.0        0.0       0         0         0
GR 181      4         181       5.5      179.4    13.5      179.4    17.5      178.2    22.5
GR 178.2    25.5      177.2    30.5     177.2    36.5      177.2    38        177      38.5
GR 177.2    39.5      177.2    41.3     179      49        179      51.5      180.8    61.5
GR 181      67.5      181      69

;Twin Oaks Buiness Park Station 0+316
NC 0.1      0.1       0.045
X1 TwinOaks316       17       43.5     45       0.0        0.0       0         0         0
GR 181      0         181       7        178.5    17        178.5    29        178.5    33.5
GR 178.5    35        177.4    39       177.4    43.5      177      44        177.4    45
GR 177.4    53        178.5    57       178.5    58.5      178.5    63        178.5    75
GR 181      85        181      92

;Twin Oak Buisiness Park Station 0+742
NC 0.1      0.1       0.045
X1 TwinOaks742       17       32       33.5     0.0        0.0       0         0         0
GR 181.6    2.5       181.6    4        179.9    12        179.8    17.5      178.8    21.5
GR 178.7    24        177.9    29       177.9    32        177.6    32.5      177.9    33.5
GR 177.9    36.8      179.6    44.5     179.6    47        181      54.5      181.1    55
GR 181.6    63        181.6    64.5
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[LOSSES]
;;Link           Inlet      Outlet     Average    Flap Gate
;;-------------- ---------- ---------- ---------- ----------
C1               0.5        1          0          NO
C10              0.5        1          0          NO
C11              0.3        0.5        0          NO
C12              0.5        1          0          NO
C13              0.3        0.5        0          NO
C14              0.3        0.5        0          NO
C15              0.1        0.3        0          NO
C16              0.3        0.5        0          NO
C17              0.5        1          0          NO
C18              0.5        1          0          NO
C19              0.3        0.5        0          NO
C2               0.3        0.5        0          NO
C20              0.5        1          0          NO
C21              0.3        0.5        0          NO
C22              0.3        0.5        0          NO
C23              0.3        0.5        0          NO
C24              0.1        0.3        0          NO
C25              0.3        0.5        0          NO
C26              0.3        0.5        0          NO
C27              0.1        0.3        0          NO
C28              0.5        1          0          NO
C3               0.1        0.3        0          NO
C4               0.5        1          0          NO
C5               0.3        0.5        0          NO
C6               0.5        1          0          NO
C6000            0.1        0.3        0          NO
C6007            0.3        0.5        0          NO
C6015a           0.1        0.3        0          NO
C6015b           0.1        0.3        0          NO
C6025a           0.3        0.5        0          NO
C6025b           0.1        0.3        0          NO
C6025c           0.1        0.3        0          NO
C6030            0.1        0.3        0          NO
C6040            0.3        0.5        0          NO
C6045a           0.1        0.3        0          NO
C6045b           0.3        0.5        0          NO
C6055a           0.3        0.5        0          NO
C6055b           0.1        0.3        0          NO
C6055c           0.1        0.3        0          NO
C6055d           0.3        0.5        0          NO
C6060a           0.1        0.3        0          NO
C6060b           0.1        0.3        0          NO
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C6060c           0.1        0.3        0          NO
C6060d           0.1        0.3        0          NO
C6060e           0.1        0.3        0          NO
C6060f           0.1        0.3        0          NO
C6060g           0.1        0.3        0          NO
C6060h           0.1        0.3        0          NO
C6060i           0.1        0.3        0          NO
C6060j           0.1        0.3        0          NO
C6060k           0.3        0.5        0          NO
C6075a           0.3        0.5        0          NO
C6075b           0.1        0.3        0          NO
C6080            0.3        0.5        0          NO
C6090a           0.3        0.5        0          NO
C6090b           0.1        0.3        0          NO
C6090c           0.1        0.3        0          NO
C6090d           0.3        0.5        0          NO
C6100a           0.1        0.3        0          NO
C6100b           0.1        0.3        0          NO
C6100c           0.3        0.5        0          NO
C6110a           0.3        0.5        0          NO
C6110b           0.3        0.5        0          NO
C6120a           0.1        0.3        0          NO
C6120b           0.3        0.5        0          NO
C6120c           0.3        0.5        0          NO
C6130b           0.1        0.3        0          NO
C6130c           0.1        0.3        0          NO
C6133a           0.3        0.5        0          NO
C6133b           0.1        0.3        0          NO
C6133c           0.1        0.3        0          NO
C6135a           0.1        0.3        0          NO
C6135b           0.1        0.3        0          NO
C6145            0.1        0.3        0          NO
C6150            0.1        0.3        0          NO
C6160a           0.3        0.5        0          NO
C6160b           0.3        0.5        0          NO
C6170e           0.3        0.5        0          NO
C6170f           0.3        0.5        0          NO
C6170l           0.3        0.5        0          NO
C6180a           0.3        0.5        0          NO
C6180b           0.1        0.3        0          NO
C6180c           0.1        0.3        0          NO
C6180d           0.3        0.5        0          NO
C6180e           0.3        0.5        0          NO
C6190            0.3        0.5        0          NO
C6200            0.1        0.3        0          NO
C6220            0.3        0.5        0          NO
```

```
C7               0.3        0.5        0          NO
C7025            0.5        1          0          NO
C7040            0.5        1          0          NO
C7075            0.5        1          0          NO
C7105            0.5        1          0          NO
C7133            0.5        1          0          NO
C8               0.5        1          0          NO
C9               0.3        0.5        0          NO
CJ0.5            0.1        0.3        0          NO
CJ0.75           0.1        0.3        0          NO
CJ0.8            0.1        0.3        0          NO
CJ0.9            0.1        0.3        0          NO
CJ4              0.1        0.3        0          NO
CJ4.5            0.1        0.3        0          NO
CJ53             0.1        0.3        0          NO
CJ53.5           0.1        0.3        0          NO
CJ62             0.1        0.3        0          NO
CJ63             0.1        0.3        0          NO
CJ64             0.1        0.3        0          NO
CJ65             0.1        0.3        0          NO
CJ66             0.1        0.3        0          NO
CJ67             0.1        0.3        0          NO
CJ68             0.1        0.3        0          NO
CJ69             0.1        0.3        0          NO
CJ70             0.1        0.3        0          NO
CJ71             0.1        0.3        0          NO
CJ72             0.1        0.3        0          NO
CJ73             0.1        0.3        0          NO
CJ74             0.1        0.3        0          NO
CJ75             0.1        0.3        0          NO
CJ76             0.1        0.3        0          NO
CJ77             0.1        0.3        0          NO
CJ80             0.1        0.3        0          NO
CJ81             0.1        0.3        0          NO
CJ84             0.1        0.3        0          NO
CJ85             0.1        0.3        0          NO
CJ86             0.1        0.3        0          NO
CJ87             0.1        0.3        0          NO
CJ88             0.1        0.3        0          NO
CJ89             0.1        0.3        0          NO
CJ90             0.1        0.3        0          NO

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
;Bridge and crossing at EC Row - culvert size 6 x 1.8 according to 1997 SWM report
```

```
;Original area=20.065, shape curve area=20.069
0.35             Shape      0          0
0.35                        0.043      2.382
0.35                        0.087      3.525
0.35                        0.336      4.512
0.35                        0.577      4.568
0.35                        1          2.609

;Original area=38.697, shape curve area=38.7
1.5              Shape      0          0
1.5                         0.108      1.196
1.5                         0.135      1.395
1.5                         0.324      2.431
1.5                         0.405      2.875
1.5                         0.572      3.543
1.5                         0.838      3.81
1.5                         0.919      3.973
1.5                         1          3.973

;Original area=23.477, shape curve area=23.473
11.5             Shape      0          0
11.5                        0.018      0.578
11.5                        0.771      3.002
11.5                        0.86       3.002
11.5                        0.888      2.708
11.5                        0.916      1.964
11.5                        1          0

;Original area=6.498, shape curve area=6.5
13.25            Shape      0          0
13.25                       0.26       1.188
13.25                       0.292      1.313
13.25                       1          1.181

;Original area=6.024, shape curve area=6.025
14.5             Shape      0          0
14.5                        0.414      1.38
14.5                        1          3.173

;Original area=8.915, shape curve area=8.917
16.5             Shape      0          0
16.5                        0.072      1.309
16.5                        0.713      1.145
16.5                        1          1.04

;Bridge #6-Forest Glade Drive
```

```
;Original area=47.004, shape curve area=47.001
35092.5          Shape      0          3.765
35092.5                     0.174      4.287
35092.5                     0.176      4.295
35092.5                     0.912      4.294
35092.5                     0.941      3.039
35092.5                     1          0

;Bridge #7-Hwy 2
;Original area=62.934, shape curve area=62.943
40573.5          Shape      0          2.242
40573.5                     0.926      2.241
40573.5                     1          0

;Original area=7.936, shape curve area=7.936
7.5              Shape      0          0
7.5                         0.143      4.768
7.5                         0.144      5.246
7.5                         0.158      5.301
7.5                         0.714      5.286
7.5                         0.857      2.786
7.5                         0.858      1.5
7.5                         1          0

5002             Storage    0          100000
5002                        2          100000

5005             Storage    0          25000
5005                        2          25000

5180             Storage    0          10000
5180                        2          10000

5205             Storage    0          15000
5205                        2          15000

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
100yr_24hr-chi   12/14/2011 0:00:00    0
100yr_24hr-chi   12/14/2011 0:10:00    0.66
100yr_24hr-chi   12/14/2011 0:20:00    0.67
100yr_24hr-chi   12/14/2011 0:30:00    0.69
100yr_24hr-chi   12/14/2011 0:40:00    0.7
100yr_24hr-chi   12/14/2011 0:50:00    0.72
100yr_24hr-chi   12/14/2011 1:00:00    0.73
```

```
100yr_24hr-chi   12/14/2011 1:10:00    0.75
100yr_24hr-chi   12/14/2011 1:20:00    0.77
100yr_24hr-chi   12/14/2011 1:30:00    0.78
100yr_24hr-chi   12/14/2011 1:40:00    0.8
100yr_24hr-chi   12/14/2011 1:50:00    0.82
100yr_24hr-chi   12/14/2011 2:00:00    0.84
100yr_24hr-chi   12/14/2011 2:10:00    0.87
100yr_24hr-chi   12/14/2011 2:20:00    0.89
100yr_24hr-chi   12/14/2011 2:30:00    0.91
100yr_24hr-chi   12/14/2011 2:40:00    0.94
100yr_24hr-chi   12/14/2011 2:50:00    0.97
100yr_24hr-chi   12/14/2011 3:00:00    1
100yr_24hr-chi   12/14/2011 3:10:00    1.03
100yr_24hr-chi   12/14/2011 3:20:00    1.07
100yr_24hr-chi   12/14/2011 3:30:00    1.1
100yr_24hr-chi   12/14/2011 3:40:00    1.14
100yr_24hr-chi   12/14/2011 3:50:00    1.19
100yr_24hr-chi   12/14/2011 4:00:00    1.23
100yr_24hr-chi   12/14/2011 4:10:00    1.28
100yr_24hr-chi   12/14/2011 4:20:00    1.34
100yr_24hr-chi   12/14/2011 4:30:00    1.4
100yr_24hr-chi   12/14/2011 4:40:00    1.47
100yr_24hr-chi   12/14/2011 4:50:00    1.54
100yr_24hr-chi   12/14/2011 5:00:00    1.62
100yr_24hr-chi   12/14/2011 5:10:00    1.71
100yr_24hr-chi   12/14/2011 5:20:00    1.82
100yr_24hr-chi   12/14/2011 5:30:00    1.94
100yr_24hr-chi   12/14/2011 5:40:00    2.07
100yr_24hr-chi   12/14/2011 5:50:00    2.23
100yr_24hr-chi   12/14/2011 6:00:00    2.42
100yr_24hr-chi   12/14/2011 6:10:00    2.64
100yr_24hr-chi   12/14/2011 6:20:00    2.92
100yr_24hr-chi   12/14/2011 6:30:00    3.25
100yr_24hr-chi   12/14/2011 6:40:00    3.68
100yr_24hr-chi   12/14/2011 6:50:00    4.25
100yr_24hr-chi   12/14/2011 7:00:00    5.03
100yr_24hr-chi   12/14/2011 7:10:00    6.18
100yr_24hr-chi   12/14/2011 7:20:00    8
100yr_24hr-chi   12/14/2011 7:30:00    11.31
100yr_24hr-chi   12/14/2011 7:40:00    18.95
100yr_24hr-chi   12/14/2011 7:50:00    50.14
100yr_24hr-chi   12/14/2011 8:00:00    171.94
100yr_24hr-chi   12/14/2011 8:10:00    66.41
100yr_24hr-chi   12/14/2011 8:20:00    33.95
100yr_24hr-chi   12/14/2011 8:30:00    21.97
100yr_24hr-chi   12/14/2011 8:40:00    15.98
```

```
100yr_24hr-chi   12/14/2011 8:50:00    12.47
100yr_24hr-chi   12/14/2011 9:00:00    10.18
100yr_24hr-chi   12/14/2011 9:10:00    8.59
100yr_24hr-chi   12/14/2011 9:20:00    7.42
100yr_24hr-chi   12/14/2011 9:30:00    6.53
100yr_24hr-chi   12/14/2011 9:40:00    5.84
100yr_24hr-chi   12/14/2011 9:50:00    5.27
100yr_24hr-chi   12/14/2011 10:00:00   4.81
100yr_24hr-chi   12/14/2011 10:10:00   4.42
100yr_24hr-chi   12/14/2011 10:20:00   4.09
100yr_24hr-chi   12/14/2011 10:30:00   3.81
100yr_24hr-chi   12/14/2011 10:40:00   3.57
100yr_24hr-chi   12/14/2011 10:50:00   3.35
100yr_24hr-chi   12/14/2011 11:00:00   3.16
100yr_24hr-chi   12/14/2011 11:10:00   2.99
100yr_24hr-chi   12/14/2011 11:20:00   2.84
100yr_24hr-chi   12/14/2011 11:30:00   2.71
100yr_24hr-chi   12/14/2011 11:40:00   2.59
100yr_24hr-chi   12/14/2011 11:50:00   2.47
100yr_24hr-chi   12/14/2011 12:00:00   2.37
100yr_24hr-chi   12/14/2011 12:10:00   2.28
100yr_24hr-chi   12/14/2011 12:20:00   2.19
100yr_24hr-chi   12/14/2011 12:30:00   2.11
100yr_24hr-chi   12/14/2011 12:40:00   2.04
100yr_24hr-chi   12/14/2011 12:50:00   1.97
100yr_24hr-chi   12/14/2011 13:00:00   1.91
100yr_24hr-chi   12/14/2011 13:10:00   1.85
100yr_24hr-chi   12/14/2011 13:20:00   1.79
100yr_24hr-chi   12/14/2011 13:30:00   1.74
100yr_24hr-chi   12/14/2011 13:40:00   1.69
100yr_24hr-chi   12/14/2011 13:50:00   1.65
100yr_24hr-chi   12/14/2011 14:00:00   1.6
100yr_24hr-chi   12/14/2011 14:10:00   1.56
100yr_24hr-chi   12/14/2011 14:20:00   1.52
100yr_24hr-chi   12/14/2011 14:30:00   1.48
100yr_24hr-chi   12/14/2011 14:40:00   1.45
100yr_24hr-chi   12/14/2011 14:50:00   1.42
100yr_24hr-chi   12/14/2011 15:00:00   1.38
100yr_24hr-chi   12/14/2011 15:10:00   1.35
100yr_24hr-chi   12/14/2011 15:20:00   1.33
100yr_24hr-chi   12/14/2011 15:30:00   1.3
100yr_24hr-chi   12/14/2011 15:40:00   1.27
100yr_24hr-chi   12/14/2011 15:50:00   1.25
100yr_24hr-chi   12/14/2011 16:00:00   1.22
100yr_24hr-chi   12/14/2011 16:10:00   1.2
100yr_24hr-chi   12/14/2011 16:20:00   1.18
```

100yr_24hr-chi	12/14/2011 16:30:00	1.15
100yr_24hr-chi	12/14/2011 16:40:00	1.13
100yr_24hr-chi	12/14/2011 16:50:00	1.11
100yr_24hr-chi	12/14/2011 17:00:00	1.09
100yr_24hr-chi	12/14/2011 17:10:00	1.08
100yr_24hr-chi	12/14/2011 17:20:00	1.06
100yr_24hr-chi	12/14/2011 17:30:00	1.04
100yr_24hr-chi	12/14/2011 17:40:00	1.02
100yr_24hr-chi	12/14/2011 17:50:00	1.01
100yr_24hr-chi	12/14/2011 18:00:00	0.99
100yr_24hr-chi	12/14/2011 18:10:00	0.98
100yr_24hr-chi	12/14/2011 18:20:00	0.96
100yr_24hr-chi	12/14/2011 18:30:00	0.95
100yr_24hr-chi	12/14/2011 18:40:00	0.94
100yr_24hr-chi	12/14/2011 18:50:00	0.92
100yr_24hr-chi	12/14/2011 19:00:00	0.91
100yr_24hr-chi	12/14/2011 19:10:00	0.9
100yr_24hr-chi	12/14/2011 19:20:00	0.89
100yr_24hr-chi	12/14/2011 19:30:00	0.87
100yr_24hr-chi	12/14/2011 19:40:00	0.86
100yr_24hr-chi	12/14/2011 19:50:00	0.85
100yr_24hr-chi	12/14/2011 20:00:00	0.84
100yr_24hr-chi	12/14/2011 20:10:00	0.83
100yr_24hr-chi	12/14/2011 20:20:00	0.82
100yr_24hr-chi	12/14/2011 20:30:00	0.81
100yr_24hr-chi	12/14/2011 20:40:00	0.8
100yr_24hr-chi	12/14/2011 20:50:00	0.79
100yr_24hr-chi	12/14/2011 21:00:00	0.78
100yr_24hr-chi	12/14/2011 21:10:00	0.77
100yr_24hr-chi	12/14/2011 21:20:00	0.76
100yr_24hr-chi	12/14/2011 21:30:00	0.75
100yr_24hr-chi	12/14/2011 21:40:00	0.75
100yr_24hr-chi	12/14/2011 21:50:00	0.74
100yr_24hr-chi	12/14/2011 22:00:00	0.73
100yr_24hr-chi	12/14/2011 22:10:00	0.72
100yr_24hr-chi	12/14/2011 22:20:00	0.71
100yr_24hr-chi	12/14/2011 22:30:00	0.71
100yr_24hr-chi	12/14/2011 22:40:00	0.7
100yr_24hr-chi	12/14/2011 22:50:00	0.69
100yr_24hr-chi	12/14/2011 23:00:00	0.69
100yr_24hr-chi	12/14/2011 23:10:00	0.68
100yr_24hr-chi	12/14/2011 23:20:00	0.67
100yr_24hr-chi	12/14/2011 23:30:00	0.67
100yr_24hr-chi	12/14/2011 23:40:00	0.66
100yr_24hr-chi	12/14/2011 23:50:00	0.65
100yr_24hr-chi	12/15/2011 0:00:00	0.65

100yr_24hr-chi+	12/14/2011 0:10:00	0.792
100yr_24hr-chi+	12/14/2011 0:20:00	0.804
100yr_24hr-chi+	12/14/2011 0:30:00	0.828
100yr_24hr-chi+	12/14/2011 0:40:00	0.84
100yr_24hr-chi+	12/14/2011 0:50:00	0.864
100yr_24hr-chi+	12/14/2011 1:00:00	0.876
100yr_24hr-chi+	12/14/2011 1:10:00	0.9
100yr_24hr-chi+	12/14/2011 1:20:00	0.924
100yr_24hr-chi+	12/14/2011 1:30:00	0.936
100yr_24hr-chi+	12/14/2011 1:40:00	0.96
100yr_24hr-chi+	12/14/2011 1:50:00	0.984
100yr_24hr-chi+	12/14/2011 2:00:00	1.008
100yr_24hr-chi+	12/14/2011 2:10:00	1.044
100yr_24hr-chi+	12/14/2011 2:20:00	1.068
100yr_24hr-chi+	12/14/2011 2:30:00	1.092
100yr_24hr-chi+	12/14/2011 2:40:00	1.128
100yr_24hr-chi+	12/14/2011 2:50:00	1.164
100yr_24hr-chi+	12/14/2011 3:00:00	1.2
100yr_24hr-chi+	12/14/2011 3:10:00	1.236
100yr_24hr-chi+	12/14/2011 3:20:00	1.284
100yr_24hr-chi+	12/14/2011 3:30:00	1.32
100yr_24hr-chi+	12/14/2011 3:40:00	1.368
100yr_24hr-chi+	12/14/2011 3:50:00	1.428
100yr_24hr-chi+	12/14/2011 4:00:00	1.476
100yr_24hr-chi+	12/14/2011 4:10:00	1.536
100yr_24hr-chi+	12/14/2011 4:20:00	1.608
100yr_24hr-chi+	12/14/2011 4:30:00	1.68
100yr_24hr-chi+	12/14/2011 4:40:00	1.764
100yr_24hr-chi+	12/14/2011 4:50:00	1.848
100yr_24hr-chi+	12/14/2011 5:00:00	1.944
100yr_24hr-chi+	12/14/2011 5:10:00	2.052
100yr_24hr-chi+	12/14/2011 5:20:00	2.184
100yr_24hr-chi+	12/14/2011 5:30:00	2.328
100yr_24hr-chi+	12/14/2011 5:40:00	2.484
100yr_24hr-chi+	12/14/2011 5:50:00	2.676
100yr_24hr-chi+	12/14/2011 6:00:00	2.904
100yr_24hr-chi+	12/14/2011 6:10:00	3.168
100yr_24hr-chi+	12/14/2011 6:20:00	3.504
100yr_24hr-chi+	12/14/2011 6:30:00	3.9
100yr_24hr-chi+	12/14/2011 6:40:00	4.416
100yr_24hr-chi+	12/14/2011 6:50:00	5.1
100yr_24hr-chi+	12/14/2011 7:00:00	6.036
100yr_24hr-chi+	12/14/2011 7:10:00	7.416
100yr_24hr-chi+	12/14/2011 7:20:00	9.6
100yr_24hr-chi+	12/14/2011 7:30:00	13.572

100yr_24hr-chi+	12/14/2011 7:40:00	22.74
100yr_24hr-chi+	12/14/2011 7:50:00	60.168
100yr_24hr-chi+	12/14/2011 8:00:00	206.328
100yr_24hr-chi+	12/14/2011 8:10:00	79.692
100yr_24hr-chi+	12/14/2011 8:20:00	40.74
100yr_24hr-chi+	12/14/2011 8:30:00	26.364
100yr_24hr-chi+	12/14/2011 8:40:00	19.176
100yr_24hr-chi+	12/14/2011 8:50:00	14.964
100yr_24hr-chi+	12/14/2011 9:00:00	12.216
100yr_24hr-chi+	12/14/2011 9:10:00	10.308
100yr_24hr-chi+	12/14/2011 9:20:00	8.904
100yr_24hr-chi+	12/14/2011 9:30:00	7.836
100yr_24hr-chi+	12/14/2011 9:40:00	7.008
100yr_24hr-chi+	12/14/2011 9:50:00	6.324
100yr_24hr-chi+	12/14/2011 10:00:00	5.772
100yr_24hr-chi+	12/14/2011 10:10:00	5.304
100yr_24hr-chi+	12/14/2011 10:20:00	4.908
100yr_24hr-chi+	12/14/2011 10:30:00	4.572
100yr_24hr-chi+	12/14/2011 10:40:00	4.284
100yr_24hr-chi+	12/14/2011 10:50:00	4.02
100yr_24hr-chi+	12/14/2011 11:00:00	3.792
100yr_24hr-chi+	12/14/2011 11:10:00	3.588
100yr_24hr-chi+	12/14/2011 11:20:00	3.408
100yr_24hr-chi+	12/14/2011 11:30:00	3.252
100yr_24hr-chi+	12/14/2011 11:40:00	3.108
100yr_24hr-chi+	12/14/2011 11:50:00	2.964
100yr_24hr-chi+	12/14/2011 12:00:00	2.844
100yr_24hr-chi+	12/14/2011 12:10:00	2.736
100yr_24hr-chi+	12/14/2011 12:20:00	2.628
100yr_24hr-chi+	12/14/2011 12:30:00	2.532
100yr_24hr-chi+	12/14/2011 12:40:00	2.448
100yr_24hr-chi+	12/14/2011 12:50:00	2.364
100yr_24hr-chi+	12/14/2011 13:00:00	2.292
100yr_24hr-chi+	12/14/2011 13:10:00	2.22
100yr_24hr-chi+	12/14/2011 13:20:00	2.148
100yr_24hr-chi+	12/14/2011 13:30:00	2.088
100yr_24hr-chi+	12/14/2011 13:40:00	2.028
100yr_24hr-chi+	12/14/2011 13:50:00	1.98
100yr_24hr-chi+	12/14/2011 14:00:00	1.92
100yr_24hr-chi+	12/14/2011 14:10:00	1.872
100yr_24hr-chi+	12/14/2011 14:20:00	1.824
100yr_24hr-chi+	12/14/2011 14:30:00	1.776
100yr_24hr-chi+	12/14/2011 14:40:00	1.74
100yr_24hr-chi+	12/14/2011 14:50:00	1.704
100yr_24hr-chi+	12/14/2011 15:00:00	1.656
100yr_24hr-chi+	12/14/2011 15:10:00	1.62

100yr_24hr-chi+	12/14/2011 15:20:00	1.596
100yr_24hr-chi+	12/14/2011 15:30:00	1.56
100yr_24hr-chi+	12/14/2011 15:40:00	1.524
100yr_24hr-chi+	12/14/2011 15:50:00	1.5
100yr_24hr-chi+	12/14/2011 16:00:00	1.464
100yr_24hr-chi+	12/14/2011 16:10:00	1.44
100yr_24hr-chi+	12/14/2011 16:20:00	1.416
100yr_24hr-chi+	12/14/2011 16:30:00	1.38
100yr_24hr-chi+	12/14/2011 16:40:00	1.356
100yr_24hr-chi+	12/14/2011 16:50:00	1.332
100yr_24hr-chi+	12/14/2011 17:00:00	1.308
100yr_24hr-chi+	12/14/2011 17:10:00	1.296
100yr_24hr-chi+	12/14/2011 17:20:00	1.272
100yr_24hr-chi+	12/14/2011 17:30:00	1.248
100yr_24hr-chi+	12/14/2011 17:40:00	1.224
100yr_24hr-chi+	12/14/2011 17:50:00	1.212
100yr_24hr-chi+	12/14/2011 18:00:00	1.188
100yr_24hr-chi+	12/14/2011 18:10:00	1.176
100yr_24hr-chi+	12/14/2011 18:20:00	1.152
100yr_24hr-chi+	12/14/2011 18:30:00	1.14
100yr_24hr-chi+	12/14/2011 18:40:00	1.128
100yr_24hr-chi+	12/14/2011 18:50:00	1.104
100yr_24hr-chi+	12/14/2011 19:00:00	1.092
100yr_24hr-chi+	12/14/2011 19:10:00	1.08
100yr_24hr-chi+	12/14/2011 19:20:00	1.068
100yr_24hr-chi+	12/14/2011 19:30:00	1.044
100yr_24hr-chi+	12/14/2011 19:40:00	1.032
100yr_24hr-chi+	12/14/2011 19:50:00	1.02
100yr_24hr-chi+	12/14/2011 20:00:00	1.008
100yr_24hr-chi+	12/14/2011 20:10:00	0.996
100yr_24hr-chi+	12/14/2011 20:20:00	0.984
100yr_24hr-chi+	12/14/2011 20:30:00	0.972
100yr_24hr-chi+	12/14/2011 20:40:00	0.96
100yr_24hr-chi+	12/14/2011 20:50:00	0.948
100yr_24hr-chi+	12/14/2011 21:00:00	0.936
100yr_24hr-chi+	12/14/2011 21:10:00	0.924
100yr_24hr-chi+	12/14/2011 21:20:00	0.912
100yr_24hr-chi+	12/14/2011 21:30:00	0.9
100yr_24hr-chi+	12/14/2011 21:40:00	0.9
100yr_24hr-chi+	12/14/2011 21:50:00	0.888
100yr_24hr-chi+	12/14/2011 22:00:00	0.876
100yr_24hr-chi+	12/14/2011 22:10:00	0.864
100yr_24hr-chi+	12/14/2011 22:20:00	0.852
100yr_24hr-chi+	12/14/2011 22:30:00	0.852
100yr_24hr-chi+	12/14/2011 22:40:00	0.84
100yr_24hr-chi+	12/14/2011 22:50:00	0.828

100yr_24hr-chi+	12/14/2011 23:00:00	0.828
100yr_24hr-chi+	12/14/2011 23:10:00	0.816
100yr_24hr-chi+	12/14/2011 23:20:00	0.804
100yr_24hr-chi+	12/14/2011 23:30:00	0.804
100yr_24hr-chi+	12/14/2011 23:40:00	0.792
100yr_24hr-chi+	12/14/2011 23:50:00	0.78
100yr_24hr-chi+	12/15/2011 0:00:00	0.78

2yr_24hr-chi	12/14/2011 0:00:00	0
2yr_24hr-chi	12/14/2011 0:10:00	0.41
2yr_24hr-chi	12/14/2011 0:20:00	0.41
2yr_24hr-chi	12/14/2011 0:30:00	0.42
2yr_24hr-chi	12/14/2011 0:40:00	0.43
2yr_24hr-chi	12/14/2011 0:50:00	0.44
2yr_24hr-chi	12/14/2011 1:00:00	0.45
2yr_24hr-chi	12/14/2011 1:10:00	0.45
2yr_24hr-chi	12/14/2011 1:20:00	0.46
2yr_24hr-chi	12/14/2011 1:30:00	0.47
2yr_24hr-chi	12/14/2011 1:40:00	0.49
2yr_24hr-chi	12/14/2011 1:50:00	0.5
2yr_24hr-chi	12/14/2011 2:00:00	0.51
2yr_24hr-chi	12/14/2011 2:10:00	0.52
2yr_24hr-chi	12/14/2011 2:20:00	0.53
2yr_24hr-chi	12/14/2011 2:30:00	0.55
2yr_24hr-chi	12/14/2011 2:40:00	0.56
2yr_24hr-chi	12/14/2011 2:50:00	0.58
2yr_24hr-chi	12/14/2011 3:00:00	0.59
2yr_24hr-chi	12/14/2011 3:10:00	0.61
2yr_24hr-chi	12/14/2011 3:20:00	0.63
2yr_24hr-chi	12/14/2011 3:30:00	0.65
2yr_24hr-chi	12/14/2011 3:40:00	0.67
2yr_24hr-chi	12/14/2011 3:50:00	0.7
2yr_24hr-chi	12/14/2011 4:00:00	0.72
2yr_24hr-chi	12/14/2011 4:10:00	0.75
2yr_24hr-chi	12/14/2011 4:20:00	0.78
2yr_24hr-chi	12/14/2011 4:30:00	0.81
2yr_24hr-chi	12/14/2011 4:40:00	0.84
2yr_24hr-chi	12/14/2011 4:50:00	0.88
2yr_24hr-chi	12/14/2011 5:00:00	0.93
2yr_24hr-chi	12/14/2011 5:10:00	0.97
2yr_24hr-chi	12/14/2011 5:20:00	1.03
2yr_24hr-chi	12/14/2011 5:30:00	1.09
2yr_24hr-chi	12/14/2011 5:40:00	1.16
2yr_24hr-chi	12/14/2011 5:50:00	1.24
2yr_24hr-chi	12/14/2011 6:00:00	1.33
2yr_24hr-chi	12/14/2011 6:10:00	1.44

2yr_24hr-chi	12/14/2011 6:20:00	1.57
2yr_24hr-chi	12/14/2011 6:30:00	1.73
2yr_24hr-chi	12/14/2011 6:40:00	1.94
2yr_24hr-chi	12/14/2011 6:50:00	2.2
2yr_24hr-chi	12/14/2011 7:00:00	2.55
2yr_24hr-chi	12/14/2011 7:10:00	3.06
2yr_24hr-chi	12/14/2011 7:20:00	3.84
2yr_24hr-chi	12/14/2011 7:30:00	5.21
2yr_24hr-chi	12/14/2011 7:40:00	8.29
2yr_24hr-chi	12/14/2011 7:50:00	21.14
2yr_24hr-chi	12/14/2011 8:00:00	83.69
2yr_24hr-chi	12/14/2011 8:10:00	28
2yr_24hr-chi	12/14/2011 8:20:00	14.3
2yr_24hr-chi	12/14/2011 8:30:00	9.5
2yr_24hr-chi	12/14/2011 8:40:00	7.11
2yr_24hr-chi	12/14/2011 8:50:00	5.69
2yr_24hr-chi	12/14/2011 9:00:00	4.75
2yr_24hr-chi	12/14/2011 9:10:00	4.09
2yr_24hr-chi	12/14/2011 9:20:00	3.6
2yr_24hr-chi	12/14/2011 9:30:00	3.21
2yr_24hr-chi	12/14/2011 9:40:00	2.91
2yr_24hr-chi	12/14/2011 9:50:00	2.66
2yr_24hr-chi	12/14/2011 10:00:00	2.45
2yr_24hr-chi	12/14/2011 10:10:00	2.28
2yr_24hr-chi	12/14/2011 10:20:00	2.13
2yr_24hr-chi	12/14/2011 10:30:00	2
2yr_24hr-chi	12/14/2011 10:40:00	1.88
2yr_24hr-chi	12/14/2011 10:50:00	1.78
2yr_24hr-chi	12/14/2011 11:00:00	1.69
2yr_24hr-chi	12/14/2011 11:10:00	1.61
2yr_24hr-chi	12/14/2011 11:20:00	1.54
2yr_24hr-chi	12/14/2011 11:30:00	1.47
2yr_24hr-chi	12/14/2011 11:40:00	1.41
2yr_24hr-chi	12/14/2011 11:50:00	1.36
2yr_24hr-chi	12/14/2011 12:00:00	1.31
2yr_24hr-chi	12/14/2011 12:10:00	1.26
2yr_24hr-chi	12/14/2011 12:20:00	1.22
2yr_24hr-chi	12/14/2011 12:30:00	1.18
2yr_24hr-chi	12/14/2011 12:40:00	1.14
2yr_24hr-chi	12/14/2011 12:50:00	1.11
2yr_24hr-chi	12/14/2011 13:00:00	1.07
2yr_24hr-chi	12/14/2011 13:10:00	1.04
2yr_24hr-chi	12/14/2011 13:20:00	1.02
2yr_24hr-chi	12/14/2011 13:30:00	0.99
2yr_24hr-chi	12/14/2011 13:40:00	0.96
2yr_24hr-chi	12/14/2011 13:50:00	0.94

2yr_24hr-chi	12/14/2011 14:00:00	0.92
2yr_24hr-chi	12/14/2011 14:10:00	0.89
2yr_24hr-chi	12/14/2011 14:20:00	0.87
2yr_24hr-chi	12/14/2011 14:30:00	0.85
2yr_24hr-chi	12/14/2011 14:40:00	0.84
2yr_24hr-chi	12/14/2011 14:50:00	0.82
2yr_24hr-chi	12/14/2011 15:00:00	0.8
2yr_24hr-chi	12/14/2011 15:10:00	0.79
2yr_24hr-chi	12/14/2011 15:20:00	0.77
2yr_24hr-chi	12/14/2011 15:30:00	0.76
2yr_24hr-chi	12/14/2011 15:40:00	0.74
2yr_24hr-chi	12/14/2011 15:50:00	0.73
2yr_24hr-chi	12/14/2011 16:00:00	0.71
2yr_24hr-chi	12/14/2011 16:10:00	0.7
2yr_24hr-chi	12/14/2011 16:20:00	0.69
2yr_24hr-chi	12/14/2011 16:30:00	0.68
2yr_24hr-chi	12/14/2011 16:40:00	0.67
2yr_24hr-chi	12/14/2011 16:50:00	0.66
2yr_24hr-chi	12/14/2011 17:00:00	0.65
2yr_24hr-chi	12/14/2011 17:10:00	0.64
2yr_24hr-chi	12/14/2011 17:20:00	0.63
2yr_24hr-chi	12/14/2011 17:30:00	0.62
2yr_24hr-chi	12/14/2011 17:40:00	0.61
2yr_24hr-chi	12/14/2011 17:50:00	0.6
2yr_24hr-chi	12/14/2011 18:00:00	0.59
2yr_24hr-chi	12/14/2011 18:10:00	0.58
2yr_24hr-chi	12/14/2011 18:20:00	0.57
2yr_24hr-chi	12/14/2011 18:30:00	0.57
2yr_24hr-chi	12/14/2011 18:40:00	0.56
2yr_24hr-chi	12/14/2011 18:50:00	0.55
2yr_24hr-chi	12/14/2011 19:00:00	0.54
2yr_24hr-chi	12/14/2011 19:10:00	0.54
2yr_24hr-chi	12/14/2011 19:20:00	0.53
2yr_24hr-chi	12/14/2011 19:30:00	0.52
2yr_24hr-chi	12/14/2011 19:40:00	0.52
2yr_24hr-chi	12/14/2011 19:50:00	0.51
2yr_24hr-chi	12/14/2011 20:00:00	0.51
2yr_24hr-chi	12/14/2011 20:10:00	0.5
2yr_24hr-chi	12/14/2011 20:20:00	0.49
2yr_24hr-chi	12/14/2011 20:30:00	0.49
2yr_24hr-chi	12/14/2011 20:40:00	0.48
2yr_24hr-chi	12/14/2011 20:50:00	0.48
2yr_24hr-chi	12/14/2011 21:00:00	0.47
2yr_24hr-chi	12/14/2011 21:10:00	0.47
2yr_24hr-chi	12/14/2011 21:20:00	0.46
2yr_24hr-chi	12/14/2011 21:30:00	0.46

2yr_24hr-chi	12/14/2011 21:40:00	0.45
2yr_24hr-chi	12/14/2011 21:50:00	0.45
2yr_24hr-chi	12/14/2011 22:00:00	0.44
2yr_24hr-chi	12/14/2011 22:10:00	0.44
2yr_24hr-chi	12/14/2011 22:20:00	0.44
2yr_24hr-chi	12/14/2011 22:30:00	0.43
2yr_24hr-chi	12/14/2011 22:40:00	0.43
2yr_24hr-chi	12/14/2011 22:50:00	0.42
2yr_24hr-chi	12/14/2011 23:00:00	0.42
2yr_24hr-chi	12/14/2011 23:10:00	0.42
2yr_24hr-chi	12/14/2011 23:20:00	0.41
2yr_24hr-chi	12/14/2011 23:30:00	0.41
2yr_24hr-chi	12/14/2011 23:40:00	0.4
2yr_24hr-chi	12/14/2011 23:50:00	0.4
2yr_24hr-chi	12/15/2011 0:00:00	0.4

5yr_24hr-chi	12/14/2011 0:00:00	0
5yr_24hr-chi	12/14/2011 0:10:00	0.47
5yr_24hr-chi	12/14/2011 0:20:00	0.47
5yr_24hr-chi	12/14/2011 0:30:00	0.48
5yr_24hr-chi	12/14/2011 0:40:00	0.49
5yr_24hr-chi	12/14/2011 0:50:00	0.5
5yr_24hr-chi	12/14/2011 1:00:00	0.51
5yr_24hr-chi	12/14/2011 1:10:00	0.52
5yr_24hr-chi	12/14/2011 1:20:00	0.54
5yr_24hr-chi	12/14/2011 1:30:00	0.55
5yr_24hr-chi	12/14/2011 1:40:00	0.56
5yr_24hr-chi	12/14/2011 1:50:00	0.57
5yr_24hr-chi	12/14/2011 2:00:00	0.59
5yr_24hr-chi	12/14/2011 2:10:00	0.6
5yr_24hr-chi	12/14/2011 2:20:00	0.62
5yr_24hr-chi	12/14/2011 2:30:00	0.64
5yr_24hr-chi	12/14/2011 2:40:00	0.65
5yr_24hr-chi	12/14/2011 2:50:00	0.67
5yr_24hr-chi	12/14/2011 3:00:00	0.69
5yr_24hr-chi	12/14/2011 3:10:00	0.71
5yr_24hr-chi	12/14/2011 3:20:00	0.74
5yr_24hr-chi	12/14/2011 3:30:00	0.76
5yr_24hr-chi	12/14/2011 3:40:00	0.79
5yr_24hr-chi	12/14/2011 3:50:00	0.81
5yr_24hr-chi	12/14/2011 4:00:00	0.84
5yr_24hr-chi	12/14/2011 4:10:00	0.88
5yr_24hr-chi	12/14/2011 4:20:00	0.91
5yr_24hr-chi	12/14/2011 4:30:00	0.95
5yr_24hr-chi	12/14/2011 4:40:00	1
5yr_24hr-chi	12/14/2011 4:50:00	1.04

5yr_24hr-chi	12/14/2011 5:00:00	1.1
5yr_24hr-chi	12/14/2011 5:10:00	1.16
5yr_24hr-chi	12/14/2011 5:20:00	1.22
5yr_24hr-chi	12/14/2011 5:30:00	1.3
5yr_24hr-chi	12/14/2011 5:40:00	1.38
5yr_24hr-chi	12/14/2011 5:50:00	1.48
5yr_24hr-chi	12/14/2011 6:00:00	1.6
5yr_24hr-chi	12/14/2011 6:10:00	1.74
5yr_24hr-chi	12/14/2011 6:20:00	1.9
5yr_24hr-chi	12/14/2011 6:30:00	2.11
5yr_24hr-chi	12/14/2011 6:40:00	2.37
5yr_24hr-chi	12/14/2011 6:50:00	2.71
5yr_24hr-chi	12/14/2011 7:00:00	3.17
5yr_24hr-chi	12/14/2011 7:10:00	3.84
5yr_24hr-chi	12/14/2011 7:20:00	4.88
5yr_24hr-chi	12/14/2011 7:30:00	6.75
5yr_24hr-chi	12/14/2011 7:40:00	11
5yr_24hr-chi	12/14/2011 7:50:00	28.71
5yr_24hr-chi	12/14/2011 8:00:00	107.37
5yr_24hr-chi	12/14/2011 8:10:00	38.11
5yr_24hr-chi	12/14/2011 8:20:00	19.35
5yr_24hr-chi	12/14/2011 8:30:00	12.68
5yr_24hr-chi	12/14/2011 8:40:00	9.36
5yr_24hr-chi	12/14/2011 8:50:00	7.4
5yr_24hr-chi	12/14/2011 9:00:00	6.12
5yr_24hr-chi	12/14/2011 9:10:00	5.22
5yr_24hr-chi	12/14/2011 9:20:00	4.56
5yr_24hr-chi	12/14/2011 9:30:00	4.05
5yr_24hr-chi	12/14/2011 9:40:00	3.64
5yr_24hr-chi	12/14/2011 9:50:00	3.31
5yr_24hr-chi	12/14/2011 10:00:00	3.04
5yr_24hr-chi	12/14/2011 10:10:00	2.81
5yr_24hr-chi	12/14/2011 10:20:00	2.62
5yr_24hr-chi	12/14/2011 10:30:00	2.45
5yr_24hr-chi	12/14/2011 10:40:00	2.3
5yr_24hr-chi	12/14/2011 10:50:00	2.17
5yr_24hr-chi	12/14/2011 11:00:00	2.06
5yr_24hr-chi	12/14/2011 11:10:00	1.95
5yr_24hr-chi	12/14/2011 11:20:00	1.86
5yr_24hr-chi	12/14/2011 11:30:00	1.78
5yr_24hr-chi	12/14/2011 11:40:00	1.7
5yr_24hr-chi	12/14/2011 11:50:00	1.63
5yr_24hr-chi	12/14/2011 12:00:00	1.57
5yr_24hr-chi	12/14/2011 12:10:00	1.51
5yr_24hr-chi	12/14/2011 12:20:00	1.46
5yr_24hr-chi	12/14/2011 12:30:00	1.41

5yr_24hr-chi	12/14/2011 12:40:00	1.36
5yr_24hr-chi	12/14/2011 12:50:00	1.32
5yr_24hr-chi	12/14/2011 13:00:00	1.28
5yr_24hr-chi	12/14/2011 13:10:00	1.24
5yr_24hr-chi	12/14/2011 13:20:00	1.21
5yr_24hr-chi	12/14/2011 13:30:00	1.17
5yr_24hr-chi	12/14/2011 13:40:00	1.14
5yr_24hr-chi	12/14/2011 13:50:00	1.11
5yr_24hr-chi	12/14/2011 14:00:00	1.08
5yr_24hr-chi	12/14/2011 14:10:00	1.06
5yr_24hr-chi	12/14/2011 14:20:00	1.03
5yr_24hr-chi	12/14/2011 14:30:00	1.01
5yr_24hr-chi	12/14/2011 14:40:00	0.99
5yr_24hr-chi	12/14/2011 14:50:00	0.96
5yr_24hr-chi	12/14/2011 15:00:00	0.94
5yr_24hr-chi	12/14/2011 15:10:00	0.92
5yr_24hr-chi	12/14/2011 15:20:00	0.9
5yr_24hr-chi	12/14/2011 15:30:00	0.89
5yr_24hr-chi	12/14/2011 15:40:00	0.87
5yr_24hr-chi	12/14/2011 15:50:00	0.85
5yr_24hr-chi	12/14/2011 16:00:00	0.84
5yr_24hr-chi	12/14/2011 16:10:00	0.82
5yr_24hr-chi	12/14/2011 16:20:00	0.81
5yr_24hr-chi	12/14/2011 16:30:00	0.79
5yr_24hr-chi	12/14/2011 16:40:00	0.78
5yr_24hr-chi	12/14/2011 16:50:00	0.77
5yr_24hr-chi	12/14/2011 17:00:00	0.75
5yr_24hr-chi	12/14/2011 17:10:00	0.74
5yr_24hr-chi	12/14/2011 17:20:00	0.73
5yr_24hr-chi	12/14/2011 17:30:00	0.72
5yr_24hr-chi	12/14/2011 17:40:00	0.71
5yr_24hr-chi	12/14/2011 17:50:00	0.7
5yr_24hr-chi	12/14/2011 18:00:00	0.69
5yr_24hr-chi	12/14/2011 18:10:00	0.68
5yr_24hr-chi	12/14/2011 18:20:00	0.67
5yr_24hr-chi	12/14/2011 18:30:00	0.66
5yr_24hr-chi	12/14/2011 18:40:00	0.65
5yr_24hr-chi	12/14/2011 18:50:00	0.64
5yr_24hr-chi	12/14/2011 19:00:00	0.63
5yr_24hr-chi	12/14/2011 19:10:00	0.62
5yr_24hr-chi	12/14/2011 19:20:00	0.62
5yr_24hr-chi	12/14/2011 19:30:00	0.61
5yr_24hr-chi	12/14/2011 19:40:00	0.6
5yr_24hr-chi	12/14/2011 19:50:00	0.59
5yr_24hr-chi	12/14/2011 20:00:00	0.59
5yr_24hr-chi	12/14/2011 20:10:00	0.58

5yr_24hr-chi	12/14/2011 20:20:00	0.57
5yr_24hr-chi	12/14/2011 20:30:00	0.57
5yr_24hr-chi	12/14/2011 20:40:00	0.56
5yr_24hr-chi	12/14/2011 20:50:00	0.55
5yr_24hr-chi	12/14/2011 21:00:00	0.55
5yr_24hr-chi	12/14/2011 21:10:00	0.54
5yr_24hr-chi	12/14/2011 21:20:00	0.53
5yr_24hr-chi	12/14/2011 21:30:00	0.53
5yr_24hr-chi	12/14/2011 21:40:00	0.52
5yr_24hr-chi	12/14/2011 21:50:00	0.52
5yr_24hr-chi	12/14/2011 22:00:00	0.51
5yr_24hr-chi	12/14/2011 22:10:00	0.51
5yr_24hr-chi	12/14/2011 22:20:00	0.5
5yr_24hr-chi	12/14/2011 22:30:00	0.5
5yr_24hr-chi	12/14/2011 22:40:00	0.49
5yr_24hr-chi	12/14/2011 22:50:00	0.49
5yr_24hr-chi	12/14/2011 23:00:00	0.48
5yr_24hr-chi	12/14/2011 23:10:00	0.48
5yr_24hr-chi	12/14/2011 23:20:00	0.47
5yr_24hr-chi	12/14/2011 23:30:00	0.47
5yr_24hr-chi	12/14/2011 23:40:00	0.46
5yr_24hr-chi	12/14/2011 23:50:00	0.46
5yr_24hr-chi	12/15/2011 0:00:00	0.46

Hazel	12/14/2011 00:00:00	2
Hazel	12/14/2011 00:15:00	2
Hazel	12/14/2011 00:30:00	2
Hazel	12/14/2011 00:45:00	2
Hazel	12/14/2011 01:00:00	2
Hazel	12/14/2011 01:15:00	2
Hazel	12/14/2011 01:30:00	2
Hazel	12/14/2011 01:45:00	2
Hazel	12/14/2011 02:00:00	2
Hazel	12/14/2011 02:15:00	2
Hazel	12/14/2011 02:30:00	2
Hazel	12/14/2011 02:45:00	2
Hazel	12/14/2011 03:00:00	2
Hazel	12/14/2011 03:15:00	2
Hazel	12/14/2011 03:30:00	2
Hazel	12/14/2011 03:45:00	2
Hazel	12/14/2011 04:00:00	2
Hazel	12/14/2011 04:15:00	2
Hazel	12/14/2011 04:30:00	2
Hazel	12/14/2011 04:45:00	2
Hazel	12/14/2011 05:00:00	2
Hazel	12/14/2011 05:15:00	2

Hazel	12/14/2011 05:30:00	2
Hazel	12/14/2011 05:45:00	2
Hazel	12/14/2011 06:00:00	2
Hazel	12/14/2011 06:15:00	2
Hazel	12/14/2011 06:30:00	2
Hazel	12/14/2011 06:45:00	2
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Hazel	12/14/2011 07:15:00	2
Hazel	12/14/2011 07:30:00	2
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Hazel	12/14/2011 08:15:00	2
Hazel	12/14/2011 08:30:00	2
Hazel	12/14/2011 08:45:00	2
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Hazel	12/14/2011 09:15:00	2
Hazel	12/14/2011 09:30:00	2
Hazel	12/14/2011 09:45:00	2
Hazel	12/14/2011 10:00:00	2
Hazel	12/14/2011 10:15:00	2
Hazel	12/14/2011 10:30:00	2
Hazel	12/14/2011 10:45:00	2
Hazel	12/14/2011 11:00:00	2
Hazel	12/14/2011 11:15:00	2
Hazel	12/14/2011 11:30:00	2
Hazel	12/14/2011 11:45:00	2
Hazel	12/14/2011 12:00:00	2
Hazel	12/14/2011 12:15:00	2
Hazel	12/14/2011 12:30:00	2
Hazel	12/14/2011 12:45:00	2
Hazel	12/14/2011 13:00:00	2
Hazel	12/14/2011 13:15:00	2
Hazel	12/14/2011 13:30:00	2
Hazel	12/14/2011 13:45:00	2
Hazel	12/14/2011 14:00:00	2
Hazel	12/14/2011 14:15:00	2
Hazel	12/14/2011 14:30:00	2
Hazel	12/14/2011 14:45:00	2
Hazel	12/14/2011 15:00:00	2
Hazel	12/14/2011 15:15:00	2
Hazel	12/14/2011 15:30:00	2
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Hazel	12/14/2011 16:15:00	2
Hazel	12/14/2011 16:30:00	2
Hazel	12/14/2011 16:45:00	2

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Hazel           12/14/2011 17:15:00   2
Hazel           12/14/2011 17:30:00   2
Hazel           12/14/2011 17:45:00   2
Hazel           12/14/2011 18:00:00   2
Hazel           12/14/2011 18:15:00   2
Hazel           12/14/2011 18:30:00   2
Hazel           12/14/2011 18:45:00   2
Hazel           12/14/2011 19:00:00   2
Hazel           12/14/2011 19:15:00   2
Hazel           12/14/2011 19:30:00   2
Hazel           12/14/2011 19:45:00   2
Hazel           12/14/2011 20:00:00   2
Hazel           12/14/2011 20:15:00   2
Hazel           12/14/2011 20:30:00   2
Hazel           12/14/2011 20:45:00   2
Hazel           12/14/2011 21:00:00   2
Hazel           12/14/2011 21:15:00   2
Hazel           12/14/2011 21:30:00   2
Hazel           12/14/2011 21:45:00   2
Hazel           12/14/2011 22:00:00   2
Hazel           12/14/2011 22:15:00   2
Hazel           12/14/2011 22:30:00   2
Hazel           12/14/2011 22:45:00   2
Hazel           12/14/2011 23:00:00   2
Hazel           12/14/2011 23:15:00   2
Hazel           12/14/2011 23:30:00   2
Hazel           12/14/2011 23:45:00   2
Hazel           12/15/2011 00:00:00   2
Hazel           12/15/2011 00:15:00   2
Hazel           12/15/2011 00:30:00   2
Hazel           12/15/2011 00:45:00   2
Hazel           12/15/2011 01:00:00   2
Hazel           12/15/2011 01:15:00   2
Hazel           12/15/2011 01:30:00   2
Hazel           12/15/2011 01:45:00   2
Hazel           12/15/2011 02:00:00   2
Hazel           12/15/2011 02:15:00   2
Hazel           12/15/2011 02:30:00   2
Hazel           12/15/2011 02:45:00   2
Hazel           12/15/2011 03:00:00   2
Hazel           12/15/2011 03:15:00   2
Hazel           12/15/2011 03:30:00   2
Hazel           12/15/2011 03:45:00   2
Hazel           12/15/2011 04:00:00   2
Hazel           12/15/2011 04:15:00   2
```

```
Hazel           12/15/2011 04:30:00   2
Hazel           12/15/2011 04:45:00   2
Hazel           12/15/2011 05:00:00   2
Hazel           12/15/2011 05:15:00   2
Hazel           12/15/2011 05:30:00   2
Hazel           12/15/2011 05:45:00   2
Hazel           12/15/2011 06:00:00   2
Hazel           12/15/2011 06:15:00   2
Hazel           12/15/2011 06:30:00   2
Hazel           12/15/2011 06:45:00   2
Hazel           12/15/2011 07:00:00   2
Hazel           12/15/2011 07:15:00   2
Hazel           12/15/2011 07:30:00   2
Hazel           12/15/2011 07:45:00   2
Hazel           12/15/2011 08:00:00   2
Hazel           12/15/2011 08:15:00   2
Hazel           12/15/2011 08:30:00   2
Hazel           12/15/2011 08:45:00   2
Hazel           12/15/2011 09:00:00   2
Hazel           12/15/2011 09:15:00   2
Hazel           12/15/2011 09:30:00   2
Hazel           12/15/2011 09:45:00   2
Hazel           12/15/2011 10:00:00   2
Hazel           12/15/2011 10:15:00   2
Hazel           12/15/2011 10:30:00   2
Hazel           12/15/2011 10:45:00   2
Hazel           12/15/2011 11:00:00   3
Hazel           12/15/2011 11:15:00   3
Hazel           12/15/2011 11:30:00   3
Hazel           12/15/2011 11:45:00   3
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Hazel           12/15/2011 12:15:00   6
Hazel           12/15/2011 12:30:00   6
Hazel           12/15/2011 12:45:00   6
Hazel           12/15/2011 13:00:00   4
Hazel           12/15/2011 13:15:00   4
Hazel           12/15/2011 13:30:00   4
Hazel           12/15/2011 13:45:00   4
Hazel           12/15/2011 14:00:00   6
Hazel           12/15/2011 14:15:00   6
Hazel           12/15/2011 14:30:00   6
Hazel           12/15/2011 14:45:00   6
Hazel           12/15/2011 15:00:00   13
Hazel           12/15/2011 15:15:00   13
Hazel           12/15/2011 15:30:00   13
Hazel           12/15/2011 15:45:00   13
```

```
Hazel           12/15/2011 16:00:00   17
Hazel           12/15/2011 16:15:00   17
Hazel           12/15/2011 16:30:00   17
Hazel           12/15/2011 16:45:00   17
Hazel           12/15/2011 17:00:00   13
Hazel           12/15/2011 17:15:00   13
Hazel           12/15/2011 17:30:00   13
Hazel           12/15/2011 17:45:00   13
Hazel           12/15/2011 18:00:00   23
Hazel           12/15/2011 18:15:00   23
Hazel           12/15/2011 18:30:00   23
Hazel           12/15/2011 18:45:00   23
Hazel           12/15/2011 19:00:00   13
Hazel           12/15/2011 19:15:00   13
Hazel           12/15/2011 19:30:00   13
Hazel           12/15/2011 19:45:00   13
Hazel           12/15/2011 20:00:00   13
Hazel           12/15/2011 20:15:00   13
Hazel           12/15/2011 20:30:00   13
Hazel           12/15/2011 20:45:00   13
Hazel           12/15/2011 21:00:00   53
Hazel           12/15/2011 21:15:00   53
Hazel           12/15/2011 21:30:00   53
Hazel           12/15/2011 21:45:00   53
Hazel           12/15/2011 22:00:00   38
Hazel           12/15/2011 22:15:00   38
Hazel           12/15/2011 22:30:00   38
Hazel           12/15/2011 22:45:00   38
Hazel           12/15/2011 23:00:00   13
Hazel           12/15/2011 23:15:00   13
Hazel           12/15/2011 23:30:00   13
Hazel           12/15/2011 23:45:00   13

[REPORT]
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS       8.90075          -15.0871         22.15025         2.5371
UNITS            None
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[COORDINATES]
;;Node           X-Coord          Y-Coord
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J0.5             16.985           -0.152
J0.75            18.692           0.284
J0.8             18.395           -1.031
J0.9             19.214           -0.89
J1               16.485           -9.729
J10              17.767           -2.714
J102             17.763           -4.705
J103             17.705           -6.139
J105             17.695           -6.512
J106             17.65            -7.016
J107             17.413           -9.822
J11              17.41            -9.958
J12              17.483           -3.714
J13              12.599           -3.886
J14              17.152           -4.96
J15              17.05            -5.072
J16              16.744           -5.673
J17              16.635           -0.364
J18              16.638           -6.682
J19              16.55            -8.295
J2               17.618           -1.327
J20              16.497           -9.079
J21              17.319           -4.274
J22              17.511           -3.663
J23              17.718           -2.233
J24              17.612           -1.387
J25              13.555           -9.073
J26              16.72            -6.073
J27              16.925           -0.818
J28              15.777           -6.089
J29              11.758           -6.079
J3               13.979           -2.058
J30              15.796           -4.698
J31              15.782           -5.253
J32              15.698           -6.176
J33              15.699           -6.284
J34              15.662           -7.031
J35              15.631           -7.385
J36              15.597           -7.798
J37              15.565           -8.154
J37500           16.359           0.531
J38              15.567           -8.402
J39              15.545           -8.633
```

```
J39001           16.396           0.396
J4               17.936           -1.525
J4.5             18.632           -1.692
J40              15.521           -9.008
J40323           16.428           0.126
J41              15.519           -9.054
J41106           16.537           -0.056
J42              15.764           -5.714
J43              15.499           -9.204
J43501           16.736           -0.577
J44              15.746           -5.816
J45              15.725           -5.962
J46              15.465           -9.789
J46102           16.964           -0.828
J46203           17.543           -1.049
J47              16.408           -6.135
J48              16.243           -6.107
J49              16.01            -6.102
J5               16.374           0.493
J50              15.704           -6.039
J5015            12.783           -5.986
J5025            12.576           -8.444
J5030            13.752           -5.942
J5045            14.722           -5.995
J5055            15.7             -6.081
J5060            15.506           -9.144
J5065            14.046           -10.388
J5075            15.481           -9.664
J5080            15.401           -10.779
J5090            16.707           -6.15
J51              15.279           -6.032
J5100            16.463           -9.891
J5110            17.318           -4.34
J5120            17.555           -3.114
J5135            17.78            -1.936
J5150            17.84            -1.619
J5160            17.885           -1.514
J5180            16.606           -0.27
J5190            15.81            -2.931
J53              14.678           -6.196
J53.5            14.541           -8.92
J55              13.747           -6.048
J55.5            13.552           -8.923
J56              12.902           -5.96
J58              12.759           -6.192
J58.5            12.687           -6.83
```

```
J58.7            12.563           -8.703
J6               11.587           -7.473
J62              15.445           -9.149
J63              15.299           -9.146
J64              15.224           -9.22
J65              14.994           -9.231
J66              14.987           -9.254
J67              14.982           -9.377
J68              14.979           -9.449
J69              14.638           -9.43
J7               17.83            -1.691
J70              14.545           -9.424
J71              14.485           -9.441
J72              14.478           -9.576
J73              14.474           -9.615
J74              14.26            -10.398
J75              14.175           -10.397
J76              14.107           -10.384
J8               18.404           -4.002
J80              15.407           -10.899
J81              15.377           -11.069
J84              15.289           -11.079
J85              15.199           -11.085
J86              15.123           -11.108
J87              15.043           -11.115
J88              14.846           -11.24
J89              14.645           -11.209
J9               17.693           -2.274
J90              14.513           -11.216
J5205            16.337           0.656
S5180            17.403           -1.147
S5205            16.988           -0.595

[VERTICES]
;;Link           X-Coord          Y-Coord
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C11              16.596           -0.357
C11              16.574           -0.31
C13              16.346           0.493
C13              16.336           0.51
C16              16.66            -6.133
C16              16.67            -6.09
C19              16.951           -0.841
C19              16.933           -0.838
C2               17.289           -4.326
C2               17.288           -4.289
```

```
C21              15.727           -6.044
C21              15.778           -6.046
C5               17.462           -3.692
C5               17.479           -3.659
C6110a           17.299           -4.065
C6110b           17.478           -3.401
C6120c           17.795           -2.157
C6130c           17.773           -4.171
C6130c           17.911           -4.119
C6135a           17.842           -1.81
C6160a           17.884           -1.459
C6160a           17.824           -1.42
C6160a           17.662           -1.445
C6160b           17.738           -1.18
C6160b           17.709           -1.053
C6170e           17.26            -0.872
C6170e           17.067           -0.929
C6170f           16.832           -0.732
C6190            16.415           -2.397
C6190            16.802           -1.945
C6190            16.783           -1.728
C6190            16.844           -1.678
C6190            16.787           -1.473
C6190            16.857           -1.444
C6190            16.774           -1.209
C6190            17.054           -1.073
C6200            13.471           -3.615
C6200            13.407           -3.468
C6200            13.934           -3.346
C6200            13.857           -3.14
C6200            15.643           -2.658
C6220            15.668           -1.235
C6220            15.51            -0.866
C7               17.683           -2.257
C7               17.696           -2.231
C9               17.583           -1.371
C9               17.589           -1.332
CJ0.8            18.44            -1.425
CJ0.8            18.027           -1.38
CJ64             15.226           -9.147
CJ74             14.414           -10.4

[POLYGONS]
;;Subcatchment   X-Coord          Y-Coord
;;-------------- ---------------- ----------------
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```

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1000             9.677            -6.784
1000             9.753            -6.143
1000             11.294           -5.777
1000             11.615           -6.067
1002             11.075           -10.137
1002             9.503            -9.504
1002             9.686            -6.809
1002             11.034           -7.932
1002             11.054           -8.667
1002             11.218           -9.157
1002             11.075           -10.137
1005             11.641           -6.132
1005             11.716           -6.236
1005             11.671           -6.727
1005             11.78            -7.128
1005             11.824           -8.636
1005             11.479           -8.339
1005             11.03            -7.935
1005             11.056           -7.407
1005             11.299           -6.678
1005             11.641           -6.132
1007             11.205           -9.023
1007             11.022           -8.696
1007             11.041           -7.952
1007             11.83            -8.612
1007             11.8             -8.75
1007             11.205           -9.023
1010             11.83            -10.163
1010             11.463           -10.149
1010             11.443           -10.238
1010             11.094           -10.096
1010             11.071           -9.787
1010             11.261           -9.042
1010             11.864           -8.757
1010             11.83            -10.163
1015             12.651           -5.92
1015             12.741           -6.046
1015             11.749           -6.263
1015             11.637           -6.066
1015             11.318           -5.817
1015             11.57            -5.758
1015             11.823           -5.896
1015             12.651           -5.92
1020             12.562           -8.559
```

1020	11.845	-8.741
1020	11.788	-7.104
1020	11.694	-6.784
1020	11.763	-6.263
1020	12.701	-6.046
1020	12.599	-8.359
1020	12.896	-8.577
1020	12.881	-8.631
1020	12.562	-8.559
1025	11.964	-8.716
1025	12.516	-8.556
1025	12.89	-8.652
1025	12.87	-8.713
1025	12.6	-8.724
1025	12.516	-8.858
1025	12.834	-9.243
1025	12.734	-9.427
1025	11.964	-8.716
1027	12.751	-9.443
1027	12.634	-9.828
1027	12.747	-9.96
1027	12.752	-10.248
1027	12.489	-10.228
1027	12.494	-10.655
1027	11.458	-10.258
1027	11.483	-10.169
1027	11.889	-10.213
1027	11.847	-8.791
1027	11.981	-8.724
1027	12.751	-9.443
1030	12.73	-6.346
1030	12.671	-5.94
1030	11.857	-5.902
1030	11.665	-5.806
1030	12.182	-5.632
1030	12.452	-5.614
1030	13.606	-5.577
1030	13.696	-5.992
1030	12.73	-6.346
1035	13.691	-5.981
1035	13.518	-8.912
1035	12.876	-8.652
1035	12.893	-8.548
1035	12.598	-8.375
1035	12.72	-6.37
1035	13.691	-5.981
1040	12.639	-8.741
1040	12.894	-8.673
1040	13.552	-8.964
1040	13.466	-9.797
1040	12.813	-9.281
1040	12.529	-8.9
1040	12.639	-8.741
1045	14.76	-5.992
1045	13.714	-6.461
1045	13.684	-5.892
1045	13.606	-5.596
1045	14.057	-5.505
1045	14.417	-5.614
1045	14.76	-5.992
1050	14.502	-9.207
1050	14.141	-9.207
1050	14.039	-9.248
1050	13.539	-8.989
1050	13.705	-6.508
1050	14.697	-5.981
1050	14.502	-9.207
1055	14.381	-5.577
1055	15.265	-5.505
1055	15.752	-6.01
1055	14.702	-6.502
1055	14.706	-5.956
1055	14.381	-5.577
1060	15.728	-6.075
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1060	15.189	-8.771
1060	14.7	-9.199
1060	14.499	-9.199
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1060	15.704	-6.017
1060	15.728	-6.075
1065	14.709	-9.181
1065	15.198	-8.771
1065	15.512	-9.19
1065	15.434	-9.714
1065	14.747	-9.605
1065	14.034	-9.257
1065	14.112	-9.196
1065	14.709	-9.181
1070	12.752	-9.422
1070	12.851	-9.24
1070	13.5	-9.822
1070	13.567	-9.013
1070	14.814	-9.622
1070	15.163	-9.722
1070	15.113	-10.437
1070	14.814	-10.719
1070	14.431	-10.852
1070	12.752	-9.422
1072	13.414	-10.577
1072	13.396	-10.994
1072	12.5	-10.68
1072	12.531	-10.238
1072	12.746	-10.258
1072	12.754	-9.901
1072	12.633	-9.797
1072	12.772	-9.45
1072	14.385	-10.855
1072	14.12	-10.845
1072	13.414	-10.577
1075	15.417	-9.73
1075	15.37	-10.977
1075	16.04	-12.236
1075	14.428	-10.874
1075	14.861	-10.705
1075	15.088	-10.488
1075	15.154	-9.712
1075	15.417	-9.73
1080	13.436	-10.6
1080	14.135	-10.864
1080	14.406	-10.881
1080	15.132	-11.437
1080	14.965	-11.671
1080	14.672	-11.793
1080	13.872	-12.253
1080	13.702	-13.175
1080	13.885	-14.286
1080	11.781	-13.439
1080	11.983	-12.926
1080	11.961	-11.825
1080	12.12	-11.865
1080	12.315	-11.672
1080	12.459	-11.668
1080	12.631	-11.513
1080	12.693	-11.343
1080	12.552	-11.17
1080	12.246	-11.087
1080	11.954	-11.1
1080	11.944	-10.488
1080	13.401	-10.999
1080	13.436	-10.6
1085	13.709	-13.171
1085	13.88	-12.27
1085	14.634	-11.813
1085	14.956	-11.674
1085	15.147	-11.437
1085	16.052	-12.253
1085	13.892	-14.286
1085	13.709	-13.171
1090	16.184	-6.371
1090	15.734	-6.569
1090	15.77	-6.046
1090	16.094	-5.469
1090	16.405	-5.725
1090	16.688	-6.127
1090	16.184	-6.371
1095	16.694	-6.121
1095	17.164	-6.721
1095	16.952	-9.661
1095	16.393	-8.99
1095	15.565	-8.401
1095	15.725	-6.573
1095	16.694	-6.121
1100	15.576	-8.43
1100	16.452	-9.005
1100	16.956	-9.658
1100	16.927	-9.836
1100	16.467	-9.836
1100	15.453	-9.717
1100	15.576	-8.43
1105	16.081	-12.268
1105	15.37	-10.948
1105	15.435	-9.732
1105	16.956	-9.821
1105	16.793	-11.852
1105	16.482	-12.105
1105	16.23	-12.105
1105	16.081	-12.268
1110	16.104	-5.442
1110	16.149	-5.345
1110	16.704	-4.994
1110	17.229	-4.397
1110	17.355	-4.481
1110	17.516	-4.922

1110	17.481	-5.308
1110	17.253	-5.71
1110	17.176	-6.072
1110	17.182	-6.327
1110	17.074	-6.464
1110	17.013	-6.485
1110	16.475	-5.809
1110	16.104	-5.442
1115	13.451	-5.608
1115	12.071	-5.665
1115	11.642	-5.799
1115	11.605	-5.73
1115	16.762	-4.404
1115	17.295	-4.376
1115	16.716	-4.999
1115	16.135	-5.332
1115	15.814	-5.976
1115	15.72	-6.017
1115	15.279	-5.528
1115	13.933	-5.528
1115	13.451	-5.608
1120	16.917	-3.109
1120	17.559	-3.273
1120	17.611	-3.795
1120	17.484	-4.945
1120	17.32	-4.333
1120	16.812	-4.408
1120	14.095	-5.14
1120	13.9	-4.632
1120	16.26	-3.631
1120	16.917	-3.109
1125	17.261	-5.703
1125	17.476	-5.342
1125	17.523	-4.427
1125	17.617	-3.979
1125	17.578	-3.304
1125	17.798	-3.351
1125	17.931	-3.531
1125	18.237	-4.325
1125	18.065	-6.296
1125	17.648	-6.272
1125	17.11	-6.466
1125	17.175	-6.349
1125	17.18	-6.073
1125	17.261	-5.703
1130	17.029	-6.506

1130	17.668	-6.28
1130	18.667	-6.357
1130	18.446	-9.909
1130	16.984	-9.846
1130	17.157	-6.732
1130	17.029	-6.506
1133	16.784	-11.82
1133	16.952	-9.845
1133	17.454	-9.895
1133	17.37	-11.201
1133	16.985	-11.706
1133	16.784	-11.82
1135	17.51	-3.255
1135	16.904	-3.101
1135	17.102	-2.616
1135	17.764	-2.374
1135	17.797	-2.803
1135	17.841	-3.344
1135	17.51	-3.255
1140	17.764	-2.34
1140	17.973	-2.495
1140	18.271	-3.344
1140	18.546	-3.685
1140	18.426	-4.029
1140	18.23	-4.316
1140	17.885	-3.366
1140	17.764	-2.34
1145	19.649	-6.445
1145	18.093	-6.299
1145	18.23	-4.33
1145	18.433	-4.036
1145	19.806	-3.734
1145	19.649	-6.445
1150	17.653	-2.385
1150	17.102	-2.572
1150	17.433	-2.076
1150	17.643	-1.935
1150	17.863	-1.922
1150	18.006	-2.484
1150	17.83	-2.363
1150	17.653	-2.385
1155	17.886	-1.879
1155	18.212	-1.931
1155	18.538	-2.113
1155	19.41	-2.308
1155	19.657	-2.53

1155	19.657	-3.012
1155	19.827	-3.272
1155	19.814	-3.715
1155	18.45	-4.022
1155	18.485	-3.624
1155	18.173	-3.064
1155	18.004	-2.491
1155	17.886	-1.879
1160	17.91	-1.905
1160	17.663	-1.939
1160	17.459	-2.032
1160	17.51	-1.7
1160	17.876	-1.598
1160	18.258	-1.913
1160	17.91	-1.905
1165	19.844	-1.776
1165	20.322	-1.765
1165	20.276	-1.526
1165	21.339	-1.591
1165	21.369	-2.169
1165	21.548	-3.284
1165	19.81	-3.689
1165	19.844	-3.324
1165	19.662	-3.074
1165	19.696	-2.607
1165	19.457	-2.334
1165	18.523	-2.118
1165	17.905	-1.588
1165	17.988	-1.4
1165	19.821	-1.514
1165	19.844	-1.776
1170	17.884	-1.598
1170	17.493	-1.666
1170	17.467	-1.36
1170	17.978	-1.386
1170	17.884	-1.598
1175	19.607	-0.514
1175	19.632	-0.529
1175	19.616	-0.389
1175	19.745	-0.3
1175	21.158	-0.077
1175	21.337	-1.589
1175	20.304	-1.534
1175	20.317	-1.783
1175	19.832	-1.801
1175	19.818	-1.506

1175	18.418	-1.438
1175	18.313	-0.664
1175	18.61	-0.65
1175	19.607	-0.514
1180	18.043	-0.762
1180	18.295	-0.661
1180	18.456	-1.365
1180	16.544	-1.311
1180	16.434	-1.054
1180	16.787	-0.953
1180	17.068	-0.953
1180	17.531	-0.742
1180	18.043	-0.762
1185	17.483	-1.722
1185	17.386	-2.134
1185	17.095	-2.558
1185	16.841	-3.079
1185	16.405	-3.503
1185	15.766	-3.799
1185	15.789	-2.97
1185	15.859	-2.776
1185	15.703	-1.903
1185	16.284	-1.638
1185	16.574	-1.335
1185	17.459	-1.371
1185	17.483	-1.722
1190	14.543	-3.616
1190	14.892	-3.2
1190	15.636	-2.942
1190	15.775	-2.976
1190	15.757	-3.804
1190	13.863	-4.614
1190	14.035	-5.095
1190	13.154	-5.319
1190	13.184	-4.378
1190	13.632	-3.975
1190	14.543	-3.616
1195	12.54	-2.813
1195	12.976	-2.643
1195	13.255	-3.128
1195	15.696	-1.911
1195	15.854	-2.772
1195	15.773	-2.96
1195	15.641	-2.922
1195	14.951	-3.176
1195	14.66	-3.54

```
1195            13.715           -3.903
1195            13.109           -4.339
1195            12.479           -3.879
1195            12.637           -3.479
1195            12.54            -2.813
1200            10.585           -3.93
1200            12.497           -2.885
1200            12.631           -3.497
1200            12.482           -3.93
1200            13.184           -4.378
1200            13.139           -5.334
1200            11.287           -5.812
1200            10.585           -3.93
1205            17.507           -0.715
1205            17.037           -0.941
1205            16.41            -1.037
1205            16.284           -0.8
1205            16.297           -0.803
1205            16.097           -0.724
1205            16.081           -0.698
1205            16.013           -0.578
1205            16.993           -0.219
1205            18.19            0.084
1205            18.307           -0.663
1205            18.029           -0.785
1205            17.507           -0.715
1210            18.824           0.295
1210            20.184           1.621
1210            20.898           1.736
1210            21.163           -0.039
1210            19.619           -0.373
1210            19.621           -0.485
1210            18.599           -0.646
1210            18.309           -0.652
1210            18.213           0.076
1210            18.824           0.295
1215            15.58            -1.051
1215            16.072           -0.697
1215            16.237           -0.764
1215            16.36            -0.905
1215            16.557           -1.384
1215            16.273           -1.623
1215            14.972           -2.299
1215            13.298           -3.114
1215            13.455           -2.757
1215            13.432           -2.366
```

```
1215            13.778           -1.619
1215            14.035           -1.708
1215            14.102           -1.719
1215            15.106           -1.206
1215            15.58            -1.051
1220            13.767           -1.595
1220            13.403           -2.372
1220            13.45            -2.818
1220            13.297           -3.124
1220            12.862           -2.665
1220            12.239           -2.948
1220            11.874           -3.136
1220            11.26            -1.877
1220            13.203           -1.384
1220            13.767           -1.595
1225            13.189           -1.362
1225            16.008           -0.6
1225            16.087           -0.692
1225            15.936           -0.83
1225            15.647           -1.02
1225            15.114           -1.204
1225            13.932           -1.71
1225            13.603           -1.5
1225            13.189           -1.362

[SYMBOLS]
;;Gage          X-Coord          Y-Coord
;;-------------- ---------------- ----------------
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------

Upper Little River Model.

*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Starting Date ............ DEC-14-2011 00:00:00
Ending Date .............. DEC-17-2011 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:05:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 30.00 sec


WARNING 04: minimum elevation drop used for Conduit C1

WARNING 04: minimum elevation drop used for Conduit C10

WARNING 04: minimum elevation drop used for Conduit C11

WARNING 04: minimum elevation drop used for Conduit C12

WARNING 04: minimum elevation drop used for Conduit C13

WARNING 03: negative offset ignored for Link C14

WARNING 04: minimum elevation drop used for Conduit C14

WARNING 04: minimum elevation drop used for Conduit C16

WARNING 04: minimum elevation drop used for Conduit C17

WARNING 04: minimum elevation drop used for Conduit C18

WARNING 04: minimum elevation drop used for Conduit C19

WARNING 04: minimum elevation drop used for Conduit C2

WARNING 04: minimum elevation drop used for Conduit C20

WARNING 04: minimum elevation drop used for Conduit C21

WARNING 04: minimum elevation drop used for Conduit C23

WARNING 04: minimum elevation drop used for Conduit C28

WARNING 04: minimum elevation drop used for Conduit C4

WARNING 04: minimum elevation drop used for Conduit C5

WARNING 04: minimum elevation drop used for Conduit C6

WARNING 03: negative offset ignored for Link C6025a

WARNING 03: negative offset ignored for Link C6055a

WARNING 03: negative offset ignored for Link C6060k

WARNING 04: minimum elevation drop used for Conduit C6135a

WARNING 03: negative offset ignored for Link C6180a

WARNING 03: negative offset ignored for Link C6220

WARNING 04: minimum elevation drop used for Conduit C7

WARNING 03: negative offset ignored for Link C7025

WARNING 04: minimum elevation drop used for Conduit C7025

WARNING 03: negative offset ignored for Link C7105

WARNING 03: negative offset ignored for Link C7105

WARNING 04: minimum elevation drop used for Conduit C7105

WARNING 04: minimum elevation drop used for Conduit C8

WARNING 04: minimum elevation drop used for Conduit C9

WARNING 04: minimum elevation drop used for Conduit CJ64

WARNING 04: minimum elevation drop used for Conduit CJ66

WARNING 04: minimum elevation drop used for Conduit CJ73

WARNING 04: minimum elevation drop used for Conduit CJ76

WARNING 04: minimum elevation drop used for Conduit CJ80

WARNING 04: minimum elevation drop used for Conduit CJ81

WARNING 04: minimum elevation drop used for Conduit CJ84

WARNING 03: negative offset ignored for Link CJ87

WARNING 03: negative offset ignored for Link CJ88

WARNING 03: negative offset ignored for Link OR1180-1

WARNING 03: negative offset ignored for Link OR1205-1

WARNING 02: maximum depth increased for Node J10

WARNING 02: maximum depth increased for Node J102

WARNING 02: maximum depth increased for Node J12

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J17

WARNING 02: maximum depth increased for Node J18

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J20

WARNING 02: maximum depth increased for Node J21

WARNING 02: maximum depth increased for Node J22

WARNING 02: maximum depth increased for Node J23

WARNING 02: maximum depth increased for Node J24

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J3

WARNING 02: maximum depth increased for Node J33

WARNING 02: maximum depth increased for Node J37500

WARNING 02: maximum depth increased for Node J38

WARNING 02: maximum depth increased for Node J40

WARNING 02: maximum depth increased for Node J40323

WARNING 02: maximum depth increased for Node J41

WARNING 02: maximum depth increased for Node J41106

WARNING 02: maximum depth increased for Node J48

WARNING 02: maximum depth increased for Node J49

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J5015

WARNING 02: maximum depth increased for Node J5025

WARNING 02: maximum depth increased for Node J5030
```

WARNING 02: maximum depth increased for Node J5045

WARNING 02: maximum depth increased for Node J5065

WARNING 02: maximum depth increased for Node J5080

WARNING 02: maximum depth increased for Node J5090

WARNING 02: maximum depth increased for Node J5110

WARNING 02: maximum depth increased for Node J5150

WARNING 02: maximum depth increased for Node J5180

WARNING 02: maximum depth increased for Node J5190

WARNING 02: maximum depth increased for Node J53

WARNING 02: maximum depth increased for Node J56

WARNING 02: maximum depth increased for Node J58

WARNING 02: maximum depth increased for Node J58.5

WARNING 02: maximum depth increased for Node J67

WARNING 02: maximum depth increased for Node J69

WARNING 02: maximum depth increased for Node J7

WARNING 02: maximum depth increased for Node J71

WARNING 02: maximum depth increased for Node J72

WARNING 02: maximum depth increased for Node J73

WARNING 02: maximum depth increased for Node J75

WARNING 02: maximum depth increased for Node J76

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J80

WARNING 02: maximum depth increased for Node J81

WARNING 02: maximum depth increased for Node J84

WARNING 02: maximum depth increased for Node J85

WARNING 02: maximum depth increased for Node J86

WARNING 02: maximum depth increased for Node J87

WARNING 02: maximum depth increased for Node J88

WARNING 02: maximum depth increased for Node J89

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J90

```
*********************
Rainfall File Summary
*********************
Station    First        Last         Recording   Periods    Periods    Periods
ID         Date         Date         Frequency  w/Precip    Missing    Malfunc.
-------------------------------------------------------------------------------
6139525    APR-02-1960  OCT-31-2007     60 min     19633       4280          0

**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......       485.751       108.167
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........       169.983        37.852
Surface Runoff ...........       314.985        70.141
Final Surface Storage ....         1.055         0.235
Continuity Error (%) .....        -0.056

**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......       314.985      3149.884
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........       313.621      3136.238
Internal Outflow .........         0.000         0.000
Storage Losses ...........         0.000         0.000
Initial Stored Volume ....         0.000         0.001
Final Stored Volume ......         0.648         6.479
Continuity Error (%) .....         0.228

*************************
Highest Continuity Errors
*************************
Node J5190 (20.78%)
Node J102 (5.64%)
Node J29 (4.81%)
Node J103 (-4.30%)
Node J58.5 (-3.99%)

***************************
Time-Step Critical Elements
***************************
Link C12 (38.45%)
Link C18 (34.36%)
Link C17 (9.09%)
Link C20 (7.09%)
Link C1 (3.12%)

********************************
Highest Flow Instability Indexes
********************************
Link CJ64 (8)
Link CJ66 (6)
Link C7025 (5)
Link CJ65 (4)
Link C8 (4)

*************************
Routing Time Step Summary
*************************
Minimum Time Step           :     0.50 sec
Average Time Step           :     2.64 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     2.28
```

```
***************************
Subcatchment Runoff Summary
***************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
1000	108.17	0.00	0.00	10.02	97.43	93.95	14.22	0.901
1002	108.17	0.00	0.00	23.53	84.19	133.37	17.76	0.778
1005	108.17	0.00	0.00	9.05	98.53	50.80	12.26	0.911
1007	108.17	0.00	0.00	21.36	86.40	18.18	3.09	0.799
1010	108.17	0.00	0.00	20.03	87.77	33.73	6.77	0.811
1015	108.17	0.00	0.00	18.15	89.74	12.87	3.46	0.830
1020	108.17	0.00	0.00	45.09	63.06	58.61	3.29	0.583
1025	108.17	0.00	0.00	32.00	76.02	10.58	1.63	0.703
1027	108.17	0.00	0.00	3.52	103.84	58.68	11.32	0.960
1030	108.17	0.00	0.00	8.94	98.67	32.97	8.60	0.912
1035	108.17	0.00	0.00	44.53	63.63	66.96	3.80	0.588
1040	108.17	0.00	0.00	3.50	103.89	28.41	5.94	0.960
1045	108.17	0.00	0.00	42.09	66.07	17.66	1.07	0.611
1050	108.17	0.00	0.00	42.59	65.53	80.34	6.89	0.606
1055	108.17	0.00	0.00	43.66	64.50	20.62	1.19	0.596
1060	108.17	0.00	0.00	46.63	61.52	70.96	3.88	0.569
1065	108.17	0.00	0.00	33.84	74.23	21.55	3.02	0.686
1070	108.17	0.00	0.00	51.40	56.74	49.92	2.60	0.525
1072	108.17	0.00	0.00	3.56	103.76	55.59	9.55	0.959
1075	108.17	0.00	0.00	40.21	67.95	26.20	1.71	0.628
1080	108.17	0.00	0.00	48.27	59.84	167.22	13.28	0.553
1085	108.17	0.00	0.00	49.05	59.10	79.77	4.23	0.546
1090	108.17	0.00	0.00	41.46	66.69	16.53	1.02	0.617
1095	108.17	0.00	0.00	49.65	58.50	94.29	4.97	0.541
1100	108.17	0.00	0.00	49.01	59.14	31.82	1.69	0.547
1105	108.17	0.00	0.00	38.10	69.88	96.56	11.65	0.646
1110	108.17	0.00	0.00	44.70	63.45	37.77	2.14	0.587
1115	108.17	0.00	0.00	38.26	69.87	79.47	7.49	0.646
1120	108.17	0.00	0.00	44.25	63.90	90.74	5.18	0.591
1125	108.17	0.00	0.00	44.48	63.67	55.59	3.16	0.589
1130	108.17	0.00	0.00	50.61	57.53	130.34	6.82	0.532
1133	108.17	0.00	0.00	40.26	67.89	23.99	1.56	0.628
1135	108.17	0.00	0.00	42.87	65.28	15.94	0.94	0.604
1140	108.17	0.00	0.00	29.13	78.93	20.36	3.60	0.730
1145	108.17	0.00	0.00	47.87	60.24	97.52	7.78	0.557
1150	108.17	0.00	0.00	31.71	76.32	10.10	1.57	0.706
1155	108.17	0.00	0.00	46.85	61.30	67.73	3.69	0.567

1160	108.17	0.00	0.00	41.04	67.12	5.26	0.33	0.620
1165	108.17	0.00	0.00	47.53	60.62	114.21	6.16	0.560
1170	108.17	0.00	0.00	37.59	70.58	3.28	0.25	0.652
1175	108.17	0.00	0.00	43.70	64.43	93.40	7.87	0.596
1180	108.17	0.00	0.00	10.76	96.62	42.32	5.28	0.893
1185	108.17	0.00	0.00	37.67	70.31	92.43	11.34	0.650
1190	108.17	0.00	0.00	43.77	64.39	69.44	4.01	0.595
1195	108.17	0.00	0.00	45.45	62.70	92.67	5.16	0.580
1200	108.17	0.00	0.00	24.73	82.96	164.70	19.79	0.767
1205	108.17	0.00	0.00	10.80	96.57	57.53	7.11	0.893
1210	108.17	0.00	0.00	38.77	69.26	112.10	13.47	0.640
1215	108.17	0.00	0.00	36.85	71.20	91.08	11.60	0.658
1220	108.17	0.00	0.00	10.78	96.60	113.69	14.14	0.893
1225	108.17	0.00	0.00	8.71	98.98	40.10	12.71	0.915

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Node Depth Summary
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	hr:min
J0.5	JUNCTION	1.93	2.80	180.70	0	18:12
J0.75	JUNCTION	1.84	3.39	181.79	0	08:30
J0.8	JUNCTION	2.05	3.49	181.59	0	17:25
J0.9	JUNCTION	1.61	3.00	181.60	0	17:25
J1	JUNCTION	0.77	1.85	186.85	0	08:23
J10	JUNCTION	1.96	3.34	182.16	0	15:49
J102	JUNCTION	0.88	1.79	182.52	0	14:07
J103	JUNCTION	0.81	1.67	183.61	0	10:03
J105	JUNCTION	0.59	1.45	183.65	0	09:57
J106	JUNCTION	0.34	1.12	183.93	0	09:33
J107	JUNCTION	0.32	1.19	185.38	0	08:45
J11	JUNCTION	0.32	1.23	185.43	0	08:45
J12	JUNCTION	1.91	3.42	182.52	0	15:33
J13	JUNCTION	2.61	3.69	186.69	0	09:12
J14	JUNCTION	1.80	3.36	183.42	0	14:56
J15	JUNCTION	1.81	3.36	183.54	0	14:44
J16	JUNCTION	1.75	3.24	183.75	0	14:06
J17	JUNCTION	2.28	3.60	180.81	0	18:08
J18	JUNCTION	1.27	2.67	184.30	0	13:44
J19	JUNCTION	0.83	1.59	184.79	0	13:11
J2	JUNCTION	2.27	3.73	181.59	0	17:25
J20	JUNCTION	1.38	2.75	186.75	0	10:10
J21	JUNCTION	1.66	3.12	182.87	0	15:29
J22	JUNCTION	1.88	3.35	182.45	0	15:35
J23	JUNCTION	1.94	3.30	181.98	0	16:03
J24	JUNCTION	2.29	3.78	181.64	0	17:21
J25	JUNCTION	0.29	2.51	189.66	0	08:20
J26	JUNCTION	1.43	2.87	183.79	0	13:58
J27	JUNCTION	2.51	3.83	180.93	0	18:06
J28	JUNCTION	1.38	3.07	185.27	0	12:59
J29	JUNCTION	1.10	3.05	189.65	0	09:15
J3	JUNCTION	0.56	2.71	183.66	0	08:44
J30	JUNCTION	0.72	1.87	184.37	0	10:34
J31	JUNCTION	0.61	1.80	184.60	0	14:40
J32	JUNCTION	1.49	3.09	185.31	0	13:02
J33	JUNCTION	1.04	2.58	185.32	0	13:04
J34	JUNCTION	0.97	2.08	185.57	0	13:11
J35	JUNCTION	0.97	2.01	185.82	0	12:29
J36	JUNCTION	0.87	1.87	186.06	0	12:15
J37	JUNCTION	0.97	2.07	186.36	0	12:07
J37500	JUNCTION	2.32	3.52	180.32	0	18:27
J38	JUNCTION	1.00	2.15	186.60	0	11:55
J39	JUNCTION	1.14	2.26	186.79	0	11:27
J39001	JUNCTION	2.32	3.58	180.48	0	18:24
J4	JUNCTION	2.14	3.60	181.70	0	17:09
J4.5	JUNCTION	1.62	3.01	181.71	0	17:06
J40	JUNCTION	1.26	2.37	187.01	0	09:30
J40323	JUNCTION	2.33	3.59	180.59	0	18:19
J41	JUNCTION	1.10	2.23	187.07	0	09:30
J41106	JUNCTION	2.30	3.56	180.66	0	18:15
J42	JUNCTION	0.55	1.74	184.74	0	14:23
J43	JUNCTION	1.11	2.25	187.15	0	09:29
J43501	JUNCTION	2.65	3.98	180.88	0	18:07
J44	JUNCTION	0.52	1.71	184.81	0	14:13
J45	JUNCTION	0.40	1.39	184.89	0	13:57
J46	JUNCTION	1.00	2.57	188.29	0	09:08
J46102	JUNCTION	2.52	3.87	180.97	0	18:05
J46203	JUNCTION	2.17	3.57	181.27	0	17:39
J47	JUNCTION	1.59	3.32	184.54	0	13:26
J48	JUNCTION	1.59	3.31	184.74	0	13:20
J49	JUNCTION	1.59	3.34	185.03	0	13:07
J5	JUNCTION	2.36	3.61	180.41	0	18:26
J50	JUNCTION	0.43	1.45	184.95	0	13:35
J5015	JUNCTION	0.74	2.30	188.85	0	09:39
J5025	JUNCTION	1.41	4.98	195.31	0	08:35
J5030	JUNCTION	0.93	2.67	187.47	0	10:25
J5045	JUNCTION	1.11	2.72	186.97	0	12:01
J5055	JUNCTION	1.44	3.10	185.30	0	12:58
J5060	JUNCTION	1.12	2.25	187.10	0	09:30
J5065	JUNCTION	0.29	2.05	189.65	0	08:44
J5075	JUNCTION	1.06	2.20	187.78	0	09:05
J5080	JUNCTION	0.95	2.33	188.83	0	08:45
J5090	JUNCTION	1.51	3.21	184.13	0	13:33
J51	JUNCTION	1.25	2.72	185.92	0	12:30
J5100	JUNCTION	0.81	3.76	188.76	0	08:10
J5110	JUNCTION	1.75	3.45	183.20	0	15:27
J5120	JUNCTION	2.16	3.58	182.25	0	15:45
J5135	JUNCTION	1.79	3.10	181.90	0	16:11
J5150	JUNCTION	2.08	3.47	181.73	0	17:01
J5160	JUNCTION	2.24	3.70	181.70	0	17:10
J5180	JUNCTION	2.23	3.49	180.70	0	18:12
J5190	JUNCTION	2.88	3.20	182.14	0	15:41
J53	JUNCTION	0.88	2.42	186.97	0	12:02
J53.5	JUNCTION	0.06	0.14	186.98	0	12:07
J55	JUNCTION	1.23	2.97	187.47	0	10:25
J55.5	JUNCTION	0.32	1.58	188.68	0	08:33
J56	JUNCTION	1.00	2.64	188.73	0	09:44
J58	JUNCTION	0.28	1.29	188.99	0	09:20
J58.5	JUNCTION	0.31	1.41	189.61	0	08:38
J58.7	JUNCTION	1.52	7.57	197.84	0	08:20
J6	JUNCTION	0.67	2.48	189.66	0	09:24
J62	JUNCTION	0.96	2.08	187.10	0	09:30
J63	JUNCTION	0.94	2.00	187.10	0	10:07
J64	JUNCTION	1.04	2.49	187.59	0	09:31
J65	JUNCTION	0.96	2.20	187.60	0	10:16
J66	JUNCTION	1.00	4.57	189.97	0	10:16
J67	JUNCTION	0.47	1.95	188.15	0	10:26
J68	JUNCTION	0.95	2.37	188.17	0	10:27
J69	JUNCTION	1.43	2.25	188.35	0	10:16
J7	JUNCTION	1.72	2.99	181.79	0	16:37
J70	JUNCTION	1.33	2.16	188.36	0	10:17
J71	JUNCTION	1.23	2.07	188.37	0	10:17
J72	JUNCTION	0.94	1.78	188.38	0	09:15
J73	JUNCTION	0.94	1.79	188.39	0	09:15
J74	JUNCTION	0.69	2.64	189.64	0	08:44
J75	JUNCTION	0.18	1.95	189.65	0	08:44
J76	JUNCTION	0.19	1.95	189.65	0	08:44
J8	JUNCTION	2.84	3.82	183.37	0	09:33
J80	JUNCTION	1.00	2.40	188.90	0	08:43
J81	JUNCTION	1.07	2.49	188.99	0	08:41
J84	JUNCTION	1.09	2.50	189.00	0	08:40
J85	JUNCTION	1.03	2.41	189.01	0	08:39
J86	JUNCTION	0.99	2.26	189.26	0	08:26
J87	JUNCTION	1.39	2.79	189.58	0	08:23
J88	JUNCTION	0.77	2.19	189.74	0	08:22
J89	JUNCTION	0.94	2.47	190.03	0	08:11
J9	JUNCTION	1.97	3.33	182.01	0	16:00
J90	JUNCTION	0.76	2.31	190.09	0	08:10
J5205	OUTFALL	2.31	3.52	180.22	0	18:27
S5180	STORAGE	1.37	2.58	181.28	0	17:45
S5205	STORAGE	1.78	2.99	180.89	0	18:14

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Node Inflow Summary
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr
J0.5	JUNCTION	0.000	6.809	0	09:00	0.000	112.419
J0.75	JUNCTION	13.471	13.471	0	08:10	112.101	112.097
J0.8	JUNCTION	0.000	6.841	0	08:13	0.000	94.419
J0.9	JUNCTION	7.874	7.874	0	08:10	93.400	93.398
J1	JUNCTION	0.000	11.645	0	08:10	0.000	96.562
J10	JUNCTION	0.000	43.512	0	15:33	0.000	1834.770
J102	JUNCTION	0.000	4.925	0	10:55	0.000	161.007
J103	JUNCTION	6.818	6.818	0	08:10	130.337	156.424
J105	JUNCTION	0.000	1.918	0	08:10	0.000	26.717
J106	JUNCTION	0.000	1.367	0	08:31	0.000	24.890
J107	JUNCTION	0.000	1.546	0	08:10	0.000	23.987
J11	JUNCTION	1.561	1.561	0	08:10	23.987	23.987
J12	JUNCTION	5.181	40.111	0	15:24	90.743	1627.994
J13	JUNCTION	19.786	19.786	0	08:20	164.702	164.696
J14	JUNCTION	0.000	33.937	0	13:57	0.000	1300.558
J15	JUNCTION	0.000	34.463	0	13:50	0.000	1303.762
J16	JUNCTION	0.000	34.653	0	13:26	0.000	1300.589
J17	JUNCTION	24.299	50.618	0	17:50	131.184	3033.369
J18	JUNCTION	0.000	9.047	0	10:22	0.000	334.362
J19	JUNCTION	0.000	9.049	0	10:13	0.000	333.692
J2	JUNCTION	0.000	45.428	0	16:45	0.000	2261.941
J20	JUNCTION	1.688	12.624	0	08:32	31.823	333.641
J21	JUNCTION	0.000	38.930	0	15:26	0.000	1537.103
J22	JUNCTION	0.000	40.093	0	15:26	0.000	1627.783
J23	JUNCTION	3.597	45.046	0	15:33	20.357	1964.707
J24	JUNCTION	0.252	45.405	0	16:08	3.282	2170.300

J25	JUNCTION	5.937	5.937	0	08:10	28.415	28.413
J26	JUNCTION	0.000	34.713	0	13:19	0.000	1300.287
J27	JUNCTION	0.000	49.074	0	17:59	0.000	2726.468
J28	JUNCTION	0.000	24.444	0	12:42	0.000	856.043
J29	JUNCTION	31.636	38.724	0	08:17	227.330	286.186
J3	JUNCTION	14.135	14.135	0	08:20	113.691	113.687
J30	JUNCTION	7.486	7.486	0	08:10	79.477	194.004
J31	JUNCTION	0.000	4.246	0	14:05	0.000	116.185
J32	JUNCTION	0.000	5.736	0	14:05	0.000	195.275
J33	JUNCTION	0.000	5.361	0	13:28	0.000	192.820
J34	JUNCTION	0.000	5.441	0	12:13	0.000	190.860
J35	JUNCTION	0.000	5.449	0	12:09	0.000	190.495
J36	JUNCTION	0.000	5.451	0	12:05	0.000	190.510
J37	JUNCTION	0.000	5.465	0	11:05	0.000	190.508
J37500	JUNCTION	0.000	51.353	0	18:21	0.000	3136.391
J38	JUNCTION	0.000	5.512	0	11:01	0.000	190.500
J39	JUNCTION	0.000	6.093	0	10:24	0.000	191.390
J39001	JUNCTION	0.000	51.414	0	18:01	0.000	3136.606
J4	JUNCTION	0.000	5.256	0	08:13	0.000	114.404
J4.5	JUNCTION	6.162	6.162	0	08:10	114.214	114.213
J40	JUNCTION	0.000	11.735	0	09:13	0.000	395.836
J40323	JUNCTION	0.000	51.445	0	17:54	0.000	3136.652
J41	JUNCTION	0.000	12.111	0	09:11	0.000	395.801
J41106	JUNCTION	0.000	51.480	0	17:47	0.000	3136.703
J42	JUNCTION	0.000	4.266	0	13:53	0.000	114.191
J43	JUNCTION	0.000	9.611	0	09:09	0.000	273.237
J43501	JUNCTION	0.000	49.301	0	18:01	0.000	2796.503
J44	JUNCTION	0.000	4.312	0	13:29	0.000	114.226
J45	JUNCTION	0.000	4.449	0	12:40	0.000	114.275
J46	JUNCTION	0.000	8.858	0	08:41	0.000	247.154
J46102	JUNCTION	11.338	49.521	0	17:05	92.429	2674.169
J46203	JUNCTION	0.000	45.407	0	17:09	0.000	2306.298
J47	JUNCTION	0.000	24.318	0	12:59	0.000	856.148
J48	JUNCTION	0.000	24.428	0	12:45	0.000	856.062
J49	JUNCTION	0.000	24.440	0	12:43	0.000	856.036
J5	JUNCTION	0.000	51.372	0	18:12	0.000	3136.498
J50	JUNCTION	0.000	4.469	0	12:33	0.000	114.022
J5015	JUNCTION	3.459	27.441	0	08:29	12.870	464.562
J5025	JUNCTION	0.000	12.947	0	08:10	0.000	69.260
J5030	JUNCTION	8.603	28.946	0	09:20	32.969	600.506
J5045	JUNCTION	1.070	29.628	0	10:15	17.661	720.672
J5055	JUNCTION	5.071	28.920	0	12:39	91.585	973.199
J5060	JUNCTION	3.020	12.585	0	09:10	21.550	395.852
J5065	JUNCTION	0.000	0.080	0	08:44	0.000	0.061
J5075	JUNCTION	1.710	9.606	0	09:00	26.196	273.099
J5080	JUNCTION	0.000	9.112	0	08:33	0.000	246.923

J5090	JUNCTION	5.996	34.721	0	13:17	110.821	1300.332
J51	JUNCTION	0.000	22.335	0	11:54	0.000	692.293
J5100	JUNCTION	11.646	11.646	0	08:10	96.565	96.561
J5110	JUNCTION	2.136	39.810	0	14:46	37.775	1538.577
J5120	JUNCTION	3.157	43.713	0	15:20	55.591	1835.424
J5135	JUNCTION	1.574	45.095	0	15:34	10.105	1974.841
J5150	JUNCTION	3.688	45.869	0	15:33	67.729	2042.758
J5160	JUNCTION	0.331	46.534	0	15:37	5.255	2163.156
J5180	JUNCTION	0.000	51.500	0	17:43	0.000	3136.706
J5190	JUNCTION	9.173	14.064	0	08:10	162.108	340.171
J53	JUNCTION	6.889	7.951	0	08:59	80.344	104.771
J53.5	JUNCTION	0.000	0.156	0	11:07	0.000	0.399
J55	JUNCTION	3.800	9.951	0	08:21	66.957	101.965
J55.5	JUNCTION	0.000	5.937	0	08:10	0.000	28.415
J56	JUNCTION	0.000	24.826	0	09:16	0.000	463.067
J58	JUNCTION	3.288	15.161	0	08:51	58.612	184.535
J58.5	JUNCTION	9.855	15.130	0	08:20	51.912	121.095
J58.7	JUNCTION	12.948	12.948	0	08:10	69.266	69.265
J6	JUNCTION	12.262	12.262	0	08:10	50.799	52.533
J62	JUNCTION	0.000	4.977	0	12:50	0.000	101.163
J63	JUNCTION	0.000	6.982	0	12:24	0.000	100.558
J64	JUNCTION	0.000	5.464	0	09:17	0.000	102.775
J65	JUNCTION	0.000	17.572	0	10:03	0.000	104.606
J66	JUNCTION	0.000	13.937	0	10:28	0.000	105.429
J67	JUNCTION	0.000	5.903	0	09:21	0.000	105.416
J68	JUNCTION	0.000	6.039	0	09:19	0.000	105.625
J69	JUNCTION	0.000	6.069	0	09:09	0.000	105.698
J7	JUNCTION	0.000	45.064	0	15:36	0.000	1974.773
J70	JUNCTION	0.000	6.615	0	08:47	0.000	105.876
J71	JUNCTION	0.000	6.760	0	08:47	0.000	106.015
J72	JUNCTION	2.596	6.786	0	08:47	49.923	106.116
J73	JUNCTION	0.000	5.929	0	08:45	0.000	56.791
J74	JUNCTION	9.550	9.650	0	08:19	55.590	56.133
J75	JUNCTION	0.000	0.544	0	08:43	0.000	0.813
J76	JUNCTION	0.000	0.193	0	08:04	0.000	0.328
J8	JUNCTION	7.780	7.780	0	08:10	97.525	97.523
J80	JUNCTION	0.000	9.187	0	08:31	0.000	246.930
J81	JUNCTION	4.231	9.486	0	08:28	79.775	246.932
J84	JUNCTION	0.000	7.459	0	08:27	0.000	167.161
J85	JUNCTION	0.000	8.082	0	08:26	0.000	167.266
J86	JUNCTION	0.000	8.218	0	08:23	0.000	167.157
J87	JUNCTION	0.000	11.714	0	08:11	0.000	167.235
J88	JUNCTION	0.000	12.365	0	08:11	0.000	167.252
J89	JUNCTION	0.000	13.253	0	08:10	0.000	167.220
J9	JUNCTION	0.942	43.665	0	15:36	15.936	1851.098
J90	JUNCTION	13.274	13.274	0	08:10	167.222	167.218

J5205	OUTFALL	0.000	51.349	0	18:27	0.000	3136.224
S5180	STORAGE	5.282	5.282	0	08:20	42.319	42.340
S5205	STORAGE	7.107	8.687	0	08:20	57.529	64.900

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J0.75	JUNCTION	0.81	0.195	0.205
J0.8	JUNCTION	9.16	0.295	0.105
J25	JUNCTION	1.25	1.287	0.000
J29	JUNCTION	2.40	0.316	1.950
J4	JUNCTION	1.02	0.003	0.000
J50	JUNCTION	4.03	0.053	0.547
J5045	JUNCTION	0.71	0.018	0.000
J5100	JUNCTION	5.94	2.235	0.000
J53	JUNCTION	3.73	0.251	0.000
J55	JUNCTION	4.58	0.374	0.000
J56	JUNCTION	0.82	0.035	0.000
J58.7	JUNCTION	12.25	5.990	0.000
J64	JUNCTION	3.48	0.394	0.000
J65	JUNCTION	2.59	0.003	0.097
J66	JUNCTION	2.74	2.372	0.000
J68	JUNCTION	1.97	0.271	0.000
J74	JUNCTION	0.88	0.443	0.000
J87	JUNCTION	0.91	0.283	0.000
S5180	STORAGE	19.40	1.580	2.420
S5205	STORAGE	22.84	1.994	2.006

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
S5180	13.660	27	0	25.802	52	0 17:45	0.798
S5205	26.652	36	0	44.914	60	0 18:14	1.173

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Outfall Loading Summary
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Outfall Node	Flow Freq. Pcnt.	Avg. Flow CMS	Max. Flow CMS	Total Volume 10^6 ltr
J5205	99.47	25.064	51.349	3136.224
System	99.47	25.064	51.349	3136.224

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Link Flow Summary
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Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	51.353	0 18:21	1.07	3.22	1.00
C10	CONDUIT	33.462	0 11:08	1.22	3.86	1.00
C11	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C12	CONDUIT	44.556	0 16:45	0.81	1.69	1.00
C13	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C14	CHANNEL	8.499	0 08:17	0.86	24.10	0.93
C15	CHANNEL	6.310	0 09:23	0.46	0.50	0.85
C16	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C17	CONDUIT	34.713	0 13:19	2.07	5.87	1.00
C18	CONDUIT	43.453	0 14:56	0.72	1.65	1.00
C19	CHANNEL	6.709	0 18:05	0.65	4.36	0.73
C2	CHANNEL	2.846	0 15:27	0.38	0.03	0.10

C20	CONDUIT	13.511	0	08:40	2.14	8.03	1.00
C21	CHANNEL	20.590	0	12:42	0.86	5.41	1.00
C22	CHANNEL	6.664	0	11:41	0.82	0.83	0.97
C23	CHANNEL	4.449	0	12:40	0.56	14.12	1.00
C24	CHANNEL	4.266	0	13:53	0.42	0.45	0.91
C25	CHANNEL	4.210	0	14:46	0.50	0.64	0.95
C26	CHANNEL	4.246	0	14:05	0.41	0.60	0.93
C27	CHANNEL	4.312	0	13:29	0.51	0.46	1.00
C28	CONDUIT	4.469	0	12:33	2.07	8.60	1.00
C3	CHANNEL	5.711	0	13:39	0.54	0.12	1.00
C4	CONDUIT	50.605	0	17:53	1.16	3.22	0.68
C5	CHANNEL	7.013	0	15:34	0.38	0.00	0.04
C6	CONDUIT	36.402	0	14:10	2.05	6.95	1.00
C6000	CHANNEL	14.292	0	08:38	1.12	2.49	0.92
C6007	CHANNEL	7.308	0	08:24	0.46	0.41	0.95
C6015a	CHANNEL	24.826	0	09:16	0.78	0.51	1.00
C6015b	CHANNEL	23.696	0	09:27	1.40	1.00	1.00
C6025a	CHANNEL	8.057	0	08:36	1.25	0.35	0.62
C6025b	CHANNEL	12.981	0	08:52	0.86	1.04	0.99
C6025c	CHANNEL	13.237	0	09:13	0.94	0.37	1.00
C6030	CHANNEL	26.016	0	10:09	1.06	1.00	0.98
C6040	CHANNEL	3.802	0	08:33	0.45	0.27	0.80
C6045a	CHANNEL	22.335	0	11:54	1.12	1.00	1.00
C6045b	CHANNEL	21.971	0	12:22	1.50	0.45	0.86
C6055a	CHANNEL	24.440	0	12:43	1.17	0.36	0.84
C6055b	CHANNEL	24.428	0	12:45	1.05	0.73	0.93
C6055c	CHANNEL	24.318	0	12:59	1.01	0.97	1.00
C6055d	CHANNEL	24.247	0	13:21	1.15	0.81	0.91
C6060a	CHANNEL	12.111	0	09:11	0.91	1.82	0.99
C6060b	CHANNEL	11.735	0	09:13	0.94	0.54	0.99
C6060c	CHANNEL	6.093	0	10:24	0.75	1.34	1.00
C6060d	CHANNEL	5.512	0	11:01	0.78	0.85	0.89
C6060e	CHANNEL	5.465	0	11:05	0.80	0.67	0.92
C6060f	CHANNEL	5.451	0	12:05	0.76	0.95	0.92
C6060g	CHANNEL	5.449	0	12:09	0.70	0.42	0.84
C6060h	CHANNEL	5.441	0	12:13	0.63	0.54	0.93
C6060i	CHANNEL	5.361	0	13:28	0.51	0.42	0.95
C6060j	CHANNEL	5.736	0	14:05	0.28	0.08	0.90
C6060k	CHANNEL	5.796	0	14:11	0.55	0.57	0.94
C6075a	CHANNEL	9.611	0	09:09	0.87	0.67	0.92
C6075b	CHANNEL	9.477	0	09:26	0.95	0.78	0.97
C6080	CHANNEL	8.858	0	08:41	0.91	0.58	0.90
C6090a	CHANNEL	34.653	0	13:26	0.38	0.07	0.75
C6090b	CHANNEL	34.463	0	13:50	0.94	0.10	0.77
C6090c	CHANNEL	33.937	0	13:57	0.93	0.12	0.79
C6090d	CHANNEL	33.697	0	14:52	0.97	0.11	0.80
C6100a	CHANNEL	9.049	0	10:13	1.23	0.74	0.82
C6100b	CHANNEL	9.047	0	10:22	0.76	0.36	0.86
C6100c	CHANNEL	8.570	0	13:59	0.57	0.24	0.75
C6110a	CHANNEL	38.926	0	15:28	0.85	0.03	0.63
C6110b	CHANNEL	40.085	0	15:27	0.78	0.03	0.67
C6120a	CHANNEL	43.512	0	15:33	0.48	0.37	0.69
C6120b	CHANNEL	43.472	0	15:39	0.78	0.29	0.62
C6120c	CHANNEL	45.008	0	15:35	0.69	0.37	0.69
C6130b	CHANNEL	4.925	0	10:55	0.80	0.83	0.98
C6130c	CHANNEL	3.461	0	09:45	0.46	0.23	0.83
C6133a	CHANNEL	1.342	0	09:02	0.52	0.28	0.65
C6133b	CHANNEL	1.210	0	09:32	0.36	0.25	0.75
C6133c	CHANNEL	1.918	0	08:10	0.65	0.38	0.92
C6135a	CHANNEL	45.064	0	15:36	0.76	8.07	0.66
C6135b	CHANNEL	44.964	0	15:37	0.98	0.02	0.52
C6145	CHANNEL	2.865	0	10:27	0.70	0.49	0.74
C6150	CHANNEL	45.448	0	15:39	0.73	0.04	0.58
C6160a	CHANNEL	45.381	0	16:08	0.74	0.04	0.62
C6160b	CHANNEL	45.236	0	17:08	0.46	1.15	0.91
C6170e	CHANNEL	45.361	0	17:16	0.45	0.61	0.93
C6170f	CHANNEL	49.071	0	18:01	0.64	0.47	0.98
C6170l	CHANNEL	49.298	0	18:04	0.49	0.44	0.95
C6180a	CHANNEL	51.480	0	17:47	0.61	0.07	0.67
C6180b	CHANNEL	51.445	0	17:54	1.08	0.02	0.45
C6180c	CHANNEL	51.414	0	18:01	0.87	0.12	0.70
C6180d	CHANNEL	51.372	0	18:12	0.67	0.11	0.70
C6180e	CHANNEL	51.349	0	18:27	0.78	0.03	0.56
C6190	CHANNEL	3.476	0	14:52	0.55	0.83	1.00
C6200	CHANNEL	7.959	0	09:12	0.80	0.96	1.00
C6220	CHANNEL	10.726	0	08:55	0.91	1.09	0.75
C7	CHANNEL	26.630	0	15:57	>50.00	0.01	0.06
C7025	CONDUIT	12.947	0	08:10	5.60	50.50	1.00
C7040	CONDUIT	5.937	0	08:10	3.46	3.28	1.00
C7075	CONDUIT	8.279	0	09:10	2.18	1.03	1.00
C7105	CONDUIT	11.645	0	08:10	4.19	45.94	1.00
C7133	CONDUIT	1.546	0	08:10	1.31	1.52	0.80
C8	CONDUIT	36.245	0	11:36	1.01	2.95	0.97
C9	CHANNEL	0.000	0	00:00	0.00	0.00	0.00
CJ0.5	CHANNEL	6.762	0	08:33	2.32	0.18	0.86
CJ0.75	CHANNEL	6.809	0	09:00	1.15	0.79	0.81
CJ0.8	CHANNEL	3.822	0	08:23	0.49	0.24	1.00
CJ0.9	CHANNEL	6.841	0	08:13	0.91	0.28	0.97
CJ4	CHANNEL	4.637	0	08:14	0.29	0.03	1.00
CJ4.5	CHANNEL	5.256	0	08:13	0.85	0.56	0.97
CJ53	CHANNEL	7.396	0	14:40	0.61	0.38	1.00
CJ53.5	CHANNEL	0.156	0	11:07	0.05	0.01	0.54
CJ62	CHANNEL	5.044	0	12:53	0.20	0.27	1.00
CJ63	CHANNEL	4.977	0	12:50	0.39	0.62	0.97
CJ64	CHANNEL	6.982	0	12:24	0.62	21.79	1.00
CJ65	CHANNEL	5.464	0	09:17	0.80	1.02	1.00
CJ66	CHANNEL	17.572	0	10:03	0.62	19.20	1.00
CJ67	CHANNEL	13.937	0	10:28	0.68	0.67	1.00
CJ68	CHANNEL	5.903	0	09:21	0.97	0.27	0.96
CJ69	CHANNEL	6.039	0	09:19	0.83	0.27	0.80
CJ70	CHANNEL	6.069	0	09:09	0.49	0.45	1.00
CJ71	CHANNEL	6.615	0	08:47	0.45	0.33	0.96
CJ72	CHANNEL	6.760	0	08:47	0.51	0.17	0.88
CJ73	CHANNEL	5.446	0	08:47	0.42	2.38	0.81
CJ74	CHANNEL	5.929	0	08:45	1.04	1.31	0.93
CJ75	CHANNEL	0.544	0	08:43	0.10	0.01	0.94
CJ76	CHANNEL	0.193	0	08:04	0.10	0.23	0.89
CJ77	CHANNEL	0.109	0	08:45	0.20	0.00	0.91
CJ80	CHANNEL	9.112	0	08:33	1.11	8.79	0.88
CJ81	CHANNEL	9.187	0	08:31	1.01	11.34	0.90
CJ84	CHANNEL	6.929	0	08:30	0.57	5.98	1.00
CJ85	CHANNEL	7.459	0	08:27	0.62	0.35	0.98
CJ86	CHANNEL	8.082	0	08:26	1.11	0.47	0.93
CJ87	CHANNEL	8.218	0	08:23	0.99	0.87	0.95
CJ88	CHANNEL	11.714	0	08:11	1.26	0.51	0.95
CJ89	CHANNEL	12.365	0	08:11	1.14	4.15	0.86
CJ90	CHANNEL	13.253	0	08:10	1.13	0.33	0.90
OR1180-1	ORIFICE	0.798	1	02:08			1.00
OR1205-1	ORIFICE	1.597	0	08:29			1.00

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	--- Fraction of Time in Flow Class ---- Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Avg. Froude Number	Avg. Flow Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0002
C10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0003
C11	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0002
C13	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C14	1.00	0.00	0.00	0.00	0.58	0.00	0.00	0.42	0.10	0.0005
C15	1.00	0.10	0.01	0.00	0.83	0.00	0.00	0.07	0.12	0.0000
C16	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0001
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0008
C19	1.00	0.73	0.00	0.00	0.06	0.00	0.00	0.21	0.17	0.0001
C2	1.00	0.87	0.00	0.00	0.00	0.00	0.00	0.13	0.06	0.0000
C20	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0007
C21	1.00	0.76	0.00	0.00	0.20	0.00	0.05	0.00	0.13	0.0001
C22	1.00	0.00	0.00	0.00	0.47	0.00	0.00	0.53	0.21	0.0000
C23	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.09	0.0003
C24	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.12	0.0000
C25	1.00	0.00	0.04	0.00	0.96	0.00	0.00	0.00	0.11	0.0000
C26	1.00	0.04	0.01	0.00	0.95	0.00	0.00	0.00	0.09	0.0000
C27	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.10	0.0000
C28	1.00	0.05	0.00	0.00	0.47	0.00	0.48	0.00	0.05	0.0002
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0001
C5	1.00	0.80	0.00	0.00	0.00	0.00	0.20	0.00	0.09	0.0000
C6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0003
C6000	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0001
C6007	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C6015a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0000
C6015b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.30	0.0000
C6025a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000
C6025b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000
C6025c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0000
C6030	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C6040	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C6045a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.26	0.0000
C6045b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.37	0.0000
C6055a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.27	0.0000
C6055b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0000
C6055c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.24	0.0000
C6055d	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0000
C6060a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000
C6060b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
C6060c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0003
C6060d	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.21	0.0000
C6060e	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.21	0.0000
C6060f	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.19	0.0000
C6060g	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.19	0.0000
C6060h	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.22	0.0000
C6060i	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.21	0.0000
C6060j	1.00	0.00	0.01	0.00	0.98	0.00	0.00	0.00	0.09	0.0000
C6060k	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0000
C6075a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.0000
C6075b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.0000
C6080	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000

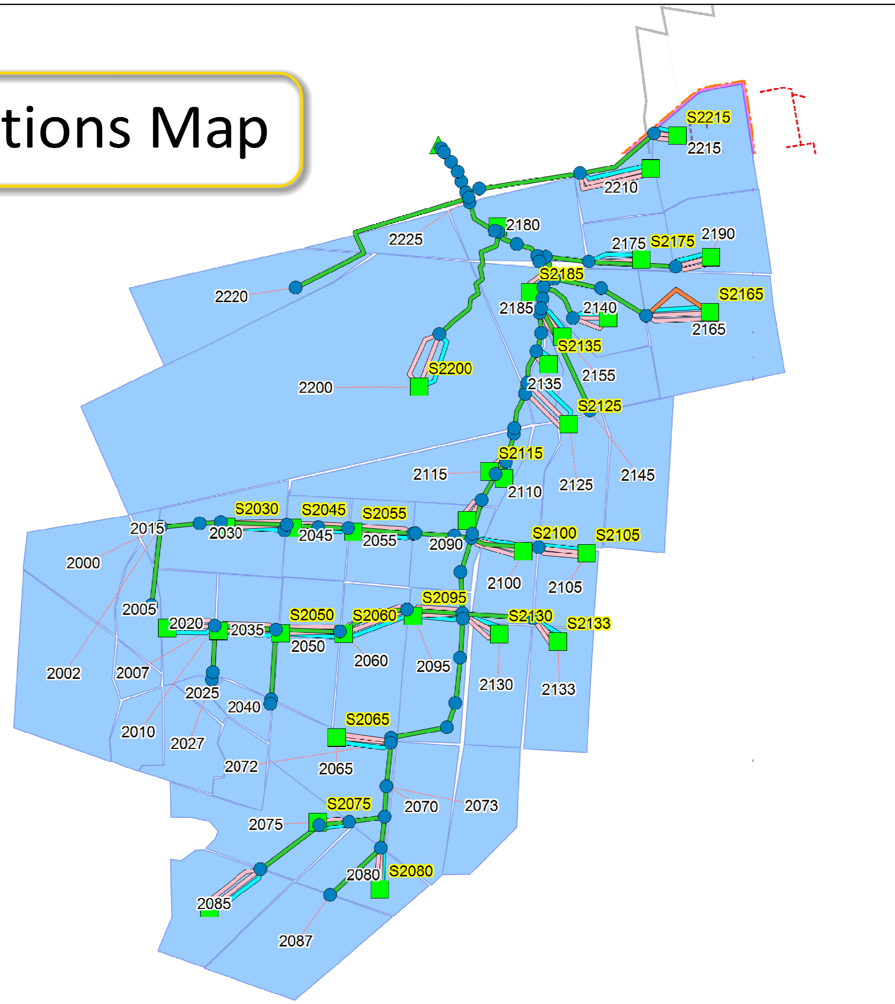
C6090a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C6090b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000
C6090c	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.22	0.0000
C6090d	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.22	0.0000
C6100a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.28	0.0000
C6100b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0000
C6100c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0000
C6110a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
C6110b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0000
C6120a	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.10	0.0000
C6120b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0000
C6120c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0000
C6130b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.0000
C6130c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C6133a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C6133b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C6133c	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.05	0.0000
C6135a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0002
C6135b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.25	0.0000
C6145	1.00	0.00	0.00	0.00	0.44	0.00	0.00	0.55	0.17	0.0000
C6150	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C6160a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0000
C6160b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0000
C6170e	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C6170f	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C6170l	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C6180a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C6180b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0000
C6180c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.0000
C6180d	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0000
C6180e	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000
C6190	1.00	0.00	0.00	0.00	0.65	0.00	0.00	0.35	0.17	0.0000
C6200	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0000
C6220	1.00	0.00	0.00	0.00	0.78	0.00	0.00	0.22	0.08	0.0000
C7	1.00	0.74	0.00	0.00	0.09	0.00	0.00	0.17	0.52	0.0000
C7025	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0012
C7040	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0001
C7075	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0000
C7105	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0009
C7133	1.00	0.00	0.03	0.00	0.97	0.00	0.00	0.00	0.10	0.0000
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0001
C9	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
CJ0.5	1.00	0.00	0.00	0.00	0.63	0.00	0.00	0.37	0.29	0.0000
CJ0.75	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0000
CJ0.8	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.02	0.0000
CJ0.9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
CJ4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0000
CJ4.5	1.00	0.00	0.00	0.00	0.98	0.00	0.00	0.02	0.04	0.0000
CJ53	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
CJ53.5	1.00	0.00	0.13	0.00	0.87	0.00	0.00	0.00	0.01	0.0000
CJ62	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.05	0.0000
CJ63	1.00	0.01	0.01	0.00	0.99	0.00	0.00	0.00	0.13	0.0000
CJ64	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.15	0.3421
CJ65	1.00	0.02	0.01	0.00	0.98	0.00	0.00	0.00	0.17	0.0001
CJ66	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.10	0.0863
CJ67	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.10	0.0004
CJ68	1.00	0.01	0.01	0.00	0.98	0.00	0.00	0.00	0.19	0.0000
CJ69	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.11	0.0000
CJ70	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
CJ71	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
CJ72	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
CJ73	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0001
CJ74	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
CJ75	1.00	0.00	0.03	0.00	0.97	0.00	0.00	0.00	0.00	0.0000
CJ76	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.09	0.0003
CJ77	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.0000
CJ80	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0002
CJ81	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0002
CJ84	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.16	0.0001
CJ85	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
CJ86	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.31	0.0000
CJ87	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0000
CJ88	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.11	0.0000
CJ89	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.16	0.0001
CJ90	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.16	0.0000

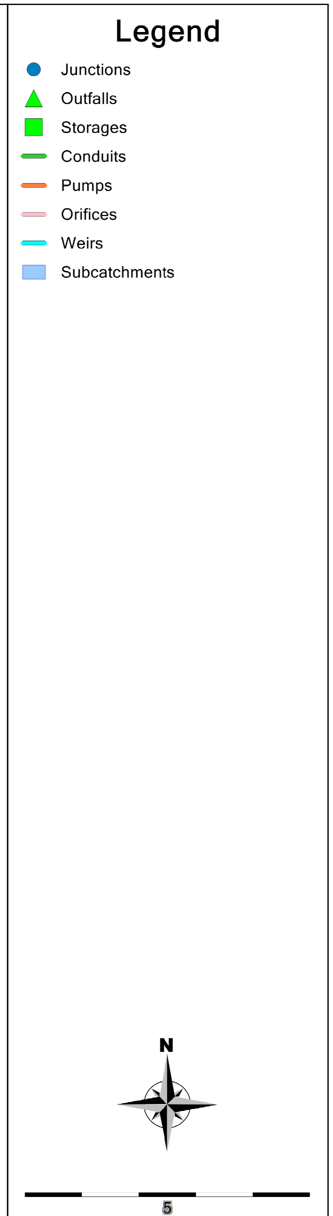
****
Conduit Surcharge Summary
****

	Hours Full			Hours Above Full Normal Flow	Hours Capacity Limited
Conduit	Both Ends	Upstream	Dnstream		
C1	12.84	12.84	12.84	18.85	12.84
C10	13.77	13.77	13.77	16.10	13.77
C12	2.86	2.86	2.86	11.21	2.86
C14	0.01	0.01	0.01	17.04	0.01
C17	6.90	6.90	6.90	16.05	6.90
C18	16.39	16.39	16.39	14.38	16.39
C19	0.01	0.01	0.01	6.11	0.01
C20	8.54	8.54	8.55	20.69	8.54
C21	4.81	4.81	4.81	7.21	0.01
C23	0.01	0.01	0.01	10.19	0.01
C28	7.87	7.87	7.87	9.12	7.87
C3	2.32	2.32	2.32	0.01	0.01
C4	0.01	0.01	0.01	18.56	0.01
C6	9.41	9.41	9.41	17.77	9.41
C6000	0.01	0.01	0.01	4.95	0.01
C6015a	1.95	1.95	1.95	0.01	0.01
C6015b	0.63	0.63	0.63	0.29	0.29
C6025b	0.01	0.01	0.01	0.54	0.01
C6030	0.01	0.01	0.01	0.29	0.01
C6045a	3.91	3.91	3.91	0.01	0.27
C6060a	0.01	0.01	0.01	5.93	0.01
C6060c	0.03	0.03	0.06	4.05	0.03
C6135a	0.01	0.01	0.01	19.77	0.01
C6160b	0.01	0.01	0.01	7.03	0.01
C6220	0.01	0.01	0.01	0.56	0.01
C7025	12.23	12.23	12.23	11.00	12.23
C7040	1.07	1.07	1.07	1.04	1.07
C7075	6.66	6.66	6.66	0.90	5.27
C7105	5.71	5.71	5.71	19.08	5.71
C7133	0.01	0.01	0.01	1.80	0.01
C8	0.01	0.01	0.01	11.46	0.01
CJ0.8	9.16	9.16	9.16	0.01	0.01
CJ4	1.01	1.01	1.02	0.01	0.01
CJ53	3.73	3.73	3.73	0.01	0.01
CJ64	1.16	1.16	2.06	18.05	1.16
CJ65	3.24	3.24	3.24	0.07	0.01
CJ66	1.86	1.86	2.20	8.09	1.86
CJ67	1.86	1.86	1.86	0.01	0.01
CJ70	1.86	1.86	1.86	0.01	0.01
CJ73	0.01	0.01	0.01	2.32	0.01
CJ74	0.01	0.01	0.01	0.82	0.01
CJ80	0.01	0.01	0.01	17.72	0.01
CJ81	0.01	0.01	0.01	19.37	0.01
CJ84	0.01	0.01	0.01	13.48	0.01
CJ89	0.01	0.01	0.01	4.65	0.01

Analysis begun on: Thu Sep 07 16:26:59 2017
Analysis ended on: Thu Sep 07 16:27:22 2017
Total elapsed time: 00:00:23

Proposed Conditions Map





```
[TITLE]
Upper Little River Model.
All slopes are assumed to be 0.15% (from Turkey Creek and Little River Subwatershed Study -
Dillon Consulting Limited, June 1998).


[OPTIONS]
;;Options            Value
;;------------------ ------------
FLOW_UNITS           CMS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         DYNWAVE
START_DATE           12/14/2011
START_TIME           00:00:00
REPORT_START_DATE    12/14/2011
REPORT_START_TIME    00:00:00
END_DATE             12/17/2011
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         30
ALLOW_PONDING        YES
INERTIAL_DAMPING     FULL
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
NORMAL_FLOW_LIMITED  BOTH
SKIP_STEADY_STATE    NO
FORCE_MAIN_EQUATION  H-W
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0

[EVAPORATION]
;;Type          Parameters
;;------------- ----------
CONSTANT     0.0
DRY_ONLY     NO

[RAINGAGES]
;;               Rain      Time   Snow   Data
;;Name           Type      Intrvl Catch  Source
;;-------------- --------- ------ ------ ----------
```

```
24HR            INTENSITY 0:10   1.0    TIMESERIES 100yr-24hr-chi
;48 hour Regional Storm event; 285 mm total precipitation
Hurricane_Hazel  INTENSITY 0:15   1.0    TIMESERIES Hazel

[SUBCATCHMENTS]
;;                                               Total    Pcnt.             Pcnt.    Curb     Snow
;;Name           Raingage         Outlet           Area     Imperv   Width    Slope    Length   Pack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------- --------
;6th Conc Road Drain North of 401
2000             24hr             j37              91.38    60       1000     0.15     0
;6th Conc including south of 401
2002             24hr             j37              156.4    60       1400     0.15     0
;East of 6th Conc Drain, between Baseline and Division Rd
2005             24hr             j6               48.04    60       1300     0.15     0
;East of 6th Conc Drain, north of 401
2007             24hr             j31              20.71    60       300      0.15     0
;East of 6th Conc Drain, south of 401
2010             24hr             j31              40.96    60       800      0.15     0
;Drains to 7th Conc Road Drain
2015             24hr             J54              10.55    60       700      0.15     0
;7th Conc Drain north of 401
2020             24hr             s2020            66.13    67       1400     0.15     0
;To 7th Conc drain; at 401 and Provincial Rd
2025             24hr             J58.7            12.64    60       300      0.15     0
;7th Conc Drain south of 401
2027             24hr             J58.7            59.42    60       900      0.15     0
;8th Conc Drain, along Baseline
2030             24hr             s2030            117.58   49       1000     0.15     0
;8th Conc Drain, north of 401
2035             24hr             s2035            81.42    63       1400     0.15     0
;8th Conc Drain, between 401 and Division Rd.
2040             24hr             J25              25.6     60       500      0.15     0
;Hayes Drain at Baseline
2045             24hr             s2045            63.81    43       900      0.15     0
;To Hayes Drain, north of 401
2050             24hr             s2050            97.34    47       1200     0.15     0
;9th Conc Drain, at Baseline
2055             24hr             s2055            65.11    50       900      0.15     0
;9th Conc Drain, north of 401
2060             24hr             s2060            112.73   57       700      0.15     0
;9th Conc Drain south of 401
2065             24hr             S2065            116.33   77       1000     0.15     0
;To Little River, south of 401
2070             24hr             j44              94.85    5        1300     0.15     0
;To Hurley Drain (?), south of 401
2072             24hr             J46              42.27    60       700      0.15     0
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2073             24hr             j44              80.41    5        1300     0.15     0
;Large catchment to 9th Conc Drain south of Division Rd.
2075             24hr             s2075            117.69   47       1000     0.15     0
;To Little River Drain, south of North Talbot Rd.
2080             24hr             S2080            69.76    11       1000     0.15     0
2085             24hr             s2085            100.9    35       800      0.15     0
2087             24hr             j41              133.74   5        1000     0.15     0
;Little River, at Baseline
2090             24hr             S2090            72.83    31       600      0.15     0
;Large catchment draining to Little River, north of 401
2095             24hr             s2095            117.98   47       700      0.15     0
;To Little River, south of 401
2100             24hr             s2100            50.57    56       700      0.15     0
;To Watson Drain, north of 401
2105             24hr             s2105            60.91    50       700      0.15     0
;To Little River, south of County Rd 42, north of Baseline
2110             24hr             S2110            49.79    52       1000     0.15     0
;To Little River, south of County Rd 42
2115             24hr             S2115            113.58   37       700      0.15     0
;Lower Watson Drain, north of 401
2125             24hr             S2125            93.38    55       700      0.15     0
;To Little River, north of 401, south of catchment 1095
2130             24hr             s2130            80.55    80       700      0.15     0
;To Watson Drain, south of 401
2133             24hr             s2133            93.08    65       700      0.15     0
;Little River, between Lauzon Pkwy and Lauzon Rd
2135             24hr             S2135            22.82    50       500      0.15     0
;To Little River, Lauzon Rd
2140             24hr             S2140            82.1     33       1000     0.15     0
;To Little River; south of County Rd 42
;Outlet to J8; 10th Concession Drain
2145             24hr             j8               104.35   10       700      0.15     0
;To Little River, Soulliere drain
2155             24hr             S2155            77.27    50       1000     0.15     0
;Desjardeins Drain
2165             24hr             s2165            179.12   53       1400     0.15     0
;Lachance Drain
2175             24hr             S2175            47.3     66       800      0.15     0
;To Little River; d/s end of Lachance drain
2180             24hr             s2180            102      57       800      0.15     0
2185             24hr             S2185            65.4     55       700      0.15     0
2190             24hr             S2190            84.96    54       900      0.15     0
;To Little River, furthest catchment west
2200             24hr             S2200            784.14   36       2000     0.15     0
;Gouin Drain
2210             24hr             s2210            58.24    63       800      0.15     0
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2215             24hr             S2215            106.67   57       900      0.15     0
;To Little River; just south of Hwy 2
2220             24hr             J3               144.51   62       800      0.15     0
;To Little River; at intersection of Hwy 2 and Lauzon Pkwy
2225             24hr             J17              42.22    60       500      0.15     0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
2000             0.013      0.25       1          2.5        0          OUTLET
2002             0.013      0.25       1          2.5        0          OUTLET
2005             0.013      0.25       1          2.5        0          OUTLET
2007             0.013      0.25       1          2.5        0          OUTLET
2010             0.013      0.25       1          2.5        0          OUTLET
2015             0.013      0.25       1          2.5        0          OUTLET
2020             0.013      0.25       1          2.5        0          OUTLET
2025             0.013      0.25       1          2.5        0          OUTLET
2027             0.013      0.25       1          2.5        0          OUTLET
2030             0.013      0.25       1          2.5        0          OUTLET
2035             0.013      0.25       1          2.5        0          OUTLET
2040             0.013      0.25       1          2.5        0          OUTLET
2045             0.013      0.25       1          2.5        0          OUTLET
2050             0.013      0.25       1          2.5        0          OUTLET
2055             0.013      0.25       1          2.5        0          OUTLET
2060             0.013      0.25       1          2.5        0          OUTLET
2065             0.013      0.25       1          2.5        0          OUTLET
2070             0.013      0.25       1          2.5        0          OUTLET
2072             0.013      0.25       1          2.5        0          OUTLET
2073             0.013      0.25       1          2.5        0          OUTLET
2075             0.013      0.25       1          2.5        0          OUTLET
2080             0.013      0.25       1          2.5        0          OUTLET
2085             0.013      0.25       1          2.5        0          OUTLET
2087             0.013      0.25       1          2.5        0          OUTLET
2090             0.013      0.25       1          2.5        0          OUTLET
2095             0.013      0.25       1          2.5        0          OUTLET
2100             0.013      0.25       1          2.5        0          OUTLET
2105             0.013      0.25       1          2.5        0          OUTLET
2110             0.013      0.25       1          2.5        0          OUTLET
2115             0.013      0.25       1          2.5        0          OUTLET
2125             0.013      0.25       1          2.5        0          OUTLET
2130             0.013      0.25       1          2.5        0          OUTLET
2133             0.013      0.25       1          2.5        0          OUTLET
2135             0.013      0.25       1          2.5        0          OUTLET
2140             0.013      0.25       1          2.5        0          OUTLET
2145             0.013      0.25       1          2.5        0          OUTLET
2155             0.013      0.25       1          2.5        0          OUTLET
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2165             0.013      0.25       1          2.5        0          OUTLET
2175             0.013      0.25       1          2.5        0          OUTLET
2180             0.013      0.25       1          2.5        0          OUTLET
2185             0.013      0.25       1          2.5        0          OUTLET
2190             0.013      0.25       1          2.5        0          OUTLET
2200             0.013      0.25       1          2.5        0          OUTLET
2210             0.013      0.25       1          2.5        0          OUTLET
2215             0.013      0.25       1          2.5        0          OUTLET
2220             0.013      0.25       1          2.5        0          OUTLET
2225             0.013      0.25       1          2.5        0          OUTLET

[INFILTRATION]
;;Subcatchment   Suction    HydCon     IMDmax
;;-------------- ---------- ---------- ----------
2000             320        0.254      0.265
2002             320        0.254      0.265
2005             320        0.254      0.265
2007             320        0.254      0.265
2010             320        0.254      0.265
2015             320        0.254      0.265
2020             320        0.254      0.265
2025             320        0.254      0.265
2027             320        0.254      0.265
2030             320        0.254      0.265
2035             320        0.254      0.265
2040             320        0.254      0.265
2045             320        0.254      0.265
2050             320        0.254      0.265
2055             320        0.254      0.265
2060             320        0.254      0.265
2065             320        0.254      0.265
2070             320        0.254      0.265
2072             320        0.254      0.265
2073             320        0.254      0.265
2075             320        0.254      0.265
2080             320        0.254      0.265
2085             320        0.254      0.265
2087             320        0.254      0.265
2090             320        0.254      0.265
2095             320        0.254      0.265
2100             320        0.254      0.265
2105             320        0.254      0.265
2110             320        0.254      0.265
2115             320        0.254      0.265
2125             320        0.254      0.265
2130             320        0.254      0.265
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2133             320        0.254      0.265
2135             320        0.254      0.265
2140             320        0.254      0.265
2145             320        0.254      0.265
2155             320        0.254      0.265
2165             320        0.254      0.265
2175             320        0.254      0.265
2180             320        0.254      0.265
2185             320        0.254      0.265
2190             320        0.254      0.265
2200             320        0.254      0.265
2210             320        0.254      0.265
2215             320        0.254      0.265
2220             320        0.254      0.265
2225             320        0.254      0.265

[JUNCTIONS]
;;               Invert     Max.       Init.      Surcharge  Ponded
;;Name           Elev.      Depth      Depth      Depth      Area
;;-------------- ---------- ---------- ---------- ---------- ----------
J1               185        2.7        0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 10
J10              178.819    5          0          5          0
;River: Gouin
;Reach: Gouin
;Transect: 0.5
J108             177.9      3.6        0          5          0
;River: Gouin
;Reach: Gouin
;Transect: 0.75
J109             178.4      3.6        0          5          0
J11              182.4      2          0          0          0
;River: Lachance
;Reach: Lachance
;Transect: 0.8
J110             178.1      3.6        0          5          0
;River: Lachance
;Reach: Lachance
;Transect: 0.9
J111             178.3      3.6        0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 12
J12              179.1      5.2        0          5          0
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J13              181.9      3          0          5          0
;River: Little River
;Reach: Baseline to Wats
;Transect: 14
J14              180.062    4.238      0          5          0
;River: Little River
;Reach: Baseline to Wats
;Transect: 15
J15              180.175    4.238      0          5          0
;River: Little River
;Reach: Baseline to Wats
;Transect: 16
J16              180.509    4.291      0          5          0
J17              177.208    5.7        0          5          0
;River: Little River
;Reach: Little River
;Transect: 18
J18              181.636    2.8        0          5          0
;River: Little River
;Reach: Little River
;Transect: 19
J19              183.2      2.1        0          5          0
;River: Little River
;Reach: Desjardeins to Lachance
;Transect: 2
;Junction of Desjardeins and Little River
J2               177.865    6          0          5          0
;River: Little River
;Reach: Little River
;Transect: 20
J20              184        2.7        0          5          0
J21              179.754    4.246      0          5          0
J22              179.1      5.2        0          5          0
J23              178.684    5.4        0          5          0
J24              177.865    6          0          5          0
;Created to include culvert d/s of 1040
J25              187.154    2          0          5          0
J26              187        3          0          5          0
J27              182.4      2          0          0          0
J28              183.4      3          0          5          0
J29              184.4      3          0          5          0
J3               180.95     2          0          5          0
J30              185.4      3          0          5          0
J31              186.4      3          0          5          0
J32              179        2          0          0          0
J33              178.75     3.6        0          5          0
```

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J34              183.4      3          0          5          0
J35              179.8      3.4        0          5          0
J36              180.916    4          0          5          0
J37              186.6      5          0          5          0
;River: Little River
;Reach: Gouin to DS end
;Transect: 37500
J37500           176.8      5.1        0          5          0
J38              182.2      4          0          5          0
J39              177.1      5.6        0          5          0
;River: Little River
;Reach: Gouin to DS end
;Transect: 39001
J39001           176.9      7.9        0          5          0
;River: Desjardeins
;Reach: Desjardeins
;Transect: 4
J4               178.1      3.6        0          5          0
;River: Little River
;Reach: Gouin to DS end
;Transect: 40323
J40323           177        5.3        0          5          0
J41              187.5      1.5        0          5          0
;River: Little River
;Reach: Lachance to Goui
;Transect: 41106
J41106           177.1      5.7        0          5          0
J42              188        1.5        0          5          0
;River: Little River
;Reach: Lachance to Goui
;Transect: 43501
J43501           176.9      5.5        0          5          0
J44              186.21     3          0          5          0
;River: Desjardeins
;Reach: Desjardeins
;Transect: 4.5
J45              178.7      3.4        0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 46
J46              185.72     2.9        0          5          0
;River: Little River
;Reach: Lachance to Goui
;Transect: 46102
J46102           177.1      5.6        0          5          0
;River: Little River
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;Reach: Lachance to Goui
;Transect: 46203
J46203          177.7     5.6        0          5          0
;River: 6th Concession D
;Reach: 9th to Little Ri
;Transect: 47
J47             181.22    3.77       0          5          0
J5              176.8     5.1        0          5          0
;River: Baseline Drain
;Reach: Hayes to 9th
;Transect: 51
J51             183.2     3.6        0          5          0
;River: 6th Concession D
;Reach: 7th to 8th
;Transect: 57
J54             186.55    1.555      0          5          0
;River: 8th Concession D
;Reach: 8th Concession
;Transect: 55
J55             184.5     2.8        0          5          0
;River: 8th Concession D
;Reach: 8th Concession
;Transect: 55.5
;Invert from topo - approximate
J55.5           187.104   2.8        0          5          0
;River: 6th Concession D
;Reach: 7th to 8th
;Transect: 56
J56             186.09    2.31       0          5          0
J57             190.33    2          0          5          0
;River: 7th Concession D
;Reach: 7th Concession
;Transect: 58.7
J58.7           190.27    5.31       0          5          0
J6              187.18    2          0          5          0
;River: 6th Concession D
;Reach: 8th to 9th
;Transect: 54
J60             184.8     2.3        0          5          0
;River: Baseline Drain
;Reach: Hayes to 9th
;Transect: 52
J61             184.25    2.15       0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 7
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J7              178.8     4.6        0          5          0
;River: 6th Concession D
;Reach: 9th to Little River
;Transect: 50
;Junction of 9th Concession Drain and 6th Concession Drain
;Slope of 9th Concession Drain (C6060a-k) updated to reflect survey information, 0.16%
J77             182.2     4          0          5          0
J8              179.557   2          0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 44
J80             185.582   2.6        0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 81
J81             186.5     1.5        0          5          0
;River: Little River
;Reach: Baseline to Wats
;Transect: 17
;Junction of upper reach of Little River and 6th Concession
;Slope of 6th Concession (C6055a-d) updated to reflect survey information-0.11%
J82             180.916   4.084      0          5          0
J83             179.4     3          0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 88
J88             187       3          0          5          0
;River: Washbrooke
;Reach: Washbrooke
;Transect: 89
J89             187.555   2.095      0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 9
J9              178.684   5.4        0          5          0
;River: Little River
;Reach: Baseline to Watson
;Transect: 13
;County Road 42
;Junction of catchments 1110,1115
J92             179.754   4.246      0          5          0
;River: Little River
;Reach: Watson to Desjardeins
;Transect: 11
;Junction of Watson Drain and Little River
J93             178.67    5.329      0          5          0
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;River: Little River
;Reach: Watson to Desjar
;Transect: 8
;Junction of catchments 1135 and 1140
J94             178.8     4.6        0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 5
J95             178.8     5          0          5          0
;River: Little River
;Reach: Watson to Desjar
;Transect: 3
J96             178       7          0          5          0
;River: Little River
;Reach: Lachance to Goui
;Transect: 42000
;Junction of McGill Drain and Little River (Node 5180 in Stantec SWMHYMO model)
J98             177.208   5.7        0          5          0
J99             178.948   2          0          5          0

[OUTFALLS]
;;              Invert     Outfall      Stage/Table      Tide
;;Name          Elev.      Type         Time Series      Gate
;;-------------- ---------- ------------ ---------------- ----
;River: Little River
;Reach: Gouin to DS end
;Transect: 36000
J5205           176.7      NORMAL                        NO

[STORAGE]
;;              Invert   Max.     Init.    Storage    Curve                       Ponded   Evap.
;;Name          Elev.    Depth    Depth    Curve      Params                      Area     Frac.    Infiltration parameters
;;-------------- -------- -------- -------- ---------- -------- -------- -------- -------- -------- -----------------------
S2020           186.9    5        0        TABULAR    5020                        0        0
S2030           185.3    5        0        TABULAR    5030                        0        0
S2035           185.9    5        0        TABULAR    5035                        0        0
S2045           183.7    5        0        TABULAR    5045                        0        0
S2050           184.9    5        0        TABULAR    5050                        0        0
S2055           182.7    5        0        TABULAR    5055                        0        0
S2060           183.9    5        0        TABULAR    5060                        0        0
S2065           186.22   5        0        TABULAR    5065                        0        0
S2075           187.5    5        0        TABULAR    5075                        0        0
S2080           187.5    5        0        TABULAR    5080                        0        0
S2085           187.75   5        0        TABULAR    5085                        0        0
S2090           182.42   5        0        TABULAR    5090                        0        0
S2095           182.9    5        0        TABULAR    5095                        0        0
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S2100           181.92   5        0        TABULAR    5100                        0        0
S2105           182.4    5        0        TABULAR    5105                        0        0
S2110           181.56   5        0        TABULAR    5110                        0        0
S2115           181.56   5        0        TABULAR    5115                        0        0
S2125           180.6    5        0        TABULAR    5125                        0        0
S2130           182.9    5        0        TABULAR    5130                        0        0
S2133           183.9    5        0        TABULAR    5133                        0        0
S2135           180.17   5        0        TABULAR    5135                        0        0
S2140           179.7    5        0        TABULAR    5140                        0        0
S2155           180.18   5        0        TABULAR    5155                        0        0
S2165           179.9    5        0        TABULAR    5165                        0        0
S2175           178.8    5        0        TABULAR    5175                        0        0
S2180           178.1    5        0        TABULAR    5180                        0        0
S2185           179.5    5        0        TABULAR    5185                        0        0
S2190           179.25   5        0        TABULAR    5190                        0        0
S2200           179.45   5        0        TABULAR    5200                        0        0
S2210           178.9    5        0        TABULAR    5210                        0        0
S2215           179.5    5        0        TABULAR    5215                        0        0

[CONDUITS]
;;              Inlet            Outlet                      Manning    Inlet      Outlet     Init.      Max.
;;Name          Node             Node             Length     N          Offset     Offset     Flow       Flow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ---------- ---------- ----------
;Forest Glade Crossing
C1              J5               J37500           18.1       0.013      176.8      176.8      0          0
C10             J9               J23              14         0.013      178.38     178.38     0          0
C11             J81              J44              295        0.03       186.5      186.21     0          0
C12             J24              J2               10         0.013      177.865    177.865    0          0
C13             J83              J45              800        0.03       179.7      178.7      0          0
C14             J1               J20              450        0.045      185        184        0          0
C15             J35              J7               500        0.045      0          178.8      0          0
C16             J28              J27              400        0.01       183.4      182.4      0          0
C17             J29              J28              400        0.01       184.4      183.4      0          0
C18             J30              J29              650        0.03       185.4      184.4      0          0
C19             J31              J30              650        0.03       186.4      185.4      0          0
C2              J13              J82              600        0.01       182.1      181.1      0          0
C20             J33              J111             900        0.045      179.75     179.3      0          0
C21             J32              J109             400        0.045      180        179.4      0          0
C22             J82              J36              10         0.015      180.916    180.916    0          0
C23             J82              J36              10         0.015      184.5      184.5      0          0
C24             J92              J21              14         0.015      183.1      183.1      0          0
C25             J9               J23              14         0.015      181.8      181.8      0          0
C26             J24              J2               10         0.015      182.5      182.5      0          0
C27             J17              J98              50         0.015      181.4      181.4      0          0
C28             J5               J37500           400        0.01       180.5      180.5      0          0
C29             J12              J22              19         0.015      182.43     182.43     0          0
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C3              J55             J60             20        0.045     184.5     184.8     0         0
C30             J77             J38             10        0.015     182.2     182.2     0         0
C31             J77             J38             10        0.015     184.8     184.8     0         0
C32             J46102          J39             10        0.015     177.1     177.1     0         0
C33             J46102          J39             10        0.015     180.8     180.8     0         0
;E-W Arterial Culvert
C34             J11             J27             10        0.01      0         182.4     0         0
C35             J34             J27             600       0.01      183.4     182.4     0         0
C37             J41             J26             700       0.01      0         187       0         0
C38             J42             J89             700       0.01      0         187.555   0         0
C4              J17             J98             50        0.013     177.208   177.208   0         0
C5              J26             J81             400       0.03      187.77    186.5     0         0
C6              J92             J21             14        0.013     179.754   179.754   0         0
C6000           J37             J54             700       0.045     186.6     186.55    0         0
;7th Street Drain; transect copied from 6th Concession drain
;Slope, Length, Manning's n from SWMHYMO
C6007           J6              j37             835       0.045     187.18    186.6     0         0
;River: 6th Concession D
;Reach: 7th to 8th
C6015a          J54             J56             100       0.045     186.55    186.09    0         0
;River: 6th Concession D
;Reach: 7th to 8th
C6015b          J56             J60             580       0.045     186.09    184.8     0         0
;River: 7th Concession D
;Reach: 7th Concession
;COPIED SECTION FROM SEC 58
;Slope, Length, Manning's n from SWMHYMO
C6025a          J57             J31             550       0.045     190.27    188.7     0         0
;River: 6th Concession D
;Reach: 8th to 9th
C6030           J60             J61             750       0.045     184.8     184.25    0         0
;River: 8th Concession D
;Reach: 8th Concession
;COPIED SECTION FROM SEC 55
;Slope, Length, Manning's n from SWMHYMO
C6040           J55.5           J30             800       0.045     187.104   186       0         0
;River: Baseline Drain
;Reach: Hayes to 9th
C6045a          J61             J51             520       0.045     184.25    183.2     0         0
;River: Baseline Drain
;Reach: Hayes to 9th
C6045b          J51             J77             150       0.045     183.2     182.2     0         0
;River: 6th Concession D
;Reach: 9th to Little Ri
C6055a          J38             J47             475       0.045     181.7     181.69    0         0
;River: 6th Concession D
;Reach: 9th to Little Ri
;Upstream of Little River and Baseline junction (J17) Outlet set to invert of Junction 17; length adjusted correctly.
C6055d          J47             J82             250       0.045     181.22    180.916   0         0
;River: Little River
;Reach: Baseline to Wats
;Bridge: Little River
C6090a          J36             J16             310       0.045     180.916   180.509   0         0
;River: Little River
;Reach: Baseline to Wats
C6090b          J16             J15             340       0.045     180.509   180.175   0         0
;River: Little River
;Reach: Baseline to Watson
;2 elevation points changed to reflect more accurate values (2996.5 and 3004.5).
C6090c          J15             J14             135       0.045     180.175   180.062   0         0
;River: Little River
;Reach: Baseline to Wats
C6090d          J14             J92             320       0.045     180.062   179.754   0         0
;River: Little River
;Reach: Little River
C6100a          J20             J19             545       0.045     184       183.2     0         0
;River: Little River
;Reach: Little River
C6100b          J19             J11             440       0.045     183.2     182.4     0         0
;River: Little River
;Reach: Little River
;Outlet set to invert of Junction 17
C6100c          J18             J82             450       0.045     181.636   180.916   0         0
;River: Little River
;Reach: Baseline to Wats
C6110a          J21             J12             470       0.045     179.754   179.1     0         0
;River: Little River
;Reach: Watson to Desjar
;Bridge: Little River, Lauzon Pkwy Bridge
C6110b          J22             J93             320       0.045     179.1     178.67    0         0
;River: Little River
;Reach: Watson to Desjar
C6120a          J93             J10             280       0.045     178.67    178.49    0         0
;River: Little River
;Reach: Watson to Desjar
C6120b          J10             J9              150       0.045     178.49    178.38    0         0
;River: Little River
;Reach: Watson to Desjar
C6120c          J23             J94             170       0.045     178.39    178.29    0         0
;River: Little River
;Reach: Watson to Soulliere
C6135a          J94             J7              215       0.045     178.29    178.15    0         0
;River: Little River
;Reach: Watson to Soulliere
C6135b          J7              J95             85        0.045     178.15    178.1     0         0
;10th Concession Drain
;Transect copied from Transect 102 from adjacent Watson Drain
;Conduit copied to provide outlet for Catchment 1145
;Slope, Length, Manning's n from SWMHYMO
C6145           J8              J23             1140      0.045     179.557   178.864   0         0
;River: Little River
;Reach: Watson to Desjardeins
;Copy of Transect 7; survey info for transect 5 not good
C6150           J95             J96             160       0.045     178.1     178       0         0
;River: Little River
;Reach: Desjardeins to Little River
;Adjusted from HEC-RAS import; automatically created junction deleted and lengths adjusted accordingly.
C6160a          J96             J24             270       0.045     178       178       0         0
;River: Little River
;Reach: Desjardeins to L
C6160b          J2              J46203          410       0.045     178       177.7     0         0
;River: Little River
;Reach: Lachance to Goui
;This is a REPEATED section.
C6170e          J46203          J46102          426       0.045     177.7     177.1     0         0
;River: Little River
;Reach: Lachance to Goui
C6170f          J39             J43501          194       0.045     177.1     176.9     0         0
;River: Little River
;Reach: Lachance to Goui
C6170l          J43501          J17             122       0.045     176.9     177.208   0         0
;River: Little River
;Reach: Lachance to Goui
C6180a          J98             J41106          90        0.045     177.2     177.1     0         0
;River: Little River
;Reach: Lachance to Goui
C6180b          J41106          J40323          78.2      0.045     177.1     177       0         0
;River: Little River
;Reach: Gouin to DS end
;This is a REPEATED section.
C6180c          J40323          J39001          132       0.045     177       176.9     0         0
;River: Little River
;Reach: Gouin to DS end
C6180d          J39001          J5              150       0.045     176.9     176.8     0         0
;River: Little River
;Reach: Gouin to DS end
;This is a REPEATED section.
C6180e          J37500          J5205           150       0.045     176.8     176.7     0         0
;McGill Drain downstream of junction with Lappan Drain
;Transect copied from Desjardeins Drain
;Elevations adjusted to match SWMHYMO channel slope
C6190           J99             J46102          2060      0.045     178.948   177.1     0         0
;Russette Drain
;No information available, transect copied from Desjardeins Drain,
;all other details copied from McGill drain info from SWMHYMO model
C6220           J3              J17             2700      0.045     179.5     178       0         0
C7              J80             J1              660       0.03      185.582   185       0         0
;MTO Plate No. 118-401/A05-0; WP No. 170-99-00; STA 12+065 to STA 13+055, 2002
C7025           J58.7           J57             30.29     0.013     190.33    190.27    0         0
;From 8th Concession North and Demonte Branch; Drainage Area Plan - Sheet 2
C7040           J25             J55.5           55        0.013     187.154   187.104   0         0
;From MTO, Engineering and Plans Office, Surveys; Kings Hwy 401-Twp of Sandwich South, County of Essex, from file 401SAS WP 60-00
C7075           J46             J80             50.6      0.013     185.72    185.582   0         0
C8              J12             J22             19        0.013     179.1     179.1     0         0
C9              J27             J18             400       0.03      182.4     181.636   0         0
;River: Gouin
;Reach: Gouin
;COPY OF DESJARDEINS DRAIN SECTION 4
CJ0.5           J108            J98             10        0.045     178.9     178.7     0         0
;River: Gouin
;Reach: Gouin
;COPY OF DESJARDEINS DRAIN SECTION 4
;Slope, Length, Manning's n from SWMHYMO
CJ0.75          J109            J108            500       0.045     179.4     178.9     0         0
;River: Lachance
;Reach: Lachance
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope
CJ0.8           J110            J2              50        0.045     178.1     177.879   0         0
;River: Lachance
;Reach: Lachance
;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope
CJ0.9           J111            J110            450       0.045     178.6     178.1     0         0
;River: Desjardeins
;Reach: Desjardeins
CJ4             J4              J96             35        0.045     178.1     178       0         0
;River: Desjardeins
;Reach: Desjardeins
CJ4.5           J45             J4              500       0.045     178.7     178.1     0         0
;River: Washbrooke
;Reach: Washbrooke
CJ81            J44             J46             795       0.045     186.21    185.72    0         0
;River: Washbrooke
;Reach: Washbrooke
CJ88            J88             J81             400       0.045     187.546   186.5     0         0
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;River: Washbrooke
;Reach: Washbrooke
CJ89             J89              J88              215        0.045      187.555    187.546    0          0

[PUMPS]
;;               Inlet            Outlet           Pump             Init.  Startup  Shutoff
;;Name           Node             Node             Curve            Status Depth    Depth
;;-------------- ---------------- ---------------- ---------------- ------ -------- --------
P1               S2165            J83              Pump2165         ON     300      300

[ORIFICES]
;;               Inlet            Outlet           Orifice      Crest      Disch.     Flap Open/Close
;;Name           Node             Node             Type         Height     Coeff.     Gate Time
;;-------------- ---------------- ---------------- ------------ ---------- ---------- ---- ----------
OR2020-1         S2020            J31              SIDE         186.9      0.6        NO   0
OR2020-2         S2020            J31              SIDE         187.1      0.6        NO   0
OR2030-1         S2030            J60              SIDE         185.3      0.6        NO   0
OR2030-2         S2030            J60              SIDE         185.5      0.6        NO   0
OR2035-1         S2035            J30              SIDE         185.9      0.6        NO   0
OR2035-2         S2035            J30              SIDE         186.1      0.6        NO   0
OR2045-1         S2045            J51              SIDE         183.7      0.6        NO   0
OR2045-2         S2045            J51              SIDE         183.9      0.6        NO   0
OR2050-1         S2050            J29              SIDE         184.9      0.6        NO   0
OR2050-2         S2050            J29              SIDE         185.1      0.6        NO   0
OR2055-1         S2055            J77              SIDE         182.7      0.6        NO   0
OR2055-2         S2055            J77              SIDE         182.9      0.6        NO   0
OR2060-1         S2060            J28              SIDE         183.9      0.6        NO   0
OR2060-2         S2060            J28              SIDE         184.1      0.6        NO   0
OR2065-1         S2065            J46              SIDE         186.22     0.6        NO   0
OR2065-2         S2065            J46              SIDE         186.42     0.6        NO   0
OR2075-1         S2075            J88              SIDE         187.5      0.6        NO   0
OR2075-2         S2075            J88              SIDE         187.7      0.6        NO   0
OR2080-1         S2080            J26              SIDE         187.5      0.6        NO   0
OR2080-2         S2080            J26              SIDE         187.7      0.6        NO   0
OR2085-1         S2085            J42              SIDE         187.75     0.6        NO   0
OR2085-2         S2085            J42              SIDE         187.95     0.6        NO   0
OR2090-1         S2090            J16              SIDE         182.416    0.6        NO   0
OR2090-2         S2090            J16              SIDE         182.616    0.6        NO   0
OR2095-1         S2095            J27              SIDE         182.9      0.6        NO   0
OR2095-2         S2095            J27              SIDE         183.1      0.6        NO   0
OR2100-1         S2100            J82              SIDE         181.916    0.6        NO   0
OR2100-2         S2100            J82              SIDE         182.116    0.6        NO   0
OR2105-1         S2105            J13              SIDE         182.4      0.6        NO   0
OR2105-2         S2105            J13              SIDE         182.6      0.6        NO   0
OR2110-1         S2110            J14              SIDE         181.562    0.6        NO   0
OR2110-2         S2110            J14              SIDE         181.762    0.6        NO   0
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OR2115-1         S2115            J14              SIDE         181.562    0.6        NO   0
OR2115-2         S2115            J14              SIDE         181.762    0.6        NO   0
OR2125-1         S2125            J22              SIDE         180.6      0.6        NO   0
OR2125-2         S2125            J22              SIDE         180.8      0.6        NO   0
OR2130-1         S2130            J27              SIDE         182.9      0.6        NO   0
OR2130-2         S2130            J27              SIDE         183.1      0.6        NO   0
OR2133-1         S2133            J34              SIDE         183.9      0.6        NO   0
OR2133-2         S2133            J34              SIDE         184.1      0.6        NO   0
OR2135-1         S2135            J93              SIDE         180.17     0.6        NO   0
OR2135-2         S2135            J93              SIDE         180.37     0.6        NO   0
OR2140-1         S2140            J35              SIDE         179.7      0.6        NO   0
OR2140-2         S2140            J35              SIDE         179.9      0.6        NO   0
OR2155-1         S2155            J23              SIDE         180.184    0.6        NO   0
OR2155-2         S2155            J23              SIDE         180.384    0.6        NO   0
OR2165-1         S2165            J83              SIDE         179.9      0.6        NO   0
OR2165-2         S2165            J83              SIDE         180.1      0.6        NO   0
OR2175-1         S2175            J111             SIDE         178.8      0.6        NO   0
OR2175-2         S2175            J111             SIDE         179        0.6        NO   0
OR2180-1         S2180            J39              SIDE         178.1      0.6        NO   0
OR2185-1         S2185            J96              SIDE         179.5      0.6        NO   0
OR2185-2         S2185            J96              SIDE         179.7      0.6        NO   0
OR2190-1         S2190            J33              SIDE         179.25     0.6        NO   0
OR2190-2         S2190            J33              SIDE         179.95     0.6        NO   0
OR2200-1         S2200            J99              SIDE         179.448    0.6        NO   0
OR2200-2         S2200            J99              SIDE         179.648    0.6        NO   0
OR2210-1         S2210            J109             SIDE         178.9      0.6        NO   0
OR2210-2         S2210            J109             SIDE         179.1      0.6        NO   0
OR2215-1         S2215            J32              SIDE         179.5      0.6        NO   0
OR2215-2         S2215            J32              SIDE         179.7      0.6        NO   0

[WEIRS]
;;               Inlet            Outlet           Weir         Crest      Disch.     Flap End      End
;;Name           Node             Node             Type         Height     Coeff.     Gate Con.     Coeff.
;;-------------- ---------------- ---------------- ------------ ---------- ---------- ---- -------- ----------
W2020            S2020            J31              TRANSVERSE   188.9      1.7        NO   0        1.3
W2030            S2030            J60              TRANSVERSE   187.3      1.7        NO   0        1.3
W2035            S2035            J30              TRANSVERSE   187.9      1.7        NO   0        1.3
W2045            S2045            J51              TRANSVERSE   185.7      1.7        NO   0        1.3
W2050            S2050            J29              TRANSVERSE   186.9      1.7        NO   0        1.3
W2055            S2055            J77              TRANSVERSE   184.7      1.7        NO   0        1.3
W2060            S2060            J28              TRANSVERSE   185.9      1.7        NO   0        1.3
W2065            S2065            J46              TRANSVERSE   188.22     1.7        NO   0        1.3
W2075            S2075            J88              TRANSVERSE   189.5      1.7        NO   0        1.3
W2080            S2080            J26              TRAPEZOIDAL  189.5      1.7        NO   0        1.3
W2085            S2085            J42              TRANSVERSE   189.75     1.7        NO   0        1.3
W2090            S2090            J16              TRANSVERSE   184.42     1.7        NO   0        1.3
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W2095            S2095            J27              TRANSVERSE   184.9      1.7        NO   0        1.3
W2100            S2100            J82              TRANSVERSE   183.92     1.7        NO   0        1.3
W2105            S2105            J13              TRANSVERSE   184.4      1.7        NO   0        1.3
W2110            S2110            J14              TRANSVERSE   183.56     1.7        NO   0        1.3
W2115            S2115            J14              TRANSVERSE   183.56     1.7        NO   0        1.3
W2125            S2125            J22              TRANSVERSE   182.6      1.7        NO   0        1.3
W2130            S2130            J27              TRANSVERSE   184.9      1.7        NO   0        1.3
W2133            S2133            J34              TRANSVERSE   185.9      1.7        NO   0        1.3
W2135            S2135            J93              TRANSVERSE   182.17     1.7        NO   0        1.3
W2140            S2140            J35              TRANSVERSE   181.7      1.7        NO   0        1.3
W2155            S2155            J23              TRANSVERSE   182.18     1.7        NO   0        1.3
W2165            S2165            J83              TRANSVERSE   181.9      1.7        NO   0        1.3
W2175            S2175            J111             TRANSVERSE   180.8      1.7        NO   0        1.3
W2185            S2185            J96              TRANSVERSE   181.5      1.7        NO   0        1.3
W2190            S2190            J33              TRANSVERSE   181.25     1.7        NO   0        1.3
W2200            S2200            J99              TRANSVERSE   181.45     1.7        NO   0        1.3
W2210            S2210            J109             TRANSVERSE   180.9      1.7        NO   0        1.3
W2215            S2215            J32              TRANSVERSE   181.5      1.7        NO   0        1.3

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels
;;-------------- ------------ ---------------- ---------- ---------- ---------- ----------
C1               RECT_CLOSED  3.25             14.8       0          0          1          15
C10              RECT_CLOSED  2.5              11         0          0          1          15
C11              IRREGULAR    1001             0          0          0          1
C12              RECT_CLOSED  3.7              14.9       0          0          1          15
C13              IRREGULAR    113              0          0          0          1
C14              Irregular    1001             0          0          0          1
C15              IRREGULAR    1001             0          0          0          1
C16              IRREGULAR    1001             0          0          0          1
C17              IRREGULAR    1001             0          0          0          1
C18              IRREGULAR    1001             0          0          0          1
C19              IRREGULAR    1001             0          0          0          1
C2               IRREGULAR    1001             0          0          0          1
C20              IRREGULAR    1001             0          0          0          1
C21              IRREGULAR    1001             0          0          0          1
C22              RECT_CLOSED  2.7              3.2        0          0          1          15
C23              IRREGULAR    LR@baseline      0          0          0          1
C24              IRREGULAR    LittleRiver@42   0          0          0          1
C25              IRREGULAR    Lauzonrd@LR      0          0          0          1
C26              IRREGULAR    Rail@LR          0          0          0          1
C27              IRREGULAR    ECRow@LR         0          0          0          1
C28              IRREGULAR    ForestGlenDR     0          0          0          1
C29              IRREGULAR    Lauzonpky@LR     0          0          0          1
C3               Irregular    55               0          0          0          1
C30              RECT_CLOSED  2.1              3          0          0          1          15
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C31              IRREGULAR    6th@9th          0          0          0          1
C32              RECT_CLOSED  3                20         0          0          1          15
C33              IRREGULAR    LT@Twinoaks      0          0          0          1
C34              RECT_CLOSED  2.4              3          0          0          1
C35              IRREGULAR    1001             0          0          0          1
C37              IRREGULAR    1001             0          0          0          1
C38              IRREGULAR    1001             0          0          0          1
C4               RECT_CLOSED  5.2              12.3       0          0          1          15
C5               IRREGULAR    1001             0          0          0          1
C6               RECT_CLOSED  2.5              7.1        0          0          1
C6000            IRREGULAR    59               0          0          0          1
C6007            IRREGULAR    59               0          0          0          1
C6015a           IRREGULAR    57               0          0          0          1
C6015b           IRREGULAR    1001             0          0          0          1
C6025a           IRREGULAR    58.7             0          0          0          1
C6030            IRREGULAR    1001             0          0          0          1
C6040            IRREGULAR    55.5             0          0          0          1
C6045a           IRREGULAR    1001             0          0          0          1
C6045b           IRREGULAR    1001             0          0          0          1
C6055a           IRREGULAR    1001             0          0          0          1
C6055d           IRREGULAR    1001             0          0          0          1
C6090a           Irregular    1002             0          0          0          1
C6090b           IRREGULAR    1002             0          0          0          1
C6090c           Irregular    1002             0          0          0          1
C6090d           IRREGULAR    1002             0          0          0          1
C6100a           IRREGULAR    1001             0          0          0          1
C6100b           IRREGULAR    1001             0          0          0          1
C6100c           IRREGULAR    1002             0          0          0          1
C6110a           IRREGULAR    1002             0          0          0          1
C6110b           IRREGULAR    1002             0          0          0          1
C6120a           Irregular    1002             0          0          0          1
C6120b           IRREGULAR    1002             0          0          0          1
C6120c           IRREGULAR    1002             0          0          0          1
C6135a           Irregular    1002             0          0          0          1
C6135b           Irregular    1002             0          0          0          1
C6145            IRREGULAR    1001             0          0          0          1
C6150            Irregular    1002             0          0          0          1
C6160a           IRREGULAR    1002             0          0          0          1
C6160b           IRREGULAR    TwinOaks742      0          0          0          1
C6170e           Irregular    TwinOaks742      0          0          0          1
C6170f           IRREGULAR    TwinOaks316      0          0          0          1
C61701           IRREGULAR    TwinOaks122      0          0          0          1
C6180a           IRREGULAR    40323            0          0          0          1
C6180b           IRREGULAR    39001            0          0          0          1
C6180c           IRREGULAR    37500            0          0          0          1
C6180d           IRREGULAR    36000            0          0          0          1
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C6180e          IRREGULAR    35002           0          0          0          1
C6190           IRREGULAR    1001            0          0          0          1
C6220           IRREGULAR    113             0          0          0          1
C7              IRREGULAR    1001            0          0          0          1
C7025           RECT_CLOSED  1.52            1.52       0          0          1          15
C7040           IRREGULAR    55.5            0          0          0          1
C7075           RECT_CLOSED  2.4             4.8        0          0          1          15
C8              RECT_CLOSED  3.5             10.9       0          0          1          15
C9              IRREGULAR    1002            0          0          0          1
CJ0.5           IRREGULAR    117             0          0          0          1
CJ0.75          IRREGULAR    117             0          0          0          1
CJ0.8           IRREGULAR    1001            0          0          0          1
CJ0.9           IRREGULAR    1001            0          0          0          1
CJ4             IRREGULAR    4               0          0          0          1
CJ4.5           IRREGULAR    113             0          0          0          1
CJ81            IRREGULAR    1001            0          0          0          1
CJ88            Irregular    1001            0          0          0          1
CJ89            IRREGULAR    1001            0          0          0          1
OR2020-1        CIRCULAR     0.2             0          0          0
OR2020-2        CIRCULAR     0.36            0          0          0
OR2030-1        CIRCULAR     0.27            0          0          0
OR2030-2        CIRCULAR     0.48            0          0          0
OR2035-1        CIRCULAR     0.23            0          0          0
OR2035-2        CIRCULAR     0.39            0          0          0
OR2045-1        CIRCULAR     0.2             0          0          0
OR2045-2        CIRCULAR     0.35            0          0          0
OR2050-1        CIRCULAR     0.25            0          0          0
OR2050-2        CIRCULAR     0.43            0          0          0
OR2055-1        CIRCULAR     0.2             0          0          0
OR2055-2        CIRCULAR     0.35            0          0          0
OR2060-1        CIRCULAR     0.27            0          0          0
OR2060-2        CIRCULAR     0.47            0          0          0
OR2065-1        CIRCULAR     0.27            0          0          0
OR2065-2        CIRCULAR     0.47            0          0          0
OR2075-1        CIRCULAR     0.27            0          0          0
OR2075-2        CIRCULAR     0.48            0          0          0
OR2080-1        CIRCULAR     0.21            0          0          0
OR2080-2        CIRCULAR     0.37            0          0          0
OR2085-1        CIRCULAR     0.25            0          0          0
OR2085-2        CIRCULAR     0.44            0          0          0
OR2090-1        CIRCULAR     0.21            0          0          0
OR2090-2        CIRCULAR     0.36            0          0          0
OR2095-1        CIRCULAR     0.27            0          0          0
OR2095-2        CIRCULAR     0.46            0          0          0
OR2100-1        CIRCULAR     0.18            0          0          0
OR2100-2        CIRCULAR     0.34            0          0          0
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OR2105-1        CIRCULAR     0.2             0          0          0
OR2105-2        CIRCULAR     0.34            0          0          0
OR2110-1        CIRCULAR     0.18            0          0          0
OR2110-2        CIRCULAR     0.31            0          0          0
OR2115-1        CIRCULAR     0.27            0          0          0
OR2115-2        CIRCULAR     0.48            0          0          0
OR2125-1        CIRCULAR     0.24            0          0          0
OR2125-2        CIRCULAR     0.42            0          0          0
OR2130-1        CIRCULAR     0.23            0          0          0
OR2130-2        CIRCULAR     0.41            0          0          0
OR2133-1        CIRCULAR     0.24            0          0          0
OR2133-2        CIRCULAR     0.42            0          0          0
OR2135-1        CIRCULAR     0.12            0          0          0
OR2135-2        CIRCULAR     0.22            0          0          0
OR2140-1        CIRCULAR     0.23            0          0          0
OR2140-2        CIRCULAR     0.4             0          0          0
OR2155-1        CIRCULAR     0.22            0          0          0
OR2155-2        CIRCULAR     0.37            0          0          0
OR2165-1        CIRCULAR     0.34            0          0          0
OR2165-2        CIRCULAR     0.58            0          0          0
OR2175-1        CIRCULAR     0.17            0          0          0
OR2175-2        CIRCULAR     0.29            0          0          0
OR2180-1        CIRCULAR     1               0          0          0
OR2185-1        CIRCULAR     0.2             0          0          0
OR2185-2        CIRCULAR     0.35            0          0          0
OR2190-1        CIRCULAR     0.23            0          0          0
OR2190-2        CIRCULAR     0.4             0          0          0
OR2200-1        CIRCULAR     0.72            0          0          0
OR2200-2        CIRCULAR     1.24            0          0          0
OR2210-1        CIRCULAR     0.19            0          0          0
OR2210-2        CIRCULAR     0.33            0          0          0
OR2215-1        CIRCULAR     0.26            0          0          0
OR2215-2        CIRCULAR     0.45            0          0          0
W2020           RECT_OPEN    1               5          5          5
W2030           RECT_OPEN    1               5          5          5
W2035           RECT_OPEN    1               5          5          5
W2045           RECT_OPEN    1               5          5          5
W2050           RECT_OPEN    1               5          5          5
W2055           RECT_OPEN    1               5          5          5
W2060           RECT_OPEN    1               5          5          5
W2065           RECT_OPEN    1               5          5          5
W2075           RECT_OPEN    1               5          5          5
W2080           TRAPEZOIDAL  1               5          5          5
W2085           RECT_OPEN    1               5          5          5
W2090           RECT_OPEN    1               5          5          5
W2095           RECT_OPEN    1               5          5          5
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W2100           RECT_OPEN    1               5          5          5
W2105           RECT_OPEN    1               5          5          5
W2110           RECT_OPEN    1               5          5          5
W2115           RECT_OPEN    1               5          5          5
W2125           RECT_OPEN    1               5          5          5
W2130           RECT_OPEN    1               5          5          5
W2133           RECT_OPEN    1               5          5          5
W2135           RECT_OPEN    1               5          5          5
W2140           RECT_OPEN    1               5          5          5
W2155           RECT_OPEN    1               5          5          5
W2165           RECT_OPEN    1               5          5          5
W2175           RECT_OPEN    1               5          5          5
W2185           RECT_OPEN    1               5          5          5
W2190           RECT_OPEN    1               5          5          5
W2200           RECT_OPEN    1               5          5          5
W2210           RECT_OPEN    1               5          5          5
W2215           RECT_OPEN    1               5          5          5

[TRANSECTS]

;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
X1 0.3               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 180.9    2605     180.5    3005.457 177.8    3009.33  177.6    3014.085 177.7    3017.186
GR 180.7    3024.75  180.8    3038.397 181.2    3438

;High-chord transect for bridge 0.35 (River: Gouin; Reach: Gouin).
;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
X1 0.35_HC           3        0        0        0.0       0.0       0        0        0
GR 181.505  2605     181.9    3018     181.502  3438

;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
X1 0.4               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181      2605     180.6    3005.457 177.9    3009.33  177.7    3014.085 177.8    3017.186
GR 180.8    3024.75  180.9    3038.397 181.3    3438

;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
X1 0.5               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.2    2605     180.8    3005.457 178.1    3009.33  177.9    3014.085 178      3017.186
GR 181      3024.75  181.1    3038.397 181.5    3438

;COPY OF DESJARDEINS DRAIN SECTION 4
NC 0.1      0.1      0.045
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```
X1 0.75              8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.7    2605     181.3    3005.457 178.6    3009.33  178.4    3014.085 178.5    3017.186
GR 181.5    3024.75  181.6    3038.397 182      3438

;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope.
NC 0.1      0.1      0.045
X1 0.8               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.4    2605     181      3005.457 178.3    3009.33  178.1    3014.085 178.2    3017.186
GR 181.2    3024.75  181.3    3038.397 181.7    3438

;COPY OF DESJARDEINS DRAIN SECTION 4 - based on 1997 SWM report, dimensions of the drain are accurate; 3 m bottom, 2:1 side slope.
NC 0.1      0.1      0.045
X1 0.9               8        3005.457 3024.75  0.0       0.0       0        0        0
GR 181.9    2605     181.5    3005.457 178.8    3009.33  178.6    3014.085 178.7    3017.186
GR 181.7    3024.75  181.8    3038.397 182.2    3438

NC 0.1      0.1      0.045
X1 1                 22       2993     3012.47  0.0       0.0       0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2990.2   180.5    2991.5   180.5    2992
GR 181.5    2993     179.6    2994.91  179.3    2995.65  178.5    2997.625 178.1    3000.09
GR 178.6    3002.54  181.9    3012.47  181.4    3140     181.5    3250     181.6    3450
GR 181.7    3650     182      4000

;High-chord transect for bridge 1.5 (River: Little River; Reach: Desjardeins to L).
NC 0.1      0.1      0.045
X1 1.5_HC            7        0        0        0.0       0.0       0        0        0
GR 184      2295     182.5    2300     182.5    2991     183.4    2991.1   183.4    3009.1
GR 182.5    3009.2   182.5    3140

NC 0.1      0.1      0.045
X1 1.6               19       2993     3012.47  0.0       0.0       0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2990.2   180.5    2991.5   180.5    2992
GR 181.5    2993     179.6    2994.91  179.3    2995.65  178.5    2997.625 178.1    3000.09
GR 178.6    3002.54  181.9    3012.47  181.4    3140     181.5    3250

NC 0.1      0.1      0.045
X1 10                21       2994     3017.014 0.0       0.0       0        0        0
GR 184      1900     184      1940     184      2000     184      2300     184      2630
GR 184      2800     184      2875     184      2949.9   182      2950     181.6    2994
GR 179.8    3001.004 179      3005.344 179.7    3010.779 181.6    3017.014 182      3050
GR 184      3050.1   184      3150     184      3300     184      3500     184      3750
GR 184      4300

;[LE: 2950][RE: 3050]
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```
NC 0.045    0.045    0.03
X1 10(orig)         19       2994     3017.014 0.0      0.0       0        0        0
GR 184      1900     182      1940     182      2000     182      2300     182      2630
GR 182      2800     182      2875     182      2950     181.6    2994     179.8    3001.004
GR 179      3005.344 179.7    3010.779 181.6    3017.014 182      3050     182      3150
GR 182      3300     182.5    3500     182.9    3750     184      4300

;Proposed Channel Section with SWM
NC 0.1      0.1      0.045
X1 1001             10       78.5     82.5     0.0      0.0       0        0        0
GR 100      63.5     99.5     63.5     97       76       97       78.5     96.7     80
GR 96.7     81       97       82.5     97       85       99.5     97.5     100      100

;ULR between Baseline Road and CP Rail
NC 0.1      0.1      0.045
X1 1002             12       86       90       0.0      0.0       0        0        0
GR 100      51       97       66       97       76       96       81       96       91
GR 95.7     92.5     95.7     93.5     96       95       96       105      97       110
GR 97       120      100      135

;COPY OF SEC 18 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 101              9        2994     3003.494 0.0      0.0       0        0        0
GR 185      2530     184.5    2800     184.3    2994     182.4    2997.988 182.4    3000.058
GR 182.5    3002.045 185.2    3003.494 184.5    3300     185      4000

;COPY OF SEC 20 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 103              7        2994     3001.563 0.0      0.0       0        0        0
GR 186.5    2594     186.1    2994     185.3    2995.615 184      2997.731 185      2999.748
GR 186.3    3001.563 186.7    3401

;COPY OF SEC 21 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 104              7        2994     3001.563 0.0      0.0       0        0        0
GR 186.5    2594     186.1    2994     185.3    2995.615 184      2997.731 185      2999.748
GR 186.3    3001.563 186.7    3401

;COPY OF SEC 22 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 105              8        2994     3005.278 0.0      0.0       0        0        0
GR 186.7    2594     186.3    2994     184.9    2998.669 184.6    3001.978 185.1    3004.914
GR 186.2    3005.278 186.3    3006     186.6    3406

;COPY OF SEC 23 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
```

```
X1 106              7        3015.126 3025.443 0.0      0.0       0        0        0
GR 186.85   2615     186.455  3015.126 185.3    3019.358 185.111  3021.732 185.3    3023.129
GR 186.4    3025.443 186.8    3425

;COPY OF SEC 24 FROM LITTLE RIVER DRAIN
NC 0.1      0.1      0.045
X1 107              7        2994     3005.566 0.0      0.0       0        0        0
GR 187.28   2594     186.88   2994     185.555  2996.426 185.225  2998.403 185.666  3001.084
GR 186.75   3005.566 187.15   3405

NC 0.1      0.1      0.045
X1 11               21       2994     3006.235 0.0      0.0       0        0        0
GR 184      1900     184      1940     184      2000     184      2300     184      2630
GR 184      2800     184      2875     184      2950     184      2993.9   182.159  2994
GR 179.562  2998.875 178.671  3000.754 179.666  3003.937 182.09   3006.235 184      3006.335
GR 184      3050     184      3150     184      3300     184      3500     184      3750
GR 184      4300

;[LE: 2994][RE: 3006.235]
NC 0.045    0.045    0.03
X1 11(orig)         19       2994     3006.235 0.0      0.0       0        0        0
GR 184      1900     182      1940     182      2000     182      2300     182      2630
GR 182      2800     182      2875     182      2950     182.159  2994     179.562  2998.875
GR 178.671  3000.754 179.666  3003.937 182.09   3006.235 182      3050     182      3150
GR 182      3300     182.5    3500     182.9    3750     184      4300

;High-chord transect for bridge 11.5 (River: Little River; Reach: Watson to Desjar).
NC 0.1      0.1      0.045
X1 11.5_HC          20       0        0        0.0      0.0       0        0        0
GR 184.3    1900     182.3    1940     181.4    2000     181.9    2300     182.2    2630
GR 182.3    2800     182.3    2875     182.3    2950     183      2994     180.1    3003.342
GR 180      3006.565 179.1    3009.925 180.1    3014.217 180.4    3015.716 183.2    3023.947
GR 182.3    3050     182.3    3150     182.3    3300     182.8    3500     183.2    3750

;From Little Tenth Concession Drain Plan and Profile Drawing
NC 0.1      0.1      0.045
X1 110              8        3001     3006.5   0.0      0.0       0        0        0
GR 186.4    2900     186.2    3000     186      3001     184.5    3003.25  184.5    3004.25
GR 186      3006.5   186.2    3007     186.4    3107

;From Plan and Profile of the Watson Drain
NC 0.1      0.1      0.045
X1 111              6        3000     3007.1   0.0      0.0       0        0        0
GR 185.2    2900     185      3000     182.5    3003.1   182.5    3004.1   185      3007.1
GR 185.2    3107
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;From Watson Drain PLan and Profile Drawing
NC 0.1      0.1      0.045
X1 112              6        3000     3004.8   0.0      0.0       0        0        0
GR 185.2    2900     185      3000     183.5    3001.9   183.5    3002.9   185      3004.8
GR 185.2    3105

;From Desjardin Drain Plan and Profile
NC 0.1      0.1      0.045
X1 113              6        3000     30010.5  0.0      0.0       0        0        0
GR 185.2    2900     185      3000     182      3004.5   182      3006     185      3010.5
GR 185.2    3110

;From Twin Oaks Buisness Park SWM Report
NC 0.1      0.1      0.045
X1 114              6        3000     3013     0.0      0.0       0        0        0
GR 185.2    2900     185      3000     182      3006     182      3007     185      3013
GR 185.2    3113

;From Profile Drawing of the Lappan Drain and McGill Outlet
NC 0.1      0.1      0.045
X1 115              6        3000     3007.5   0.0      0.0       0        0        0
GR 185.2    2900     185      3000     183      3003     185      3004.5   185      3007.5
GR 185.2    3108

;From Profile Drawing of the Lappan Drain and McGill Outlet
NC 0.1      0.1      0.045
X1 116              6        3000     3005.9   0.0      0.0       0        0        0
GR 185.2    2900     185      3000     183.5    3002.2   183.5    3003.7   185      3005.9
GR 185.2    3106

;From Plan, Profile, and Cross Section of the Gouin Drain
NC 0.1      0.1      0.045
X1 117              6        3000     3007     0.0      0.0       0        0        0
GR 185.2    2900     185      3000     183      3003     183      3004     185      3007
GR 185.2    3107

NC 0.1      0.1      0.045
X1 12               20       2994     3023.947 0.0      0.0       0        0        0
GR 184.3    1900     183      1940     183      2000     183      2300     183      2630
GR 183      2800     183      2875     183      2950     183      2994     180.1    3003.342
GR 180      3006.565 179.1    3009.925 180.1    3014.217 180.4    3015.716 183.2    3023.947
GR 183      3050     183      3150     183      3300     183      3500     183.2    3750

NC 0.1      0.1      0.045
X1 13               18       2994     3017.137 0.0      0.0       0        0        0
GR 183.9    2250     183.4    2350     183.7    2480     183.1    2620     183      2675
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GR 183      2830     183      2890     183      2950     182.835  2994     180.583  3003.421
GR 179.754  3007.359 180.617  3010.645 182.914  3017.137 183      3040     183      3240
GR 183.2    3270     183.4    3350     184      4000

;High-chord transect for bridge 13.25 (River: Little River; Reach: Baseline to Wats).
NC 0.1      0.1      0.045
X1 13.25_HC         10       0        0        0.0      0.0       0        0        0
GR 183.9    2250     183.6    2830     183.4    2950     183.895  2994     183.9    2994.4
GR 183.9    3006     183.1    3040     183.2    3270     183.4    3350     184      4000

NC 0.1      0.1      0.045
X1 13.5             18       2994     3017.137 0.0      0.0       0        0        0
GR 183.9    2250     183.4    2350     183.7    2480     183.1    2620     183      2675
GR 183      2830     182.5    2890     182.5    2950     182.835  2994     180.583  3003.421
GR 179.754  3007.359 180.617  3010.645 182.914  3017.137 182.5    3040     182.5    3240
GR 183.2    3270     183.4    3350     184      4000

NC 0.1      0.1      0.045
X1 14               19       2994     3015.242 0.0      0.0       0        0        0
GR 184.2    2250     183.7    2350     184      2480     183.4    2620     183.3    2675
GR 183.3    2830     183.3    2890     183.3    2950     183.268  2994     180.87   3001.339
GR 180.062  3004.032 180.699  3006.356 183.031  3009.792 183.047  3015.242 183.3    3040
GR 183.3    3240     183.5    3270     183.7    3350     184.3    4000

;High-chord transect for bridge 14.5 (River: Little River; Reach: Baseline to Wats).
NC 0.1      0.1      0.045
X1 14.5_HC          27       2994.2   3009.792 0.0      0.0       0        0        0
GR 184.2    2250     183.7    2350     184      2480     183.4    2620     183.3    2675
GR 183.3    2775     183.4    2850     183.1    2950     183.01   2969.787 183.268  2994
GR 183.203  2994.2   183.073  2994.597 182.9    2996.5   182.9    3004.5   182.9    3006.8
GR 182.907  3009.609 183.031  3009.792 183.047  3015.242 182.944  3025.612 183      3050
GR 183      3100     183.5    3105     183.8    3180     184.1    3370     184.4    3900
GR 184.208  3900     184.3    4000

NC 0.1      0.1      0.045
X1 15               19       2994     3015.242 0.0      0.0       0        0        0
GR 184.2    2250     183.7    2350     184      2480     183.4    2620     183.3    2675
GR 183.3    2830     183.3    2890     183.3    2950     183.268  2994     180.87   3001.339
GR 180.062  3004.032 180.699  3006.356 183.031  3009.792 183.047  3015.242 183.3    3040
GR 183.3    3240     183.5    3270     183.7    3350     184.3    4000

NC 0.1      0.1      0.045
X1 16               18       2993     3007.155 0.0      0.0       0        0        0
GR 183.8    2380     183.7    2575     183.6    2720     183.6    2825     183.5    2925
GR 183.5    2975     183.477  2993     181.681  2997.937 180.509  3001.337 180.512  3002.636
GR 183.126  3007.155 183.5    3010     183.6    3025     183.8    3075     184      3130
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GR 184      3210    184.8   3260    184.8   3450

;High-chord transect for bridge 16.5 (River: Little River; Reach: Baseline to Wats).
NC 0.1      0.1     0.045
X1 16.5_HC          12      0       0       0.0     0.0      0       0       0
GR 186.2    1000    185.2   2000    185.2   2300    184.6   2710    184.6   3003.1
GR 184.5    3006    184.6   3050    184.5   3170    184.6   3225    184.6   3700
GR 185      4000    186     5000

NC 0.1      0.1     0.045
X1 17               16      2993    3050    0.0     0.0      0       0       0
GR 185      2000    184.7   2300    184.5   2550    184.2   2710    184     2880
GR 183.7    2950    183.938 2993    180.916 2997.879 180.961 2999.52 180.944 3001.733
GR 183.6    3050    183.9   3170    184.1   3225    184.3   3425    184.6   3700
GR 185      4000

NC 0.1      0.1     0.045
X1 18               7       2999    3009.5  0.0     0.0      0       0       0
GR 185.5    2990    185.2   2999    184.3   3000    182.4   3004    181.6   3006.1
GR 182.5    3008    185.2   3009.5

NC 0.1      0.1     0.045
X1 19               9       2994    3008.988 0.0    0.0      0       0       0
GR 186.4    2899    186.2   2993    185.7   2994    185     2996.861 184.2  2999.958
GR 185      3003.863 185.9  3008.988 186.2  3009    186.4   3100

NC 0.1      0.1     0.045
X1 2                14      2925    2944.65 0.0     0.0      0       0       0
GR 184      2295    181.5   2300    181.5   2525    181.5   2700    181.5   2800
GR 181.3    2850    181.1   2925    178.6   2928.98 178     2932.22 178.5   2935.995
GR 181.6    2944.65 181.2   3075    181.4   3140    181.5   3250

NC 0.1      0.1     0.045
X1 20               8       2994    3001.563 0.0    0.0      0       0       0
GR 186.5    2893    186.3   2993    186.1   2994    185.3   2995.615 184    2997.731
GR 185      2999.748 186.3  3001.563 186.5  3101

NC 0.1      0.1     0.045
X1 21               7       2994    3001.563 0.0    0.0      0       0       0
GR 186.5    2594    186.1   2994    185.3   2995.615 184    2997.731 185    2999.748
GR 186.3    3001.563 186.7  3401

NC 0.1      0.1     0.045
X1 22               8       2994    3005.278 0.0    0.0      0       0       0
GR 186.5    2894    186.3   2994    184.9   2998.669 184.6  3001.978 185.1  3004.914
GR 186.2    3005.278 186.3  3006    186.5   3106
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NC 0.1      0.1     0.045
X1 23               7       3015.126 3025.443 0.0   0.0      0       0       0
GR 186.85   2615    186.455 3015.126 185.3  3019.358 185.111 3021.732 185.3 3023.129
GR 186.4    3025.443 186.8  3425

NC 0.1      0.1     0.045
X1 24               7       2994    3005.566 0.0    0.0      0       0       0
GR 187.28   2594    186.88  2994    185.555 2996.426 185.225 2998.403 185.666 3001.084
GR 186.75   3005.566 187.15 3405

;Upstream of Desjardins junction
NC 0.1      0.1     0.045
X1 3                18      2950    2981.62 0.0     0.0      0       0       0
GR 185      2280    182     2290    181.2   2300    181.1   2550    181     2750
GR 181      2850    181     2950    180.4   2950    178     2955.12 178     2964.396
GR 178      2977.105 181.2  2981.62 181.3   3250    181.6   3450    181.9   3750
GR 182      4000    182.4   4650    182.9   5500

NC 0.1      0.1     0.045
X1 32               13      2994    3010.776 0.0    0.0      0       0       0
GR 185.5    2893    185.3   2993    185     2994    184.726 2996.364 182.329 2999.636
GR 182.219  3000.193 183.425 3000.857 184.746 3004.58 184.978 3005.949 185.093 3007.195
GR 185.209  3010.776 185.3  3011    185.5   3111

NC 0.1      0.1     0.045
X1 33               12      2994    3007.807 0.0    0.0      0       0       0
GR 185.9    2893    185.7   2993    184.69  2994    184.46  2995.61 182.81  2999.114
GR 182.74   3000.114 182.76 3001.067 184.75 3004.397 184.92 3005.992 185.01 3007.807
GR 185.7    3008    185.9   3108

NC 0.1      0.1     0.045
X1 34               13      2994    3008.898 0.0    0.0      0       0       0
GR 185.8    2893    185.6   2993    185.21  2994    185.08  2995.761 183.56 2998.015
GR 183.49   2998.82 183.76  2999.824 185.12 3001.947 185.38 3004.25 185.48  3005.229
GR 185.54   3008.898 185.6  3009    185.8   3109

NC 0.1      0.1     0.045
X1 34001            15      2990    3010     0.0    0.0      0       0       0
GR 182      2590    181     2600    180.8   2700    180.6   2830    180     2900
GR 179.9    2990    176.7   2998    176.7   3002    179.9   3010    179.5   3018
GR 179.5    3065    180     3085    180.5   3145    180.7   3275    181     3430

NC 0.1      0.1     0.045
X1 35               14      2994    3008.799 0.0    0.0      0       0       0
GR 186      2893    185.8   2993    185.54  2994    184.41  2996.028 183.85 2996.871
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GR 183.81   2997.366 184.08 2997.831 184.35 2998.831 185.41 3000.464 185.63 3003.071
GR 185.72   3005.411 185.79 3008.799 185.8  3009    186     3109

NC 0.1      0.1     0.045
X1 35002            19      2990    3010    0.0     0.0      0       0       0
GR 183      2500    182     2590    181     2600    180.8   2700    180.6   2830
GR 180      2900    179.9   2990    176.7   2998    176.7   3002    179.9   3010
GR 179.5    3018    179.5   3065    180     3085    180.5   3145    180.7   3275
GR 181      3430    181.5   4000    182     4750    182.9   5500

;High-chord transect for bridge 35092.5 (River: Little River; Reach: Gouin to DS end).
;This is a REPEATED section.
NC 0.1      0.1     0.045
X1 35092.5_HC       13      0       0       0.0     0.0      0       0       0
GR 183      2500    180.6   2630    180.5   2830    181     2950    181.4   2983
GR 181.4    2989.2  182     2989.3  182     3013.9  181.4   3014    181.4   3018
GR 181      3065    180.9   3085    180.6   3170

;This is a REPEATED section.
NC 0.1      0.1     0.045
X1 35183            23      2992.7  3007.5  0.0     0.0      0       0       0
GR 183      2500    180.6   2630    180.5   2830    180     2900    179.4   2950
GR 179.9    2983    177.9   2989.2  177.9   2989.3  176.8   2992.7  177.4   2992.8
GR 176.8    2994.6  176.8   3000    176.8   3007.4  176.8   3007.5  179.3   3013.9
GR 179.3    3014    179.9   3015.3  179.5   3018    179.5   3065    180     3085
GR 180.5    3145    180.6   3170    180.7   3275

NC 0.1      0.1     0.045
X1 35404            11      2991    3009    0.0     0.0      0       0       0
GR 181.9    2640    180.4   2665    180.4   2800    180.4   2920    179.9   2991
GR 176.8    2996    176.8   3004    179.4   3009    179.9   3035    180.4   3175
GR 180.9    3370

NC 0.1      0.1     0.045
X1 36               12      2994    3007.976 0.0    0.0      0       0       0
GR 186.5    2893    186.3   2993    185.85  2994    184.35  2996.702 184.19 2997.51
GR 184.33   2998.331 185.76 3000.603 186.01 3002.265 186.18 3004.351 186.25 3007.976
GR 186.3    3008    186.5   3108

NC 0.1      0.1     0.045
X1 36000            11      2991    3009    0.0     0.0      0       0       0
GR 182      2640    180.5   2665    180.5   2800    180.5   2920    180     2991
GR 176.9    2996    176.9   3004    179.5   3009    180     3035    180.5   3175
GR 181      3370

NC 0.1      0.1     0.045
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X1 37               10      2994    3007.845 0.0    0.0      0       0       0
GR 186.44   2894    186.24  2994    184.35  2996.135 184.29 2996.867 184.4  2997.792
GR 185.74   2999.714 186.01 3002.317 186.16 3004.275 186.24 3007.845 186.44 3108

;This is a REPEATED section.
NC 0.1      0.1     0.045
X1 37500            11      2920.8  2956    0.0     0.0      0       0       0
GR 182.1    2640    180.6   2660    180.6   2768    180.6   2864    180.1   2920.8
GR 177      2924.8  177     2931.2  179.6   2935.2  180.1   2956    180.6   3068
GR 181.1    3224

NC 0.1      0.1     0.045
X1 38               10      2994    3007.657 0.0    0.0      0       0       0
GR 186.74   2894    186.54  2994    184.48  2996.273 184.45 2996.733 184.49 2997.226
GR 186.15   2999.756 186.35 3002.261 186.47 3004.185 186.54 3007.657 186.74 3108

NC 0.1      0.1     0.045
X1 39               9       2994    3007.859 0.0    0.0      0       0       0
GR 187.02   2894    186.82  2994    184.61  2996.225 184.53 2996.573 186.41 3000.479
GR 186.57   3002.393 186.76 3004.342 186.82 3007.859 187.02 3108

NC 0.1      0.1     0.045
X1 39001            11      2994.3  3005.8  0.0     0.0      0       0       0
GR 185      2710    180.5   2750    180.5   2825    180.5   2920    179.9   2994.3
GR 177.1    2997.3  177.1   3002.8  179.9   3005.8  180.5   3060    181     3210
GR 181      3450

NC 0.1      0.1     0.045
X1 4                9       3005.457 3024.75 0.0    0.0      0       0       0
GR 181.7    2604    181.3   3004    181     3005.457 178.3  3009.33 178.1   3014.085
GR 178.2    3017.186 181.2  3024.75 181.3   3038.397 181.7  3438

NC 0.1      0.1     0.045
X1 4.5              9       3005.457 3024.75 0.0    0.0      0       0       0
GR 181.7    2604    181.3   3004    181     3005.457 178.3  3009.33 178.1   3014.085
GR 178.2    3017.186 181.2  3024.75 181.3   3038.397 181.6  3300

NC 0.1      0.1     0.045
X1 40               10      2994    3014.272 0.0    0.0      0       0       0
GR 186.9    2893    186.7   2993    186.457 2994    185.294 2994.891 184.637 2996.625
GR 185.546  2997.316 186.637 2999.988 186.637 3014.272 186.7 3015    186.9   3115

;This is a REPEATED section.
NC 0.1      0.1     0.045
X1 40323            19      2993.9  3006.2  0.0     0.0      0       0       0
GR 182.5    2730    180.5   2750    180.5   2825    180.5   2920    179.9   2991
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GR 178.1    2993     178.1    2993.1   177.2    2993.9   177.2    2994     177.2    3000
GR 177.2    3006.1   177.2    3006.2   178      3007     178      3007.1   179.9    3009
GR 180.5    3060     181      3220     181      3300     181.5    3450

;High-chord transect for bridge 40573.5 (River: Little River; Reach: Gouin to DS end).
;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 40573.5_HC       12       0        0        0.0      0.0       0        0        0
GR 182.5    2730     182.6    2750     183      2920     183      2993     183.8    2993.1
GR 183.8    2994     183      3000     183.8    3006.1   183.8    3007     183      3007.1
GR 183      3009     181.4    3220

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 40824            18       2993.9   3006.2   0.0      0.0       0        0        0
GR 182.5    2730     180.5    2750     180.5    2825     180.5    2920     179.9    2991
GR 178.1    2993     178.1    2993.1   177.2    2993.9   177.2    2994     177.2    3000
GR 177.2    3006.1   177.2    3006.2   178      3007     178      3007.1   179.9    3009
GR 180.5    3060     181      3220     181      3300

NC 0.1      0.1      0.045
X1 41               9        2994     3001.712 0.0      0.0       0        0        0
GR 187.1    2893     186.9    2993     186.575  2994     185.38   2996.371 184.838  2996.838
GR 185.186  2999.93  186.677  3001.712 186.9    3002     187.1    3102

NC 0.1      0.1      0.045
X1 41106            16       2950.3   2965.7   0.0      0.0       0        0        0
GR 183      2860     181.5    2874     180.7    2923     181.3    2946.1   179.4    2950.3
GR 177.3    2954.36  177.3    2961.64  179.4    2965.7   181      3000     181      3045.5
GR 181      3112     181.1    3203     181.2    3308     181.5    3413     181.8    3658
GR 182.3    4148

NC 0.1      0.1      0.045
X1 42               9        2994     3002.342 0.0      0.0       0        0        0
GR 187.1    2893     186.9    2993     186.75   2994     185.322  2995.817 184.846  2997.942
GR 185.148  2999.934 186.801  3002.342 186.9    3003     187.1    3103

NC 0.1      0.1      0.045
X1 42000            16       2989     3011     0.0      0.0       0        0        0
GR 183      2860     181.5    2880     180.7    2950     181.3    2983     179.4    2989
GR 177.3    2994.8   177.3    3005.2   179.4    3011     181      3060     181      3125
GR 181      3220     181.1    3350     181.2    3500     181.5    3650     181.8    4000
GR 182.3    4700

NC 0.1      0.1      0.045
X1 43               8        2994     3001.123 0.0      0.0       0        0        0
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GR 187.2    2893     187      2993     186.941  2994     184.889  2995.821 185.528  2998.6
GR 186.865  3001.123 187      3002     187.2    3102

NC 0.1      0.1      0.045
X1 44               8        2994     3003.375 0.0      0.0       0        0        0
GR 188      2893     187.8    2993     187.6    2994     186.2    2997.03  185.6    2998.694
GR 186.2    2999.884 187.8    3003.375 188      3103

;Location of Twin Oaks Drive Structure
NC 0.1      0.1      0.045
X1 44302            20       2989.8   3010.4   0.0      0.0       0        0        0
GR 183      2660     182      2680     181      2790     180.5    2820     180.5    2840
GR 181      2860     181      2950     180      2989.8   178.9    2991.5   177.5    2993.6
GR 177.5    3006.2   178.9    3008.5   180.1    3010.4   181      3060     181      3150
GR 181.2    3250     181.2    3350     181.4    3600     181.7    4000     182.2    4600

;Location of Twin Oaks Drive Structure
;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 44323            20       2989.8   3010.4   0.0      0.0       0        0        0
GR 183      2660     182      2680     181      2790     180.5    2820     180.5    2840
GR 181      2860     181      2950     180      2989.8   178.9    2991.5   177.5    2993.6
GR 177.5    3006.2   178.9    3008.5   180.1    3010.4   181      3060     181      3150
GR 181.2    3250     181.2    3350     181.4    3600     181.7    4000     182.2    4600

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 44704            20       2989.8   3010.4   0.0      0.0       0        0        0
GR 183.2    2660     182.2    2680     181.2    2790     180.7    2820     180.7    2840
GR 181.2    2860     181.2    2950     180.2    2989.8   179.1    2991.5   177.7    2993.6
GR 177.7    3006.2   179.1    3008.5   180.3    3010.4   181.2    3060     181.2    3150
GR 181.4    3250     181.4    3350     181.6    3600     181.9    4000     182.4    4600

NC 0.1      0.1      0.045
X1 45               7        2994     2999.9   0.0      0.0       0        0        0
GR 187.7    2894     187.5    2994     185.8    2997.66  185.6    2998.61  185.8    2999.9
GR 187.5    3000     187.7    3100

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 45100            20       2989.8   3010.4   0.0      0.0       0        0        0
GR 183.4    2660     182.4    2680     181.4    2790     180.9    2820     180.9    2840
GR 181.4    2860     181.4    2950     180.4    2989.8   179.3    2991.5   177.9    2993.6
GR 177.9    3006.2   179.3    3008.5   180.5    3010.4   181.4    3060     181.4    3150
GR 181.6    3250     181.6    3350     181.8    3600     182.1    4000     182.6    4600
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NC 0.1      0.1      0.045
X1 45601            20       2989.8   3010.4   0.0      0.0       0        0        0
GR 183      2200     182      2250     181      2300     181      2825     181      2840
GR 181      2860     181      2950     180      2989.8   178.9    2991.5   178.2    2993.6
GR 178.2    3006.2   178.9    3008.5   180.1    3010.4   181      3060     181      3150
GR 181.2    3250     181.2    3350     181.4    3600     181.7    4000     182.2    4600

NC 0.1      0.1      0.045
X1 46               8        2994     3001.45  0.0      0.0       0        0        0
GR 188.3    2894     188.1    2994     186      2996.006 185.6    2996.766 185.7    2998.427
GR 187.8    3001.45  188.1    3008.62  188.3    3109

NC 0.1      0.1      0.045
X1 46102            18       2995     3005.7   0.0      0.0       0        0        0
GR 184      2240     181      2250     181      2500     181      2700     181      2850
GR 181      2992     181      2992.1   178.9    2995     178.9    2995.1   178.4    3000
GR 178.4    3005.6   178.4    3005.7   181      3008     181      3008.1   181      3025
GR 181      3200     181      3600     182      4250

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 46203            18       2995     3005.7   0.0      0.0       0        0        0
GR 184      2240     181      2250     181      2500     181      2700     181      2850
GR 181      2992     181      2992.1   178.9    2995     178.9    2995.1   178.4    3000
GR 178.4    3005.6   178.4    3005.7   181      3008     181      3008.1   181      3025
GR 181      3200     181      3600     182      4250

NC 0.1      0.1      0.045
X1 46304            18       2992.1   3008     0.0      0.0       0        0        0
GR 184      2240     181      2250     181      2500     181      2700     181      2850
GR 181      2992     181      2992.1   178.9    2995     178.9    2995.1   178.4    3000
GR 178.4    3005.6   178.4    3005.7   181      3008     181      3008.1   181      3025
GR 181      3200     181      3600     182      4250

;Upstream of Little River and Baseline junction
NC 0.1      0.1      0.045
X1 47               12       2994     3011.01  0.0      0.0       0        0        0
GR 184.79   2894     184.59   2994     184.41   2997.573 184.23   2998.34  182.32   3002
GR 181.23   3003.576 181.24   3004.4   181.22   3005.132 182.32   3006.611 184.39   3011.01
GR 184.59   3011.5   184.79   3111

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 47100            18       2766.47  2777.6   0.0      0.0       0        0        0
GR 183.9    2240     180.9    2247     180.9    2422     180.9    2562     180.9    2667
GR 180.9    2766.4   180.9    2766.47  178.8    2768.5   178.8    2768.57  178.3    2772
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GR 178.3    2775.92  178.3    2775.99  180.9    2777.6   180.9    2777.67  180.9    2789.5
GR 180.9    2912     180.9    3192     181.9    3647

NC 0.1      0.1      0.045
X1 48               11       2994     3008.902 0.0      0.0       0        0        0
GR 184.75   2894     184.55   2994     184.4    2995.178 182.28   2999.297 181.47   3001.13
GR 181.43   3001.905 181.57   3002.728 184.31   3006.35  184.41   3008.902 184.55   3009
GR 184.75   3109

NC 0.1      0.1      0.045
X1 48500            14       2992     3008     0.0      0.0       0        0        0
GR 184.9    2300     181.4    2310     181.4    2650     181.4    2810     181.2    2850
GR 180.9    2980     180.7    2992     178.2    2997     178.2    3003     180.7    3008
GR 180.9    3035     181.1    3150     181.5    3500     181.9    4000

NC 0.1      0.1      0.045
X1 49               11       2994     3016.678 0.0      0.0       0        0        0
GR 185.26   2894     185.06   2994     184.94   2997.328 184.76   2997.913 181.84   3004.357
GR 181.69   3004.762 181.81   3005.941 184.42   3008.955 184.6    3016.678 185.06   3017
GR 185.26   3117

NC 0.1      0.1      0.045
X1 49000            16       2991     3009     0.0      0.0       0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2991     178.2    2996.7   178.2    3003.3
GR 181      3009     181.2    3075     181.4    3140     181.5    3250     181.6    3450
GR 182      4000

NC 0.1      0.1      0.045
X1 5                20       2952     2971.34  0.0      0.0       0        0        0
GR 185      2280     182      2290     181.2    2300     181.1    2550     181      2750
GR 181      2850     181      2950     181.3    2952     180.1    2959.032 180      2961.837
GR 180.1    2964.914 181.2    2971.34  181      3050     181.1    3150     181.3    3250
GR 181.6    3450     181.9    3750     182      4000     182.4    4650     182.9    5500

NC 0.1      0.1      0.045
X1 50               10       2998.084 3009.343 0.0      0.0       0        0        0
GR 185.5    2894     185.3    2994     185.2    2997.059 184.9    2998.084 182.8    3003.172
GR 182.3    3004.059 181.7    3007.922 184.8    3009.343 185.3    3010     185.5    3109

;This is a REPEATED section.
NC 0.1      0.1      0.045
X1 50350            16       2991     3009     0.0      0.0       0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2991     178.2    2996.7   178.2    3003.3
GR 181      3009     181.2    3075     181.4    3140     181.5    3250     181.6    3450
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GR 182      4000

NC 0.1      0.1      0.045
X1 51               9        2994     3009.177 0.0      0.0       0        0        0
GR 185.6    2894     185.4    2994     185.3    2997.858 183.2    3001.878 182.2    3003.71
GR 183.4    3005.171 185.1    3009.177 185.4    3010     185.6    3110

NC 0.1      0.1      0.045
X1 51701            16       2991     3009     0.0      0.0       0        0        0
GR 184      2295     181.5    2300     181.5    2525     181.5    2700     181.5    2800
GR 181.3    2850     181.1    2925     181      2991     178.2    2996.7   178.2    3003.3
GR 181      3009     181.2    3075     181.4    3140     181.5    3250     181.6    3450
GR 182      4000

NC 0.1      0.1      0.045
X1 52               9        2994     3002.636 0.0      0.0       0        0        0
GR 186.7    2893     186.5    2993     185.908  2994     184.55   2996.693 184.25   2997.187
GR 184.45   2999.299 186      3002.636 186.5    3003     186.7    3103

NC 0.1      0.1      0.045
X1 53               9        100      108.721  0.0      0.0       0        0        0
GR 186.5    -1       186.3    99       185.907  100      184.55   103.803  184.331  103.804
GR 184.666  106.431  185.998  108.721  186.3    109      186.5    209

;THIS IS A COPIED SECTION OF 53
NC 0.1      0.1      0.045
X1 53.5             7        100      108.721  0.0      0.0       0        0        0
GR 188.607  0        188.407  100      187.05   103.803  186.831  103.804  187.166  106.431
GR 188.498  108.721  188.698  208.721

NC 0.1      0.1      0.045
X1 54               8        2994     3005.29  0.0      0.0       0        0        0
GR 187.5    2893     187.3    2993     186.7    2994     184.8    2996.638 184.9    3003.237
GR 186.7    3005.29  187.3    3006     187.5    3106

NC 0.1      0.1      0.045
X1 54.5             6        2994     3005.29  0.0      0.0       0        0        0
GR 188.68   2594     188.28   2994     186.58   2996.638 186.68   3003.237 188.48   3005.29
GR 188.88   3405

NC 0.1      0.1      0.045
X1 55               8        2994     3001.572 0.0      0.0       0        0        0
GR 187.1    2894     186.9    2994     184.8    2995.71  184.5    2996.6   184.7    2997.64
GR 186.7    3001.572 186.9    3002     187.1    3102

;COPIED SECTION FROM SEC 55
NC 0.1      0.1      0.045
X1 55.5             8        2994     3001.572 0.0      0.0       0        0        0
GR 187.6    2894     187.4    2994     185.3    2995.71  185      2996.6   185.2    2997.64
GR 187.2    3001.572 187.4    3002     187.6    3102

NC 0.1      0.1      0.045
X1 56               9        2994     3001.675 0.0      0.0       0        0        0
GR 188.7    2893     188.5    2993     187.66   2994     186.555  2996.174 186.09   2998.433
GR 186.66   2999.644 187.999  3001.675 188.5    3002     188.7    3102

NC 0.1      0.1      0.045
X1 57               9        2994     3008.541 0.0      0.0       0        0        0
GR 188.9    2893     188.7    2993     187.8    2994     187.088  2998.621 186.755  2999.555
GR 187      3001.32  187.911  3008.541 188.7    3010     188.9    3110

NC 0.1      0.1      0.045
X1 58               7        2994     3008.551 0.0      0.0       0        0        0
GR 188.95   2594     188.555  2994     187.7    2998.05  187.701  2999.828 187.8    3002.522
GR 188.565  3008.551 188.96   3408

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.5             9        2994     3008.551 0.0      0.0       0        0        0
GR 189.5    2894     189.3    2993     189.055  2994     188.2    2998.05  188.201  2999.828
GR 188.3    3002.522 189.065  3008.551 189.3    3009     189.5    3109

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.7             7        2994     3008.551 0.0      0.0       0        0        0
GR 194.1    2894     193.905  2994     189      2998.05  193.051  2999.828 193.15   3002.522
GR 193.915  3008.551 194.11   3108

;High-chord transect for bridge 58.74 (River: 7th Concession D; Reach: 7th Concession).
;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.74_HC         3        0        0        0.0      0.0       0        0        0
GR 194.45   2594     194.4    3347.324 194.46   3408

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.745           7        2994     3008.551 0.0      0.0       0        0        0
GR 194.45   2594     194.055  2994     189      2998.05  193.201  2999.828 193.3    3002.522
GR 194.065  3008.551 194.46   3408

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.75            7        2994     3008.551 0.0      0.0       0        0        0
GR 194.45   2594     194.055  2994     189      2998.05  193.201  2999.828 193.3    3002.522
GR 194.065  3008.551 194.46   3408

;High-chord transect for bridge 58.76 (River: 7th Concession D; Reach: 7th Concession).
;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.76_HC         3        0        0        0.0      0.0       0        0        0
GR 194.75   2594     194.6    3246.198 194.76   3408

;COPIED SECTION FROM SEC 58
NC 0.1      0.1      0.045
X1 58.8             7        2994     3008.551 0.0      0.0       0        0        0
GR 194.75   2594     194.355  2994     189      2998.05  193.501  2999.828 193.6    3002.522
GR 194.365  3008.551 194.76   3408

NC 0.1      0.1      0.045
X1 59               9        2994     2999.957 0.0      0.0       0        0        0
GR 189.4    2794     189      2993     188.333  2994     186.811  2995.149 186.666  2996.75
GR 186.788  2997.321 188.456  2999.957 189      3000     189.4    3200

NC 0.1      0.1      0.045
X1 59.5             7        2994     2999.957 0.0      0.0       0        0        0
GR 189.23   2594     188.833  2994     187.311  2995.149 187.166  2996.75  187.288  2997.321
GR 188.956  2999.957 189.36   3400

NC 0.1      0.1      0.045
X1 61               10       3.3      7.8      0.0      0.0       0        0        0
GR 187.6    -101     187.5    -1       186.65   0        185.45   3.3      185.14   4.3
GR 185.24   6.1      186.36   7.8      186.65   10       187.5    11       187.6    111

NC 0.1      0.1      0.045
X1 62               9        2994     3001.735 0.0      0.0       0        0        0
GR 187.1    2893     186.9    2993     186.869  2994     185.364  2996.285 185.013  2998.603
GR 185.033  2999.523 186.729  3001.735 186.9    3002     187.1    3102

NC 0.1      0.1      0.045
X1 63               8        2994     3001.767 0.0      0.0       0        0        0
GR 187.2    2893     187      2993     186.8    2994     185.7    2995.663 185.1    2996.67
GR 186      2999.277 187      3001.767 187.1    3102

NC 0.1      0.1      0.045
X1 64               11       2995.257 3009.048 0.0      0.0       0        0        0
GR 187.1    2894     186.9    2994     186.6    2995.257 187.1    2997.217 187.1    3000.509
GR 187.1    3003.395 185.7    3005.348 185.1    3006.053 186      3007.491 186.9    3009.048
GR 187.1    3109

NC 0.1      0.1      0.045
X1 65               7        2994     2997.22  0.0      0.0       0        0        0
GR 187.7    2894     187.5    2994     186.1    2995.73  185.6    2996.45  186.1    2996.97
GR 187.5    2997.22  187.7    3100

NC 0.1      0.1      0.045
X1 66               7        2994     3000.208 0.0      0.0       0        0        0
GR 187.6    2894     187.4    2994     186      2996.55  185.4    2997.568 185.6    2998.625
GR 187.4    3000.208 187.6    3100

NC 0.1      0.1      0.045
X1 67               8        2994     3000.472 0.0      0.0       0        0        0
GR 187.9    2894     187.7    2994     186.4    2994.948 186.3    2995.615 186.2    2997.818
GR 186.5    2998.54  187.7    3000.472 187.9    3100

NC 0.1      0.1      0.045
X1 68               9        2994     3001.43  0.0      0.0       0        0        0
GR 187.9    2894     187.7    2994     186.5    2996.165 185.8    2997.276 186      2998.469
GR 186.4    2999.253 187.5    3001.43  187.7    3002     187.9    3102

NC 0.1      0.1      0.045
X1 69               7        2994     3001.454 0.0      0.0       0        0        0
GR 188.2    2894     188      2994     186.4    2996.488 186.1    2998.293 186.6    3000.357
GR 188      3001.454 188.2    3101

;6th Concessio Drain at 9th Conc Road
NC 0.015    0.015    0.015
X1 6th@9th          4        0.0      0.0      0.0      0.0       0.0      0.0      0.0
GR 185.1    0        184.8    30       184.8    70       185      130

NC 0.1      0.1      0.045
X1 7                22       2952     2968     0.0      0.0       0        0        0
GR 185      2010     185      2020     185      2499.9   182.8    2500     181.8    2675
GR 181.8    2790     181.7    2880     181.6    2950     181.3    2952     179.3    2958.017
GR 178.8    2960.989 179.7    2963.107 180.8    2967.952 181.3    2968     181.6    2975
GR 181.8    3050     182.2    3110     185      3110.1   185      3200     185      3350
GR 185      3600     185      4000

;[LE: 2500][RE: 3110]
NC 0.045    0.045    0.03
X1 7(orig)          20       2952     2968     0.0      0.0       0        0        0
GR 185      2010     182.2    2020     182.8    2500     181.8    2675     181.8    2790
GR 181.7    2880     181.6    2950     181.3    2952     179.3    2958.017 178.8    2960.989
GR 179.7    2963.107 180.8    2967.952 181.3    2968     181.6    2975     181.8    3050
GR 182.2    3110     181.8    3200     181.7    3350     181.7    3600     182.1    4000
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NC 0.1      0.1      0.045
X1 70                6        2994     3002.143 0.0      0.0      0        0        0
GR 188.3    2894     188.1    2994     186.2    2997.78  186.5    2998.886 188.1    3002.143
GR 188.3    3102

NC 0.1      0.1      0.045
X1 71                7        2994     3003.477 0.0      0.0      0        0        0
GR 188.5    2893     188.3    2993     187.7    2994     186.3    2998.576 187.7    3003.477
GR 188.3    3004     188.5    3103

NC 0.1      0.1      0.045
X1 72                9        2994     3002.905 0.0      0.0      0        0        0
GR 188.8    2893     188.6    2993     187.7    2994     186.7    2997.097 186.6    2998.564
GR 186.9    3000.554 187.7    3002.905 188.6    3003     188.8    3103

NC 0.1      0.1      0.045
X1 73                9        2994     3003.75  0.0      0.0      0        0        0
GR 188.8    2893     188.6    2993     187.7    2994     186.8    2995.924 186.6    2997.34
GR 187      3000.72  187.7    3003.75  188.6    3004     188.8    3104

NC 0.1      0.1      0.045
X1 74                8        2990.574 2995.317 0.0      0.0      0        0        0
GR 189.1    2890     188.9    2990     188.6    2990.574 187.6    2991.996 187      2993.222
GR 187.6    2994     188.9    2995.317 189.1    3095

NC 0.1      0.1      0.045
X1 75                10       2994     2997.53  0.0      0.0      0        0        0
GR 189.9    2893     189.7    2993     188.6    2994     187.8    2994.993 187.7    2995.466
GR 187.7    2995.627 187.9    2996.195 188.6    2997.53  189.7    2998     189.9    3097

NC 0.1      0.1      0.045
X1 76                9        2994     2997.74  0.0      0.0      0        0        0
GR 189.9    2893     189.7    2993     188.6    2994     187.9    2995.14  187.7    2996.1
GR 187.8    2996.67  188.6    2997.74  189.7    2998     189.9    3098

NC 0.1      0.1      0.045
X1 77                9        2994     2997.89  0.0      0.0      0        0        0
GR 189.8    2893     189.6    2993     188.7    2994     187.6    2996.208 187.8    2997.425
GR 187.9    2997.477 188.7    2997.89  189.6    2998     189.8    3098

NC 0.1      0.1      0.045
X1 79                10       2994     3000.879 0.0      0.0      0        0        0
GR 189      2893     188.8    2993     188.1    2994     186.9    2997.613 186.5    2998.752
GR 186.9    2999.409 188.2    3000.308 188.1    3000.879 188.8    3001     189      3101
```

```
NC 0.1      0.1      0.045
X1 8                 19       2994     3015.8   0.0      0.0      0        0        0
GR 184.2    2000     182      2035     181.5    2250     181.5    2500     181.7    2700
GR 181.9    2850     181.6    2950     181.6    2994     179.6    3001.177 179.8    3007.135
GR 179.8    3009.548 181.4    3015.8   181.5    3050     181.5    3100     182      3105
GR 182.3    3180     182.6    3370     182.7    3600     182.9    3900

NC 0.1      0.1      0.045
X1 80                9        2994     3000.407 0.0      0.0      0        0        0
GR 189      2893     188.8    2993     188.1    2994     187.1    2996.175 186.5    2997.781
GR 187.1    2998.638 188.1    3000.407 188.8    3001     189      3101

NC 0.1      0.1      0.045
X1 81                7        2994     2999.293 0.0      0.0      0        0        0
GR 188.9    2594     188.5    2994     187.7    2996.045 187.4    2996.891 187.6    2997.571
GR 188.5    2999.293 188.9    3399

NC 0.1      0.1      0.045
X1 84                7        2994     2998.552 0.0      0.0      0        0        0
GR 188.8    2594     188.4    2994     187.7    2995.499 187.5    2995.925 187.6    2996.651
GR 188.4    2998.552 188.8    3398

NC 0.1      0.1      0.045
X1 85                7        2994     3001.561 0.0      0.0      0        0        0
GR 188.9    2594     188.5    2994     186.6    2994.908 187.1    2997.794 187.6    2998.696
GR 188.5    3001.561 188.9    3401

NC 0.1      0.1      0.045
X1 86                9        2994     2999.067 0.0      0.0      0        0        0
GR 189.5    2893     189.3    2993     188.711  2994     187      2994.034 187.255  2994.987
GR 188.45   2996.398 188.711  2999.067 189.3    3000     189.5    3100

NC 0.1      0.1      0.045
X1 87                12       2994     2997.967 0.0      0.0      0        0        0
GR 189.3    2893     189.1    2993     188.336  2994     188.366  2994.583 187.525  2995.032
GR 187.401  2995.783 186.791  2995.793 187.611  2997.225 188.362  2997.446 188.35   2997.967
GR 189.1    2999     189.3    3099

NC 0.1      0.1      0.045
X1 88                9        2994     2998.364 0.0      0.0      0        0        0
GR 190      2893     189.8    2993     188.599  2994     187.755  2995.171 187.546  2996.074
GR 187.711  2996.87  188.535  2998.364 189.8    2999     190      3098

NC 0.1      0.1      0.045
X1 89                9        2994     3000.356 0.0      0.0      0        0        0
GR 190.2    2893     190      2993     189.09   2994     187.888  2995.606 187.555  2996.413
```

```
GR 187.75   2998.017 189.25   3000.356 190      3001     190.2    3101

;High-chord transect for bridge 7.5 (River: Little River; Reach: Watson to Desjar).
NC 0.1      0.1      0.045
X1 8A                21       2994     3015.8   0.0      0.0      0        0        0
GR 184.2    2000     184.2    2035     184.2    2250     184.2    2500     184.2    2700
GR 184.2    2850     184.2    2984.9   182.5    2985     181.6    2994     179.6    3001.177
GR 179.8    3007.135 179.8    3009.548 181.4    3015.8   182.5    3020     184.2    3020.1
GR 184.2    3100     184.2    3105     184.2    3180     184.2    3370     184.2    3600
GR 184.2    3900

;[LE: 2985][RE: 3020]
NC 0.045    0.045    0.03
X1 8A(orig)          19       2994     3015.8   0.0      0.0      0        0        0
GR 184.2    2000     182.5    2035     182.5    2250     182.5    2500     182.5    2700
GR 182.5    2850     182.5    2985     181.6    2994     179.6    3001.177 179.8    3007.135
GR 179.8    3009.548 181.4    3015.8   182.5    3020     182.5    3100     182.5    3105
GR 182.5    3180     182.6    3370     182.7    3600     182.9    3900

NC 0.1      0.1      0.045
X1 9                 21       2994     3015.387 0.0      0.0      0        0        0
GR 184.2    2000     184.2    2035     184.2    2250     184.2    2500     184.2    2700
GR 184.2    2850     184.2    2949.9   182      2950     181.7    2994     179.6    3000.144
GR 178.8    3003.25  180.4    3009.303 181.6    3015.387 182      3050     184.2    3050.1
GR 184.2    3100     184.2    3105     184.2    3180     184.2    3370     184.2    3600
GR 184.2    3900

;[LE: 2950][RE: 3050]
NC 0.045    0.045    0.03
X1 9(orig)           19       2994     3015.387 0.0      0.0      0        0        0
GR 184.2    2000     182      2035     182      2250     182      2500     182      2700
GR 182      2850     182      2950     181.7    2994     179.6    3000.144 178.8    3003.25
GR 180.4    3009.303 181.6    3015.387 182      3050     182      3100     182      3105
GR 182.3    3180     182.6    3370     182.7    3600     182.9    3900

NC 0.1      0.1      0.045
X1 90                10       2994     3000.348 0.0      0.0      0        0        0
GR 190.5    1594     189.99   2094     189.49   2594     189.087  2994     187.777  2995.854
GR 187.9    2998.618 189.001  3000.348 189.4    3400     189.9    3900     190.4    4400

;EC Row at Little River
NC 0.015    0.015    0.015
X1 ECRow@LR          22       0.0      0.0      0.0      0.0      0.0      0.0      0.0
GR 182.5    2730     182.6    2750     182.8    2825     183      2920     183      2991
GR 183      2993     183      2993.1   183      2993.9   183      2994     183      3000
GR 183      3006.1   183      3006.2   183      3007     183      3007.1   183      3009
```

```
GR 182.6    3060     181.4    3220     182      3300     182      3450     182      4000
GR 182.1    4700     182.9    5500

;Forest Glen Drive
NC 0.015    0.015    0.015
X1 ForestGlenDR     27       0.0      0.0      0.0      0.0      0.0      0.0      0.0
GR 183      2500     180.6    2630     180.5    2830     180.8    2900     181      2950
GR 181.4    2983     181.4    2989.2   182      2989.3   182      2992.7   182      2992.8
GR 182      2994.6   182      3000     182      3007.4   182      3007.5   182      3013.9
GR 181.4    3014     181.4    3015.3   181.4    3018     181      3065     180.9    3085
GR 180.7    3145     180.6    3170     180.7    3275     181      3430     181.5    4000
GR 182      4750     182.9    5500

;Lauzon Parkway at Little River
NC 0.015    0.015    0.015
X1 Lauzonpky@LR     28       0.0      0.0      0.0      0.0      0.0      0.0      0.0
GR 183      1350     183      1760     182.4    1840     182.5    2230     182.7    2500
GR 182.7    2700     182.9    2880     183      2920     183.3    2950     183.9    2984.4
GR 185.1    2984.5   185.1    2988     185.1    2994.6   185.1    2994.7   185.1    2996.8
GR 185.1    3000     185.1    3003.8   185.1    3005.4   185.1    3005.5   185.1    3012
GR 185.1    3015.9   183.9    3016     183.4    3050     182.8    3150     182.7    3200
GR 183      3290     183.2    3330     183.4    3400

;Little River at Lauzon road
NC 0.015    0.015    0.015
X1 Lauzonrd@LR      26       0.0      0.0      0.0      0.0      0.0      0.0      0.0
GR 185      2010     182      2020     182      2500     181.8    2530     181.9    2675
GR 181.9    2790     181.9    2880     182      2950     182      2992.4   182.2    2992.5
GR 182.2    2995     182.2    2995.1   182.2    2996.1   182.2    3000.4   182.2    3003.9
GR 182.2    3005.9   182.2    3006     182.2    3007.8   182      3008.4   182      3050
GR 182      3110     182.1    3200     182.3    3275     182.3    3430     182.6    3600
GR 181.9    4100

;Little River at County road 42
NC 0.015    0.015    0.015
X1 LittleRiver@42   19       0.0      0.0      0.0      0.0      0.0      0.0      0.0
GR 183.9    2250     183.9    2350     183.8    2480     183.7    2620     183.7    2675
GR 183.6    2830     183.5    2890     183.4    2950     183.9    2994.4   183.9    2996
GR 183.9    2996.1   183.9    3003     183.9    3003.1   183.9    3006     183.1    3040
GR 183.2    3240     183.2    3270     183.4    3350     184      4000

;Little River at baseline Road
NC 0.015    0.015    0.015
X1 LR@baseline      19       0.0      0.0      0.0      0.0      0.0      0.0      0.0
GR 185.2    2000     185.2    2300     184.8    2550     184.6    2710     184.6    2880
GR 184.6    2950     184.6    2994.3   184.6    2996.9   184.6    2997     184.6    3000
```

```
GR 184.6    3003     184.6    3003.1   184.5    3006     184.6    3050     184.5    3170
GR 184.6    3225     184.6    3425     184.6    3700     185      4000

;Little River at Twin Oaks
NC 0.015    0.015    0.015
X1 LT@Twinoaks      4        0.0      0.0      0.0       0.0       0.0       0.0       0.0
GR 181      0        180.8    60       180.8    80       181      160

;Rail Line at Little River
NC 0.015    0.015    0.015
X1 Rail@LR          28       0.0      0.0      0.0       0.0       0.0       0.0       0.0
GR 184      2295     182.5    2300     182.5    2525     182.5    2700     182.5    2800
GR 182.5    2850     182.5    2925     182.5    2990.2   182.5    2991     183.4    2991.1
GR 183.4    2992.6   183.4    2992.7   183.4    2996.6   183.4    3002.1   183.4    3003.4
GR 183.4    3007.4   183.4    3007.5   183.4    3008.3   183.4    3009.1   182.5    3009.2
GR 182.5    3075     182.5    3140     182.5    3250     182.6    3450     182.9    3650
GR 183      4000     183      4650     183      5500

;Cross Section from Twin Oak Buisness Park Station 0+122
NC 0.1      0.1      0.045
X1 TwinOaks122      17       38       39.5     0.0       0.0       0         0         0
GR 181      4        181      5.5      179.4    13.5     179.4    17.5     178.2    22.5
GR 178.2    25.5     177.2    30.5     177.2    36.5     177.2    38       177      38.5
GR 177.2    39.5     177.2    41.3     179      49       179      51.5     180.8    61.5
GR 181      67.5     181      69

;Twin Oaks Buiness Park Station 0+316
NC 0.1      0.1      0.045
X1 TwinOaks316      17       43.5     45       0.0       0.0       0         0         0
GR 181      0        181      7        178.5    17       178.5    29       178.5    33.5
GR 178.5    35       177.4    39       177.4    43.5     177      44       177.4    45
GR 177.4    53       178.5    57       178.5    58.5     178.5    63       178.5    75
GR 181      85       181      92

;Twin Oak Buisiness Park Station 0+742
NC 0.1      0.1      0.045
X1 TwinOaks742      17       32       33.5     0.0       0.0       0         0         0
GR 181.6    2.5      181.6    4        179.9    12       179.8    17.5     178.8    21.5
GR 178.7    24       177.9    29       177.9    32       177.6    32.5     177.9    33.5
GR 177.9    36.8     179.6    44.5     179.6    47       181      54.5     181.1    55
GR 181.6    63       181.6    64.5

[LOSSES]
;;Link           Inlet      Outlet     Average    Flap Gate
;;-------------- ---------- ---------- ---------- ----------
C1               0.5        1          0          NO
C10              0.5        1          0          NO
C11              0.1        0.3        0          NO
C12              0.5        1          0          NO
C14              0.1        0.3        0          NO
C15              0.1        0.3        0          NO
C18              0.1        0.3        0          NO
C19              0.1        0.3        0          NO
C2               0.3        0.5        0          NO
C20              0.1        0.3        0          NO
C21              0.1        0.3        0          NO
C22              0.5        1          0          NO
C23              0.3        0.5        0          NO
C24              0.3        0.5        0          NO
C25              0.3        0.5        0          NO
C27              0.3        0.5        0          NO
C28              0.3        0.5        0          NO
C29              0.3        0.5        0          NO
C3               0.1        0.3        0          NO
C30              0.5        1          0          NO
C31              0.3        0.5        0          NO
C32              0.5        1          0          NO
C33              0.3        0.5        0          NO
C35              0.3        0.5        0          NO
C4               0.5        1          0          NO
C5               0.1        0.3        0          NO
C6               0.5        1          0          NO
C6000            0.1        0.3        0          NO
C6007            0.3        0.5        0          NO
C6015a           0.1        0.3        0          NO
C6015b           0.1        0.3        0          NO
C6025a           0.3        0.5        0          NO
C6030            0.1        0.3        0          NO
C6040            0.3        0.5        0          NO
C6045a           0.1        0.3        0          NO
C6045b           0.3        0.5        0          NO
C6055a           0.3        0.5        0          NO
C6055d           0.3        0.5        0          NO
C6090a           0.3        0.5        0          NO
C6090b           0.1        0.3        0          NO
C6090c           0.1        0.3        0          NO
C6090d           0.3        0.5        0          NO
C6100a           0.1        0.3        0          NO
C6100b           0.3        0.5        0          NO
C6100c           0.3        0.5        0          NO
C6110a           0.3        0.5        0          NO
C6110b           0.3        0.5        0          NO
C6120a           0.1        0.3        0          NO
C6120b           0.3        0.5        0          NO
C6120c           0.3        0.5        0          NO
C6135a           0.1        0.3        0          NO
C6135b           0.1        0.3        0          NO
C6145            0.1        0.3        0          NO
C6150            0.1        0.3        0          NO
C6160a           0.3        0.5        0          NO
C6160b           0.3        0.5        0          NO
C6170e           0.3        0.5        0          NO
C6170f           0.3        0.5        0          NO
C61701           0.3        0.5        0          NO
C6180a           0.3        0.5        0          NO
C6180b           0.1        0.3        0          NO
C6180c           0.1        0.3        0          NO
C6180d           0.3        0.5        0          NO
C6180e           0.3        0.5        0          NO
C6190            0.1        0.3        0          NO
C6220            0.3        0.5        0          NO
C7               0.3        0.5        0          NO
C7025            0.5        1          0          NO
C7040            0.5        1          0          NO
C7075            0.5        1          0          NO
C8               0.5        1          0          NO
C9               0.3        0.5        0          NO
CJ0.5            0.1        0.3        0          NO
CJ0.75           0.1        0.3        0          NO
CJ0.8            0.1        0.3        0          NO
CJ0.9            0.1        0.3        0          NO
CJ4              0.1        0.3        0          NO
CJ4.5            0.1        0.3        0          NO
CJ81             0.3        0.5        0          NO
CJ88             0.1        0.3        0          NO
CJ89             0.1        0.3        0          NO

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
Pump2165         Pump4      0          0
Pump2165                    0.01       0.83
Pump2165                    10         0.83
Pump2165                    1000       0.83

;Bridge and crossing at EC Row - culvert size 6 x 1.8 according to 1997 SWM report
;Original area=20.065, shape curve area=20.069
0.35             Shape      0          0
0.35                        0.043      2.382
0.35                        0.087      3.525
0.35                        0.336      4.512
0.35                        0.577      4.568
0.35                        1          2.609

;Original area=38.697, shape curve area=38.7
1.5              Shape      0          0
1.5                         0.108      1.196
1.5                         0.135      1.395
1.5                         0.324      2.431
1.5                         0.405      2.875
1.5                         0.572      3.543
1.5                         0.838      3.81
1.5                         0.919      3.973
1.5                         1          3.973

;Original area=23.477, shape curve area=23.473
11.5             Shape      0          0
11.5                        0.018      0.578
11.5                        0.771      3.002
11.5                        0.86       3.002
11.5                        0.888      2.708
11.5                        0.916      1.964
11.5                        1          0

;Original area=6.498, shape curve area=6.5
13.25            Shape      0          0
13.25                       0.26       1.188
13.25                       0.292      1.313
13.25                       1          1.181

;Original area=6.024, shape curve area=6.025
14.5             Shape      0          0
14.5                        0.414      1.38
14.5                        1          3.173

;Original area=8.915, shape curve area=8.917
16.5             Shape      0          0
16.5                        0.072      1.309
16.5                        0.713      1.145
16.5                        1          1.04

;Bridge #6-Forest Glade Drive
;Original area=47.004, shape curve area=47.001
35092.5          Shape      0          3.765
```

```
35092.5                     0.174      4.287
35092.5                     0.176      4.295
35092.5                     0.912      4.294
35092.5                     0.941      3.039
35092.5                     1          0

;Bridge #7-Hwy 2
;Original area=62.934, shape curve area=62.943
40573.5          Shape      0          2.242
40573.5                     0.926      2.241
40573.5                     1          0

;Original area=7.936, shape curve area=7.936
7.5              Shape      0          0
7.5                         0.143      4.768
7.5                         0.144      5.246
7.5                         0.158      5.301
7.5                         0.714      5.286
7.5                         0.857      2.786
7.5                         0.858      1.5
7.5                         1          0

;Control upstream flows to 2-year predevelopment flow
5002             Storage    0          100000
5002                        2          100000

5005             Storage    0          25000
5005                        2          25000

5020             Storage    0          25616
5020                        2          35198

5030             Storage    0          34160
5030                        2          46370

5035             Storage    0          29698
5035                        2          40536

5045             Storage    0          16735
5045                        2          23584

5050             Storage    0          27179
5050                        2          37242

5055             Storage    0          19063
5055                        2          26629
```

```
5060             Storage    0          37211
5060                        2          50360

5065             Storage    0          51900
5065                        2          69569

5070             Storage    0          33882
5070                        2          46007

5073             Storage    0          28724
5073                        2          39262

5075             Storage    0          32728
5075                        2          44498

5080             Storage    0          8201
5080                        2          12425

5085             Storage    0          22812
5085                        2          31531

5087             Storage    0          50395
5087                        2          67601

5090             Storage    0          15066
5090                        2          21402

5095             Storage    0          32809
5095                        2          44604

5100             Storage    0          16388
5100                        2          23130

5105             Storage    0          17765
5105                        2          24931

5110             Storage    0          15140
5110                        2          21499

5115             Storage    0          26706
5115                        2          36623

5125             Storage    0          29557
5125                        2          40351
```

```
5130             Storage    0          37637
5130                        2          50917

5133             Storage    0          35074
5133                        2          47566

5135             Storage    0          6656
5135                        2          10403

5140             Storage    0          17819
5140                        2          25002

5145             Storage    0          33029
5145                        2          44892

5155             Storage    0          22536
5155                        2          31170

5165             Storage    0          54873
5165                        2          73457

5175             Storage    0          17966
5175                        2          25194

;Control Twin Oaks flows to existing rates
5180             Storage    0          20000
5180                        2          20000

5185             Storage    0          20799
5185                        2          28899

5190             Storage    0          26315
5190                        2          36112

5200             Storage    0          181716
5200                        2          239329

5210             Storage    0          21243
5210                        2          29480

5215             Storage    0          35210
5215                        2          47744

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
```

```
100yr-24hr-chi   12/14/2011 0:00:00    0
100yr-24hr-chi   12/14/2011 0:10:00    0.66
100yr-24hr-chi   12/14/2011 0:20:00    0.67
100yr-24hr-chi   12/14/2011 0:30:00    0.69
100yr-24hr-chi   12/14/2011 0:40:00    0.7
100yr-24hr-chi   12/14/2011 0:50:00    0.72
100yr-24hr-chi   12/14/2011 1:00:00    0.73
100yr-24hr-chi   12/14/2011 1:10:00    0.75
100yr-24hr-chi   12/14/2011 1:20:00    0.77
100yr-24hr-chi   12/14/2011 1:30:00    0.78
100yr-24hr-chi   12/14/2011 1:40:00    0.8
100yr-24hr-chi   12/14/2011 1:50:00    0.82
100yr-24hr-chi   12/14/2011 2:00:00    0.84
100yr-24hr-chi   12/14/2011 2:10:00    0.87
100yr-24hr-chi   12/14/2011 2:20:00    0.89
100yr-24hr-chi   12/14/2011 2:30:00    0.91
100yr-24hr-chi   12/14/2011 2:40:00    0.94
100yr-24hr-chi   12/14/2011 2:50:00    0.97
100yr-24hr-chi   12/14/2011 3:00:00    1
100yr-24hr-chi   12/14/2011 3:10:00    1.03
100yr-24hr-chi   12/14/2011 3:20:00    1.07
100yr-24hr-chi   12/14/2011 3:30:00    1.1
100yr-24hr-chi   12/14/2011 3:40:00    1.14
100yr-24hr-chi   12/14/2011 3:50:00    1.19
100yr-24hr-chi   12/14/2011 4:00:00    1.23
100yr-24hr-chi   12/14/2011 4:10:00    1.28
100yr-24hr-chi   12/14/2011 4:20:00    1.34
100yr-24hr-chi   12/14/2011 4:30:00    1.4
100yr-24hr-chi   12/14/2011 4:40:00    1.47
100yr-24hr-chi   12/14/2011 4:50:00    1.54
100yr-24hr-chi   12/14/2011 5:00:00    1.62
100yr-24hr-chi   12/14/2011 5:10:00    1.71
100yr-24hr-chi   12/14/2011 5:20:00    1.82
100yr-24hr-chi   12/14/2011 5:30:00    1.94
100yr-24hr-chi   12/14/2011 5:40:00    2.07
100yr-24hr-chi   12/14/2011 5:50:00    2.23
100yr-24hr-chi   12/14/2011 6:00:00    2.42
100yr-24hr-chi   12/14/2011 6:10:00    2.64
100yr-24hr-chi   12/14/2011 6:20:00    2.92
100yr-24hr-chi   12/14/2011 6:30:00    3.25
100yr-24hr-chi   12/14/2011 6:40:00    3.68
100yr-24hr-chi   12/14/2011 6:50:00    4.25
100yr-24hr-chi   12/14/2011 7:00:00    5.03
100yr-24hr-chi   12/14/2011 7:10:00    6.18
100yr-24hr-chi   12/14/2011 7:20:00    8
100yr-24hr-chi   12/14/2011 7:30:00    11.31
```

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100yr-24hr-chi	12/14/2011 8:20:00	33.95
100yr-24hr-chi	12/14/2011 8:30:00	21.97
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100yr-24hr-chi	12/14/2011 8:50:00	12.47
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100yr-24hr-chi	12/14/2011 9:10:00	8.59
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100yr-24hr-chi	12/14/2011 9:50:00	5.27
100yr-24hr-chi	12/14/2011 10:00:00	4.81
100yr-24hr-chi	12/14/2011 10:10:00	4.42
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100yr-24hr-chi	12/14/2011 10:30:00	3.81
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100yr-24hr-chi	12/14/2011 12:40:00	2.04
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100yr-24hr-chi	12/14/2011 13:40:00	1.69
100yr-24hr-chi	12/14/2011 13:50:00	1.65
100yr-24hr-chi	12/14/2011 14:00:00	1.6
100yr-24hr-chi	12/14/2011 14:10:00	1.56
100yr-24hr-chi	12/14/2011 14:20:00	1.52
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100yr-24hr-chi	12/14/2011 14:40:00	1.45
100yr-24hr-chi	12/14/2011 14:50:00	1.42
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100yr-24hr-chi	12/14/2011 15:10:00	1.35

100yr-24hr-chi	12/14/2011 15:20:00	1.33
100yr-24hr-chi	12/14/2011 15:30:00	1.3
100yr-24hr-chi	12/14/2011 15:40:00	1.27
100yr-24hr-chi	12/14/2011 15:50:00	1.25
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100yr-24hr-chi	12/14/2011 16:20:00	1.18
100yr-24hr-chi	12/14/2011 16:30:00	1.15
100yr-24hr-chi	12/14/2011 16:40:00	1.13
100yr-24hr-chi	12/14/2011 16:50:00	1.11
100yr-24hr-chi	12/14/2011 17:00:00	1.09
100yr-24hr-chi	12/14/2011 17:10:00	1.08
100yr-24hr-chi	12/14/2011 17:20:00	1.06
100yr-24hr-chi	12/14/2011 17:30:00	1.04
100yr-24hr-chi	12/14/2011 17:40:00	1.02
100yr-24hr-chi	12/14/2011 17:50:00	1.01
100yr-24hr-chi	12/14/2011 18:00:00	0.99
100yr-24hr-chi	12/14/2011 18:10:00	0.98
100yr-24hr-chi	12/14/2011 18:20:00	0.96
100yr-24hr-chi	12/14/2011 18:30:00	0.95
100yr-24hr-chi	12/14/2011 18:40:00	0.94
100yr-24hr-chi	12/14/2011 18:50:00	0.92
100yr-24hr-chi	12/14/2011 19:00:00	0.91
100yr-24hr-chi	12/14/2011 19:10:00	0.9
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100yr-24hr-chi	12/14/2011 19:40:00	0.86
100yr-24hr-chi	12/14/2011 19:50:00	0.85
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100yr-24hr-chi	12/14/2011 20:10:00	0.83
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100yr-24hr-chi	12/14/2011 20:30:00	0.81
100yr-24hr-chi	12/14/2011 20:40:00	0.8
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100yr-24hr-chi	12/14/2011 21:00:00	0.78
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100yr-24hr-chi	12/14/2011 21:20:00	0.76
100yr-24hr-chi	12/14/2011 21:30:00	0.75
100yr-24hr-chi	12/14/2011 21:40:00	0.75
100yr-24hr-chi	12/14/2011 21:50:00	0.74
100yr-24hr-chi	12/14/2011 22:00:00	0.73
100yr-24hr-chi	12/14/2011 22:10:00	0.72
100yr-24hr-chi	12/14/2011 22:20:00	0.71
100yr-24hr-chi	12/14/2011 22:30:00	0.71
100yr-24hr-chi	12/14/2011 22:40:00	0.7
100yr-24hr-chi	12/14/2011 22:50:00	0.69

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100yr-24hr-chi	12/14/2011 23:10:00	0.68
100yr-24hr-chi	12/14/2011 23:20:00	0.67
100yr-24hr-chi	12/14/2011 23:30:00	0.67
100yr-24hr-chi	12/14/2011 23:40:00	0.66
100yr-24hr-chi	12/14/2011 23:50:00	0.65
100yr-24hr-chi	12/15/2011 0:00:00	0.65

100yr-24hr-chi+	12/14/2011 0:00:00	0
100yr-24hr-chi+	12/14/2011 0:10:00	0.792
100yr-24hr-chi+	12/14/2011 0:20:00	0.804
100yr-24hr-chi+	12/14/2011 0:30:00	0.828
100yr-24hr-chi+	12/14/2011 0:40:00	0.84
100yr-24hr-chi+	12/14/2011 0:50:00	0.864
100yr-24hr-chi+	12/14/2011 1:00:00	0.876
100yr-24hr-chi+	12/14/2011 1:10:00	0.9
100yr-24hr-chi+	12/14/2011 1:20:00	0.924
100yr-24hr-chi+	12/14/2011 1:30:00	0.936
100yr-24hr-chi+	12/14/2011 1:40:00	0.96
100yr-24hr-chi+	12/14/2011 1:50:00	0.984
100yr-24hr-chi+	12/14/2011 2:00:00	1.008
100yr-24hr-chi+	12/14/2011 2:10:00	1.044
100yr-24hr-chi+	12/14/2011 2:20:00	1.068
100yr-24hr-chi+	12/14/2011 2:30:00	1.092
100yr-24hr-chi+	12/14/2011 2:40:00	1.128
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100yr-24hr-chi+	12/14/2011 3:30:00	1.32
100yr-24hr-chi+	12/14/2011 3:40:00	1.368
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100yr-24hr-chi+	12/14/2011 4:20:00	1.608
100yr-24hr-chi+	12/14/2011 4:30:00	1.68
100yr-24hr-chi+	12/14/2011 4:40:00	1.764
100yr-24hr-chi+	12/14/2011 4:50:00	1.848
100yr-24hr-chi+	12/14/2011 5:00:00	1.944
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100yr-24hr-chi+	12/14/2011 5:20:00	2.184
100yr-24hr-chi+	12/14/2011 5:30:00	2.328
100yr-24hr-chi+	12/14/2011 5:40:00	2.484
100yr-24hr-chi+	12/14/2011 5:50:00	2.676
100yr-24hr-chi+	12/14/2011 6:00:00	2.904
100yr-24hr-chi+	12/14/2011 6:10:00	3.168

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100yr-24hr-chi+	12/14/2011 6:30:00	3.9
100yr-24hr-chi+	12/14/2011 6:40:00	4.416
100yr-24hr-chi+	12/14/2011 6:50:00	5.1
100yr-24hr-chi+	12/14/2011 7:00:00	6.036
100yr-24hr-chi+	12/14/2011 7:10:00	7.416
100yr-24hr-chi+	12/14/2011 7:20:00	9.6
100yr-24hr-chi+	12/14/2011 7:30:00	13.572
100yr-24hr-chi+	12/14/2011 7:40:00	22.74
100yr-24hr-chi+	12/14/2011 7:50:00	60.168
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100yr-24hr-chi+	12/14/2011 8:10:00	79.692
100yr-24hr-chi+	12/14/2011 8:20:00	40.74
100yr-24hr-chi+	12/14/2011 8:30:00	26.364
100yr-24hr-chi+	12/14/2011 8:40:00	19.176
100yr-24hr-chi+	12/14/2011 8:50:00	14.964
100yr-24hr-chi+	12/14/2011 9:00:00	12.216
100yr-24hr-chi+	12/14/2011 9:10:00	10.308
100yr-24hr-chi+	12/14/2011 9:20:00	8.904
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100yr-24hr-chi+	12/14/2011 10:00:00	5.772
100yr-24hr-chi+	12/14/2011 10:10:00	5.304
100yr-24hr-chi+	12/14/2011 10:20:00	4.908
100yr-24hr-chi+	12/14/2011 10:30:00	4.572
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100yr-24hr-chi+	12/14/2011 11:10:00	3.588
100yr-24hr-chi+	12/14/2011 11:20:00	3.408
100yr-24hr-chi+	12/14/2011 11:30:00	3.252
100yr-24hr-chi+	12/14/2011 11:40:00	3.108
100yr-24hr-chi+	12/14/2011 11:50:00	2.964
100yr-24hr-chi+	12/14/2011 12:00:00	2.844
100yr-24hr-chi+	12/14/2011 12:10:00	2.736
100yr-24hr-chi+	12/14/2011 12:20:00	2.628
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100yr-24hr-chi+	12/14/2011 13:00:00	2.292
100yr-24hr-chi+	12/14/2011 13:10:00	2.22
100yr-24hr-chi+	12/14/2011 13:20:00	2.148
100yr-24hr-chi+	12/14/2011 13:30:00	2.088
100yr-24hr-chi+	12/14/2011 13:40:00	2.028
100yr-24hr-chi+	12/14/2011 13:50:00	1.98

100yr-24hr-chi+	12/14/2011 14:00:00	1.92
100yr-24hr-chi+	12/14/2011 14:10:00	1.872
100yr-24hr-chi+	12/14/2011 14:20:00	1.824
100yr-24hr-chi+	12/14/2011 14:30:00	1.776
100yr-24hr-chi+	12/14/2011 14:40:00	1.74
100yr-24hr-chi+	12/14/2011 14:50:00	1.704
100yr-24hr-chi+	12/14/2011 15:00:00	1.656
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100yr-24hr-chi+	12/14/2011 15:30:00	1.56
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100yr-24hr-chi+	12/14/2011 16:20:00	1.416
100yr-24hr-chi+	12/14/2011 16:30:00	1.38
100yr-24hr-chi+	12/14/2011 16:40:00	1.356
100yr-24hr-chi+	12/14/2011 16:50:00	1.332
100yr-24hr-chi+	12/14/2011 17:00:00	1.308
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100yr-24hr-chi+	12/14/2011 17:30:00	1.248
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100yr-24hr-chi+	12/14/2011 18:30:00	1.14
100yr-24hr-chi+	12/14/2011 18:40:00	1.128
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100yr-24hr-chi+	12/14/2011 19:10:00	1.08
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100yr-24hr-chi+	12/14/2011 19:30:00	1.044
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100yr-24hr-chi+	12/14/2011 20:20:00	0.984
100yr-24hr-chi+	12/14/2011 20:30:00	0.972
100yr-24hr-chi+	12/14/2011 20:40:00	0.96
100yr-24hr-chi+	12/14/2011 20:50:00	0.948
100yr-24hr-chi+	12/14/2011 21:00:00	0.936
100yr-24hr-chi+	12/14/2011 21:10:00	0.924
100yr-24hr-chi+	12/14/2011 21:20:00	0.912
100yr-24hr-chi+	12/14/2011 21:30:00	0.9

100yr-24hr-chi+	12/14/2011 21:40:00	0.9
100yr-24hr-chi+	12/14/2011 21:50:00	0.888
100yr-24hr-chi+	12/14/2011 22:00:00	0.876
100yr-24hr-chi+	12/14/2011 22:10:00	0.864
100yr-24hr-chi+	12/14/2011 22:20:00	0.852
100yr-24hr-chi+	12/14/2011 22:30:00	0.852
100yr-24hr-chi+	12/14/2011 22:40:00	0.84
100yr-24hr-chi+	12/14/2011 22:50:00	0.828
100yr-24hr-chi+	12/14/2011 23:00:00	0.828
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100yr-24hr-chi+	12/14/2011 23:50:00	0.78
100yr-24hr-chi+	12/15/2011 0:00:00	0.78

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2yr-24hr-chi	12/14/2011 0:30:00	0.42
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2yr-24hr-chi	12/14/2011 0:50:00	0.44
2yr-24hr-chi	12/14/2011 1:00:00	0.45
2yr-24hr-chi	12/14/2011 1:10:00	0.45
2yr-24hr-chi	12/14/2011 1:20:00	0.46
2yr-24hr-chi	12/14/2011 1:30:00	0.47
2yr-24hr-chi	12/14/2011 1:40:00	0.49
2yr-24hr-chi	12/14/2011 1:50:00	0.5
2yr-24hr-chi	12/14/2011 2:00:00	0.51
2yr-24hr-chi	12/14/2011 2:10:00	0.52
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2yr-24hr-chi	12/14/2011 2:30:00	0.55
2yr-24hr-chi	12/14/2011 2:40:00	0.56
2yr-24hr-chi	12/14/2011 2:50:00	0.58
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2yr-24hr-chi	12/14/2011 3:20:00	0.63
2yr-24hr-chi	12/14/2011 3:30:00	0.65
2yr-24hr-chi	12/14/2011 3:40:00	0.67
2yr-24hr-chi	12/14/2011 3:50:00	0.7
2yr-24hr-chi	12/14/2011 4:00:00	0.72
2yr-24hr-chi	12/14/2011 4:10:00	0.75
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2yr-24hr-chi	12/14/2011 4:30:00	0.81
2yr-24hr-chi	12/14/2011 4:40:00	0.84
2yr-24hr-chi	12/14/2011 4:50:00	0.88
2yr-24hr-chi	12/14/2011 5:00:00	0.93

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2yr-24hr-chi	12/14/2011 5:20:00	1.03
2yr-24hr-chi	12/14/2011 5:30:00	1.09
2yr-24hr-chi	12/14/2011 5:40:00	1.16
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2yr-24hr-chi	12/14/2011 6:10:00	1.44
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2yr-24hr-chi	12/14/2011 6:50:00	2.2
2yr-24hr-chi	12/14/2011 7:00:00	2.55
2yr-24hr-chi	12/14/2011 7:10:00	3.06
2yr-24hr-chi	12/14/2011 7:20:00	3.84
2yr-24hr-chi	12/14/2011 7:30:00	5.21
2yr-24hr-chi	12/14/2011 7:40:00	8.29
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2yr-24hr-chi	12/14/2011 8:00:00	83.69
2yr-24hr-chi	12/14/2011 8:10:00	28
2yr-24hr-chi	12/14/2011 8:20:00	14.3
2yr-24hr-chi	12/14/2011 8:30:00	9.5
2yr-24hr-chi	12/14/2011 8:40:00	7.11
2yr-24hr-chi	12/14/2011 8:50:00	5.69
2yr-24hr-chi	12/14/2011 9:00:00	4.75
2yr-24hr-chi	12/14/2011 9:10:00	4.09
2yr-24hr-chi	12/14/2011 9:20:00	3.6
2yr-24hr-chi	12/14/2011 9:30:00	3.21
2yr-24hr-chi	12/14/2011 9:40:00	2.91
2yr-24hr-chi	12/14/2011 9:50:00	2.66
2yr-24hr-chi	12/14/2011 10:00:00	2.45
2yr-24hr-chi	12/14/2011 10:10:00	2.28
2yr-24hr-chi	12/14/2011 10:20:00	2.13
2yr-24hr-chi	12/14/2011 10:30:00	2
2yr-24hr-chi	12/14/2011 10:40:00	1.88
2yr-24hr-chi	12/14/2011 10:50:00	1.78
2yr-24hr-chi	12/14/2011 11:00:00	1.69
2yr-24hr-chi	12/14/2011 11:10:00	1.61
2yr-24hr-chi	12/14/2011 11:20:00	1.54
2yr-24hr-chi	12/14/2011 11:30:00	1.47
2yr-24hr-chi	12/14/2011 11:40:00	1.41
2yr-24hr-chi	12/14/2011 11:50:00	1.36
2yr-24hr-chi	12/14/2011 12:00:00	1.31
2yr-24hr-chi	12/14/2011 12:10:00	1.26
2yr-24hr-chi	12/14/2011 12:20:00	1.22
2yr-24hr-chi	12/14/2011 12:30:00	1.18
2yr-24hr-chi	12/14/2011 12:40:00	1.14

2yr-24hr-chi	12/14/2011 12:50:00	1.11
2yr-24hr-chi	12/14/2011 13:00:00	1.07
2yr-24hr-chi	12/14/2011 13:10:00	1.04
2yr-24hr-chi	12/14/2011 13:20:00	1.02
2yr-24hr-chi	12/14/2011 13:30:00	0.99
2yr-24hr-chi	12/14/2011 13:40:00	0.96
2yr-24hr-chi	12/14/2011 13:50:00	0.94
2yr-24hr-chi	12/14/2011 14:00:00	0.92
2yr-24hr-chi	12/14/2011 14:10:00	0.89
2yr-24hr-chi	12/14/2011 14:20:00	0.87
2yr-24hr-chi	12/14/2011 14:30:00	0.85
2yr-24hr-chi	12/14/2011 14:40:00	0.84
2yr-24hr-chi	12/14/2011 14:50:00	0.82
2yr-24hr-chi	12/14/2011 15:00:00	0.8
2yr-24hr-chi	12/14/2011 15:10:00	0.79
2yr-24hr-chi	12/14/2011 15:20:00	0.77
2yr-24hr-chi	12/14/2011 15:30:00	0.76
2yr-24hr-chi	12/14/2011 15:40:00	0.74
2yr-24hr-chi	12/14/2011 15:50:00	0.73
2yr-24hr-chi	12/14/2011 16:00:00	0.71
2yr-24hr-chi	12/14/2011 16:10:00	0.7
2yr-24hr-chi	12/14/2011 16:20:00	0.69
2yr-24hr-chi	12/14/2011 16:30:00	0.68
2yr-24hr-chi	12/14/2011 16:40:00	0.67
2yr-24hr-chi	12/14/2011 16:50:00	0.66
2yr-24hr-chi	12/14/2011 17:00:00	0.65
2yr-24hr-chi	12/14/2011 17:10:00	0.64
2yr-24hr-chi	12/14/2011 17:20:00	0.63
2yr-24hr-chi	12/14/2011 17:30:00	0.62
2yr-24hr-chi	12/14/2011 17:40:00	0.61
2yr-24hr-chi	12/14/2011 17:50:00	0.6
2yr-24hr-chi	12/14/2011 18:00:00	0.59
2yr-24hr-chi	12/14/2011 18:10:00	0.58
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2yr-24hr-chi	12/14/2011 18:30:00	0.57
2yr-24hr-chi	12/14/2011 18:40:00	0.56
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2yr-24hr-chi	12/14/2011 19:40:00	0.52
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2yr-24hr-chi	12/14/2011 20:20:00	0.49

2yr-24hr-chi	12/14/2011 20:30:00	0.49
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2yr-24hr-chi	12/14/2011 22:30:00	0.43
2yr-24hr-chi	12/14/2011 22:40:00	0.43
2yr-24hr-chi	12/14/2011 22:50:00	0.42
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2yr-24hr-chi	12/14/2011 23:30:00	0.41
2yr-24hr-chi	12/14/2011 23:40:00	0.4
2yr-24hr-chi	12/14/2011 23:50:00	0.4
2yr-24hr-chi	12/15/2011 0:00:00	0.4

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5yr-24hr-chi	12/14/2011 0:30:00	0.48
5yr-24hr-chi	12/14/2011 0:40:00	0.49
5yr-24hr-chi	12/14/2011 0:50:00	0.5
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5yr-24hr-chi	12/14/2011 1:10:00	0.52
5yr-24hr-chi	12/14/2011 1:20:00	0.54
5yr-24hr-chi	12/14/2011 1:30:00	0.55
5yr-24hr-chi	12/14/2011 1:40:00	0.56
5yr-24hr-chi	12/14/2011 1:50:00	0.57
5yr-24hr-chi	12/14/2011 2:00:00	0.59
5yr-24hr-chi	12/14/2011 2:10:00	0.6
5yr-24hr-chi	12/14/2011 2:20:00	0.62
5yr-24hr-chi	12/14/2011 2:30:00	0.64
5yr-24hr-chi	12/14/2011 2:40:00	0.65
5yr-24hr-chi	12/14/2011 2:50:00	0.67
5yr-24hr-chi	12/14/2011 3:00:00	0.69
5yr-24hr-chi	12/14/2011 3:10:00	0.71
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5yr-24hr-chi	12/14/2011 3:30:00	0.76
5yr-24hr-chi	12/14/2011 3:40:00	0.79

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5yr-24hr-chi	12/14/2011 4:20:00	0.91
5yr-24hr-chi	12/14/2011 4:30:00	0.95
5yr-24hr-chi	12/14/2011 4:40:00	1
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5yr-24hr-chi	12/14/2011 5:10:00	1.16
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5yr-24hr-chi	12/14/2011 5:30:00	1.3
5yr-24hr-chi	12/14/2011 5:40:00	1.38
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5yr-24hr-chi	12/14/2011 6:30:00	2.11
5yr-24hr-chi	12/14/2011 6:40:00	2.37
5yr-24hr-chi	12/14/2011 6:50:00	2.71
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5yr-24hr-chi	12/14/2011 7:10:00	3.84
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5yr-24hr-chi	12/14/2011 7:40:00	11
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5yr-24hr-chi	12/14/2011 10:50:00	2.17
5yr-24hr-chi	12/14/2011 11:00:00	2.06
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5yr-24hr-chi	12/14/2011 14:00:00	1.08
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5yr-24hr-chi	12/14/2011 14:30:00	1.01
5yr-24hr-chi	12/14/2011 14:40:00	0.99
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5yr-24hr-chi	12/14/2011 23:50:00	0.46
5yr-24hr-chi	12/15/2011 0:00:00	0.46

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Hazel	12/14/2011 00:15:00	2
Hazel	12/14/2011 00:30:00	2
Hazel	12/14/2011 00:45:00	2
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Hazel	12/14/2011 01:15:00	2
Hazel	12/14/2011 01:30:00	2
Hazel	12/14/2011 01:45:00	2
Hazel	12/14/2011 02:00:00	2
Hazel	12/14/2011 02:15:00	2
Hazel	12/14/2011 02:30:00	2
Hazel	12/14/2011 02:45:00	2
Hazel	12/14/2011 03:00:00	2
Hazel	12/14/2011 03:15:00	2
Hazel	12/14/2011 03:30:00	2

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Hazel           12/14/2011 04:15:00   2
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Hazel           12/14/2011 05:30:00   2
Hazel           12/14/2011 05:45:00   2
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Hazel           12/14/2011 06:15:00   2
Hazel           12/14/2011 06:30:00   2
Hazel           12/14/2011 06:45:00   2
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Hazel           12/15/2011 02:15:00   2
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Hazel           12/15/2011 03:15:00   2
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Hazel           12/15/2011 08:45:00   2
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Hazel           12/15/2011 10:45:00   2
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Hazel           12/15/2011 11:15:00   3
Hazel           12/15/2011 11:30:00   3
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Hazel           12/15/2011 12:00:00   6
Hazel           12/15/2011 12:15:00   6
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Hazel           12/15/2011 13:30:00   4
Hazel           12/15/2011 13:45:00   4
Hazel           12/15/2011 14:00:00   6
Hazel           12/15/2011 14:15:00   6
Hazel           12/15/2011 14:30:00   6
Hazel           12/15/2011 14:45:00   6
Hazel           12/15/2011 15:00:00   13
Hazel           12/15/2011 15:15:00   13
Hazel           12/15/2011 15:30:00   13
Hazel           12/15/2011 15:45:00   13
Hazel           12/15/2011 16:00:00   17
Hazel           12/15/2011 16:15:00   17
Hazel           12/15/2011 16:30:00   17
Hazel           12/15/2011 16:45:00   17
Hazel           12/15/2011 17:00:00   13
Hazel           12/15/2011 17:15:00   13
Hazel           12/15/2011 17:30:00   13
Hazel           12/15/2011 17:45:00   13
Hazel           12/15/2011 18:00:00   23
Hazel           12/15/2011 18:15:00   23
Hazel           12/15/2011 18:30:00   23
Hazel           12/15/2011 18:45:00   23
Hazel           12/15/2011 19:00:00   13
Hazel           12/15/2011 19:15:00   13
Hazel           12/15/2011 19:30:00   13
Hazel           12/15/2011 19:45:00   13
Hazel           12/15/2011 20:00:00   13
Hazel           12/15/2011 20:15:00   13
Hazel           12/15/2011 20:30:00   13
Hazel           12/15/2011 20:45:00   13
Hazel           12/15/2011 21:00:00   53
Hazel           12/15/2011 21:15:00   53
Hazel           12/15/2011 21:30:00   53
Hazel           12/15/2011 21:45:00   53
Hazel           12/15/2011 22:00:00   38
Hazel           12/15/2011 22:15:00   38
Hazel           12/15/2011 22:30:00   38
Hazel           12/15/2011 22:45:00   38
Hazel           12/15/2011 23:00:00   13
Hazel           12/15/2011 23:15:00   13
Hazel           12/15/2011 23:30:00   13
Hazel           12/15/2011 23:45:00   13

[REPORT]
INPUT      NO
CONTROLS   NO
SUBCATCHMENTS NONE
NODES NONE
LINKS C6090d C6180a
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[TAGS]

[MAP]
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UNITS            None

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J110             18.879           -1.298
J111             19.633           -1.388
J12              18.515           -3.709
J13              18.751           -6.41
J14              18.174           -4.906
J15              17.998           -5.116
J16              17.746           -5.579
J17              17.519           -0.26
J18              17.373           -6.846
J19              17.366           -8.353
J2               18.73            -1.283
J20              17.283           -9.147
J21              18.326           -4.313
J22              18.552           -3.515
J23              18.796           -2.209
J24              18.763           -1.38
J25              14.031           -9.162
J26              15.976           -11.696
J27              17.403           -7.572
J28              16.429           -7.507
J29              15.245           -7.891
J3               14.477           -1.841
J30              14.128           -7.856
J31              13.048           -7.789
J32              20.784           0.87
J33              21.163           -1.474
J34              18.65            -7.656
J35              19.351           -2.377
J36              17.581           -6.167
J37              12.098           -6.049
J37500           17.035           0.607
J38              16.585           -6.159
J39              17.978           -0.841
J39001           17.208           0.372
J4               19.021           -1.686
J40323           17.32            0.198
J41              15.076           -12.529
J41106           17.389           0.024
J42              13.86            -12.068
J43501           17.531           -0.347
J44              16.069           -10.61
J45              19.855           -1.857
J46              16.146           -9.844
J46102           18.048           -0.869
J46203           18.362           -1.078
J47              17.261           -6.207
J5               17.079           0.541
J51              15.393           -6.074
J54              12.783           -5.986
J55              14.282           -6.114
J55.5            14.046           -9.084
J56              13.148           -5.966
J57              13.01            -8.605
J58.7            12.991           -8.733
J6               11.938           -7.426
J60              14.323           -6.014
J61              14.866           -6.055
J7               18.833           -1.839
J77              16.537           -6.167
J8               19.66            -4.008
J80              16.15            -9.755
J81              16.034           -11.148
J82              17.565           -6.245
J83              20.641           -2.336
J88              15.412           -11.234
J89              14.889           -11.29
J9               18.765           -2.285
J92              18.32            -4.409
J93              18.715           -2.961
J94              18.817           -2.035
J95              18.897           -1.713
J96              18.942           -1.622
J98              17.466           -0.166
J99              17               -2.66
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S2035            13.109           -7.882
S2045            14.419           -6.074
S2050            14.214           -7.92
S2055            15.491           -6.134
S2060            15.312           -7.931
S2065            15.187           -9.755
S2075            14.862           -11.243
S2080            15.956           -12.433
S2085            12.952           -12.761
S2090            17.481           -5.941
S2095            16.541           -7.617
S2100            18.485           -6.484
S2105            19.599           -6.513
S2110            18.141           -5.199
S2115            17.891           -5.077
S2125            19.279           -4.248
S2130            18.065           -7.942
S2133            19.088           -8.067
S2135            18.923           -3.195
S2140            19.979           -2.378
S2155            19.163           -2.706
S2165            21.771           -2.283
S2175            20.564           -1.352
S2180            18.036           -0.775
S2185            18.608           -1.926
S2190            21.784           -1.307
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S2210            20.723           0.25
S2215            21.198           0.826

[VERTICES]
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C23              17.534           -6.176
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C24              18.286           -4.33
C25              18.746           -2.243
C25              18.759           -2.192
C26              18.705           -1.363
C26              18.682           -1.304
C27              17.456           -0.249
C27              17.428           -0.206
C28              17.028           0.536
C28              16.995           0.572
C29              18.454           -3.648
C29              18.486           -3.511
C31              16.54            -6.144
C31              16.57            -6.14
C33              18.028           -0.884
C33              17.983           -0.87
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C6110b           18.567           -3.22
C6145            19.048           -2.69
C6160a           18.938           -1.417
C6160b           18.615           -1.146
C6170e           18.126           -0.987
C6170f           17.619           -0.634
C6190            17.243           -2.436
C6190            17.531           -2.206
C6190            17.549           -2.035
C6190            17.684           -1.947
C6190            17.643           -1.776
C6190            17.761           -1.694
C6190            17.72            -1.482
C6190            17.773           -1.429
C6190            17.737           -1.217
C6190            18.002           -1.111
C6220            15.668           -1.235
C6220            15.51            -0.866
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OR2020-2         12.942           -7.692
OR2030-2         13.368           -5.965
OR2030-2         14.215           -5.951
OR2035-2         13.194           -7.743
OR2035-2         14.014           -7.77
OR2045-2         14.495           -5.983
OR2045-2         15.264           -6.006
OR2050-2         14.339           -7.811
OR2050-2         15.127           -7.807
OR2055-2         15.585           -6.034
OR2055-2         16.387           -6.084
OR2060-2         15.404           -7.768
OR2060-2         16.286           -7.449
OR2065-2         15.297           -9.701
OR2065-2         16.011           -9.794
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OR2085-2          13.591            -12.125
OR2090-2          17.446            -5.787
OR2090-2          17.613            -5.597
OR2095-2          16.617            -7.46
OR2095-2          17.304            -7.498
OR2100-2          18.348            -6.552
OR2100-2          17.67             -6.355
OR2105-2          19.534            -6.57
OR2105-2          18.842            -6.515
OR2110-2          18.098            -5.141
OR2110-2          18.11             -5.008
OR2115-2          17.897            -4.997
OR2115-2          18.083            -4.861
OR2125-2          19.116            -4.286
OR2125-2          18.567            -3.723
OR2130-2          17.865            -8.002
OR2133-2          18.964            -8.111
OR2135-2          18.82             -3.196
OR2135-2          18.736            -3.081
OR2140-2          19.824            -2.552
OR2155-2          19.075            -2.724
OR2155-2          18.887            -2.488
OR2165-2          21.701            -2.389
OR2165-2          20.8              -2.424
OR2175-2          20.503            -1.431
OR2175-2          19.909            -1.414
OR2185-2          18.589            -1.765
OR2185-2          18.805            -1.613
OR2190-2          21.794            -1.41
OR2190-2          21.311            -1.523
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OR2200-2          16.749            -2.754
OR2210-1          19.611            -0.016
OR2210-2          20.681            0.149
OR2210-2          19.524            -0.108
OR2215-2          21.129            0.762
OR2215-2          20.843            0.782
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W2035             14.003            -7.96
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W2060             16.351            -7.638
W2065             15.307            -9.843
W2065             16.026            -9.936
W2075             14.938            -11.338
W2075             15.349            -11.293
W2080             16.001            -12.316
W2080             16.016            -11.805
W2085             13.152            -12.724
W2085             13.819            -12.238
W2090             17.613            -5.896
W2090             17.728            -5.677
W2095             17.25             -7.676
W2100             18.448            -6.368
W2100             17.752            -6.263
W2105             19.575            -6.455
W2105             18.865            -6.373
W2110             18.216            -5.118
W2110             18.22             -4.971
W2115             17.95             -5.13
W2125             19.304            -4.012
W2125             18.748            -3.484
W2130             18.12             -7.828
W2133             19.105            -7.918
W2135             18.941            -3.075
W2135             18.784            -2.948
W2140             19.499            -2.292
W2155             19.184            -2.573
W2155             18.935            -2.264
W2165             21.648            -2.189
W2165             20.782            -2.236
W2175             20.481            -1.273
W2175             19.953            -1.251
W2185             18.74             -1.91
W2190             21.641            -1.252
W2190             21.173            -1.371
W2200             16.906            -3.484
W2200             17.13             -2.798
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W2215             20.883            0.959
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[POLYGONS]
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2000             9.753            -6.143
2000             11.538           -5.845
2000             11.736           -6.304
2002             11.222           -10.181
2002             9.509            -9.58
2002             9.686            -6.809
2002             11.306           -7.992
2002             11.24            -8.724
2002             11.389           -9.122
2002             11.193           -9.777
2002             11.222           -10.181
2005             11.758           -6.333
2005             11.877           -6.565
2005             11.978           -6.797
2005             12.091           -7.32
2005             12.109           -8.605
2005             11.698           -8.284
2005             11.335           -8.01
2005             11.294           -7.457
2005             11.502           -6.731
2005             11.758           -6.333
2007             11.401           -9.075
2007             11.27            -8.712
2007             11.335           -8.016
2007             12.115           -8.647
2007             12.097           -8.849
2007             11.401           -9.075
2010             12.138           -10.247
2010             11.776           -10.235
2010             11.698           -10.342
2010             11.234           -10.169
2010             11.199           -9.789
2010             11.437           -9.11
2010             12.121           -8.867
2010             12.138           -10.247
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2015             12.093           -5.717
2015             11.962           -6.704
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2020             11.996           -6.791
2020             13.084           -6.862
2020             13.025           -8.123
2020             13.001           -8.647
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2025             12.721           -8.67
2025             12.983           -8.67
2025             13.185           -8.718
2025             13.013           -8.861
2025             12.977           -8.98
2025             13.031           -9.116
2025             13.251           -9.36
2025             13.191           -9.503
2025             12.317           -8.795
2027             13.167           -9.539
2027             13.084           -9.854
2027             13.209           -10.134
2027             13.197           -10.443
2027             13.025           -10.455
2027             12.989           -10.746
2027             11.728           -10.348
2027             11.77            -10.247
2027             12.156           -10.241
2027             12.15            -8.843
2027             12.323           -8.807
2027             13.167           -9.539
2030             14.236           -6.937
2030             11.99            -6.764
2030             12.096           -5.731
2030             14.349           -5.226
2030             14.236           -6.937
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2035             14.244           -6.945
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2040             13.286           -9.384
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2045	14.356	-5.399
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2045	15.318	-6.998
2050	15.097	-9.577
2050	14.085	-9.098
2050	14.26	-6.935
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2050	15.097	-9.577
2055	16.574	-5.583
2055	16.464	-7.097
2055	15.34	-6.998
2055	15.463	-5.505
2055	16.574	-5.583
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2060	15.131	-9.599
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2065	15.411	-9.695
2065	16.232	-9.841
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2072	13.263	-9.39
2072	13.994	-9.878

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2075	12.273	-11.155
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2075	13.879	-11.033
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2080	14.462	-12.298
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2085	12.255	-12.991
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2085	12.267	-11.89
2085	12.455	-11.915
2085	12.705	-11.738
2085	12.863	-11.726
2085	14.438	-12.28
2085	12.857	-13.8
2085	12.048	-13.514
2087	14.456	-14.378
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2087	16.178	-12.912
2087	14.456	-14.378
2090	17.558	-7.181
2090	16.463	-7.107
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2090	16.577	-5.603
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2090	17.605	-6.716
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2095	17.555	-7.219
2095	17.355	-9.854
2095	16.259	-9.812
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2095	17.555	-7.219
2100	18.734	-6.347
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2100	18.734	-6.347
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2110	19.112	-4.575
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2110	18.032	-5.701
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2175            19.513          -0.72
2180            17.737          -0.275
2180            19.374          0.102
2180            19.581          -1.388
2180            17.519          -1.358
2180            17.172          -0.475
2180            17.737          -0.275
2185            18.866          -1.939
2185            18.874          -2.244
2185            18.826          -2.614
2185            18.842          -2.871
2185            18.641          -3.177
2185            18.521          -3.619
2185            17.548          -1.384
2185            18.963          -1.505
2185            18.866          -1.939
2190            21.139          -1.533
2190            20.956          -0.509
2190            21.38           -0.277
2190            22.626          -0.115
2190            22.853          -1.597
2190            21.139          -1.533
2200            10.684          -3.932
2200            15.121          -1.754
2200            15.925          -1.24
2200            17.532          -1.384
2200            18.537          -3.755
2200            18.649          -4.238
2200            11.536          -5.837
2200            10.684          -3.932
2210            20.076          0.304
2210            20.784          0.9
2210            20.75           0.447
2210            20.873          -0.046
2210            20.966          -0.519
2210            20.398          -0.572
2210            19.535          -0.706
2210            19.371          0.085
2210            20.076          0.304
2215            20.942          -0.504
2215            20.75           0.422
2215            20.764          0.905
2215            21.577          1.599
2215            22.326          1.747
2215            22.616          -0.1
2215            21.355          -0.277
2215            20.942          -0.504
2220            14.568          -1.162
2220            15.824          -1.246
2220            15.127          -1.739
2220            12.934          -2.844
2220            12.159          -3.216
2220            11.546          -1.847
2220            13.27           -1.444
2220            14.568          -1.162
2225            14.628          -1.144
2225            17.139          -0.495
2225            17.518          -1.354
2225            14.628          -1.144

[SYMBOLS]
;;Gage          X-Coord          Y-Coord
;;-------------- ---------------- ----------------
```

```
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.022)
--------------------------------------------------------------

Upper Little River Model.
All slopes are assumed to be 0.15% (from Turkey Creek and Little River Subwatershed Study -
Dillon Consulting Limited, June 1998).

*********************************************************
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
*********************************************************

****************
Analysis Options
****************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ YES
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... DYNWAVE
Starting Date ............ DEC-14-2011 00:00:00
Ending Date .............. DEC-17-2011 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 01:00:00
Wet Time Step ............ 00:05:00
Dry Time Step ............ 00:05:00
Routing Time Step ........ 30.00 sec


WARNING 04: minimum elevation drop used for Conduit C1

WARNING 03: negative offset ignored for Link C10

WARNING 03: negative offset ignored for Link C10

WARNING 04: minimum elevation drop used for Conduit C10

WARNING 04: minimum elevation drop used for Conduit C12
```

```
WARNING 03: negative offset ignored for Link C15

WARNING 04: minimum elevation drop used for Conduit C22

WARNING 04: minimum elevation drop used for Conduit C23

WARNING 04: minimum elevation drop used for Conduit C24

WARNING 04: minimum elevation drop used for Conduit C25

WARNING 04: minimum elevation drop used for Conduit C26

WARNING 04: minimum elevation drop used for Conduit C27

WARNING 04: minimum elevation drop used for Conduit C28

WARNING 04: minimum elevation drop used for Conduit C29

WARNING 04: minimum elevation drop used for Conduit C30

WARNING 04: minimum elevation drop used for Conduit C31

WARNING 04: minimum elevation drop used for Conduit C32

WARNING 04: minimum elevation drop used for Conduit C33

WARNING 03: negative offset ignored for Link C34

WARNING 04: minimum elevation drop used for Conduit C34

WARNING 03: negative offset ignored for Link C37

WARNING 03: negative offset ignored for Link C38

WARNING 04: minimum elevation drop used for Conduit C4

WARNING 04: minimum elevation drop used for Conduit C6

WARNING 03: negative offset ignored for Link C6025a

WARNING 03: negative offset ignored for Link C6055a

WARNING 03: negative offset ignored for Link C6120a

WARNING 03: negative offset ignored for Link C6120b
```

```
WARNING 03: negative offset ignored for Link C6120b

WARNING 03: negative offset ignored for Link C6120c

WARNING 03: negative offset ignored for Link C6120c

WARNING 03: negative offset ignored for Link C6135a

WARNING 03: negative offset ignored for Link C6135a

WARNING 04: minimum elevation drop used for Conduit C6135a

WARNING 03: negative offset ignored for Link C6135b

WARNING 03: negative offset ignored for Link C6135b

WARNING 04: minimum elevation drop used for Conduit C6135b

WARNING 03: negative offset ignored for Link C6150

WARNING 04: minimum elevation drop used for Conduit C6160a

WARNING 03: negative offset ignored for Link C6180a

WARNING 03: negative offset ignored for Link C6220

WARNING 03: negative offset ignored for Link C7025

WARNING 04: minimum elevation drop used for Conduit C7025

WARNING 04: minimum elevation drop used for Conduit C8

WARNING 03: negative offset ignored for Link P1

WARNING 03: negative offset ignored for Link OR2090-1

WARNING 03: negative offset ignored for Link OR2100-1

WARNING 03: negative offset ignored for Link OR2200-1

WARNING 02: maximum depth increased for Node J1

WARNING 02: maximum depth increased for Node J109

WARNING 02: maximum depth increased for Node J11
```

```
WARNING 02: maximum depth increased for Node J111

WARNING 02: maximum depth increased for Node J12

WARNING 02: maximum depth increased for Node J13

WARNING 02: maximum depth increased for Node J14

WARNING 02: maximum depth increased for Node J15

WARNING 02: maximum depth increased for Node J16

WARNING 02: maximum depth increased for Node J17

WARNING 02: maximum depth increased for Node J18

WARNING 02: maximum depth increased for Node J19

WARNING 02: maximum depth increased for Node J2

WARNING 02: maximum depth increased for Node J20

WARNING 02: maximum depth increased for Node J21

WARNING 02: maximum depth increased for Node J22

WARNING 02: maximum depth increased for Node J23

WARNING 02: maximum depth increased for Node J24

WARNING 02: maximum depth increased for Node J25

WARNING 02: maximum depth increased for Node J26

WARNING 02: maximum depth increased for Node J27

WARNING 02: maximum depth increased for Node J28

WARNING 02: maximum depth increased for Node J29

WARNING 02: maximum depth increased for Node J3

WARNING 02: maximum depth increased for Node J30

WARNING 02: maximum depth increased for Node J31
```

WARNING 02: maximum depth increased for Node J32

WARNING 02: maximum depth increased for Node J33

WARNING 02: maximum depth increased for Node J34

WARNING 02: maximum depth increased for Node J36

WARNING 02: maximum depth increased for Node J37500

WARNING 02: maximum depth increased for Node J40323

WARNING 02: maximum depth increased for Node J41

WARNING 02: maximum depth increased for Node J41106

WARNING 02: maximum depth increased for Node J42

WARNING 02: maximum depth increased for Node J44

WARNING 02: maximum depth increased for Node J46

WARNING 02: maximum depth increased for Node J5

WARNING 02: maximum depth increased for Node J54

WARNING 02: maximum depth increased for Node J56

WARNING 02: maximum depth increased for Node J57

WARNING 02: maximum depth increased for Node J6

WARNING 02: maximum depth increased for Node J60

WARNING 02: maximum depth increased for Node J61

WARNING 02: maximum depth increased for Node J8

WARNING 02: maximum depth increased for Node J80

WARNING 02: maximum depth increased for Node J81

WARNING 02: maximum depth increased for Node J82

WARNING 02: maximum depth increased for Node J83

WARNING 02: maximum depth increased for Node J88

WARNING 02: maximum depth increased for Node J89

WARNING 02: maximum depth increased for Node J9

WARNING 02: maximum depth increased for Node J92

WARNING 02: maximum depth increased for Node J98

WARNING 02: maximum depth increased for Node J99

**************************	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
**************************	---------	-------
Total Precipitation	482.374	108.167
Evaporation Loss	0.000	0.000
Infiltration Loss	123.341	27.658
Surface Runoff	357.132	80.083
Final Surface Storage	2.236	0.501
Continuity Error (%)	-0.070	

**************************	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
**************************	---------	---------
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	357.132	3571.353
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	309.509	3095.121
Internal Outflow	0.000	0.000
Storage Losses	0.000	0.000
Initial Stored Volume	0.000	0.001
Final Stored Volume	47.213	472.131
Continuity Error (%)	0.115	

****
Highest Continuity Errors
****
Node J55 (10.62%)
Node J55.5 (4.63%)
Node J26 (2.08%)
Node J33 (1.91%)
Node J110 (1.90%)

****
Time-Step Critical Elements
****
Link C22 (48.59%)
Link C32 (45.66%)
Link C30 (2.89%)
Link C12 (1.64%)
Link C7025 (1.05%)

****
Highest Flow Instability Indexes
****
Link C6180e (9)
Link C1 (2)
Link OR2190-1 (2)
Link OR2210-1 (2)
Link OR2215-1 (2)

****
Routing Time Step Summary
****
Minimum Time Step : 0.96 sec
Average Time Step : 1.58 sec
Maximum Time Step : 30.00 sec
Percent in Steady State : 0.00
Average Iterations per Step : 2.01

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
2000	108.17	0.00	0.00	17.22	90.41	82.62	12.52	0.836
2002	108.17	0.00	0.00	17.91	89.69	140.28	19.13	0.829
2005	108.17	0.00	0.00	15.03	92.71	44.54	10.50	0.857
2007	108.17	0.00	0.00	16.39	91.28	18.90	3.33	0.844
2010	108.17	0.00	0.00	15.66	92.04	37.70	7.70	0.851
2015	108.17	0.00	0.00	14.04	93.81	9.90	3.14	0.867
2020	108.17	0.00	0.00	12.48	95.16	62.93	13.66	0.880
2025	108.17	0.00	0.00	15.26	92.46	11.69	2.61	0.855
2027	108.17	0.00	0.00	16.27	91.40	54.31	9.80	0.845
2030	108.17	0.00	0.00	24.30	83.42	98.09	12.77	0.771
2035	108.17	0.00	0.00	14.58	93.07	75.78	14.69	0.860
2040	108.17	0.00	0.00	15.66	92.04	23.56	4.81	0.851
2045	108.17	0.00	0.00	25.02	82.81	52.84	8.65	0.766
2050	108.17	0.00	0.00	23.55	84.23	81.99	12.85	0.779
2055	108.17	0.00	0.00	21.49	86.27	56.17	9.40	0.798
2060	108.17	0.00	0.00	21.16	86.44	97.44	11.35	0.799
2065	108.17	0.00	0.00	9.37	98.02	114.03	15.96	0.906
2070	108.17	0.00	0.00	46.75	61.40	58.24	3.18	0.568
2072	108.17	0.00	0.00	16.04	91.64	38.74	7.31	0.847
2073	108.17	0.00	0.00	45.07	63.08	50.72	2.85	0.583
2075	108.17	0.00	0.00	25.48	82.27	96.82	12.57	0.761
2080	108.17	0.00	0.00	42.74	65.38	45.61	4.10	0.604
2085	108.17	0.00	0.00	33.24	74.63	75.31	9.16	0.690
2087	108.17	0.00	0.00	53.84	54.31	72.63	3.73	0.502
2090	108.17	0.00	0.00	35.46	72.46	52.77	6.39	0.670
2095	108.17	0.00	0.00	27.64	80.07	94.46	10.52	0.740
2100	108.17	0.00	0.00	18.47	89.23	45.13	7.70	0.825
2105	108.17	0.00	0.00	22.27	85.47	52.06	7.96	0.790
2110	108.17	0.00	0.00	19.22	88.56	44.10	8.81	0.819
2115	108.17	0.00	0.00	33.91	73.92	83.95	9.09	0.683
2125	108.17	0.00	0.00	21.45	86.19	80.49	10.08	0.797
2130	108.17	0.00	0.00	7.96	99.40	80.07	11.32	0.919
2133	108.17	0.00	0.00	15.81	91.72	85.37	11.00	0.848
2135	108.17	0.00	0.00	19.88	87.93	20.07	4.11	0.813
2140	108.17	0.00	0.00	31.34	76.58	62.87	9.05	0.708
2145	108.17	0.00	0.00	51.67	56.44	58.89	4.48	0.522
2155	108.17	0.00	0.00	21.76	86.00	66.45	10.77	0.795
2165	108.17	0.00	0.00	22.41	85.26	152.72	19.28	0.788
2175	108.17	0.00	0.00	13.27	94.35	44.63	8.64	0.872
2180	108.17	0.00	0.00	20.10	87.53	89.28	11.46	0.809
2185	108.17	0.00	0.00	19.91	87.77	57.40	8.54	0.811
2190	108.17	0.00	0.00	20.48	87.21	74.09	10.94	0.806
2200	108.17	0.00	0.00	42.54	65.22	511.45	39.34	0.603
2210	108.17	0.00	0.00	15.10	92.53	53.89	9.29	0.855
2215	108.17	0.00	0.00	19.79	87.85	93.71	12.36	0.812
2220	108.17	0.00	0.00	18.66	88.85	128.40	14.26	0.821
2225	108.17	0.00	0.00	16.97	90.67	38.28	6.06	0.838

****

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days	hr:min
J1	JUNCTION	0.67	1.14	186.14	0	11:15
J10	JUNCTION	1.61	2.44	181.26	0	16:13
J108	JUNCTION	1.53	2.24	180.14	0	18:28
J109	JUNCTION	1.68	1.88	180.28	0	12:50
J11	JUNCTION	0.93	1.64	184.04	0	09:34
J110	JUNCTION	1.83	2.73	180.83	0	17:29
J111	JUNCTION	1.66	2.53	180.83	0	17:29
J12	JUNCTION	1.51	2.39	181.49	0	15:41
J13	JUNCTION	0.74	1.77	183.67	0	12:40
J14	JUNCTION	1.30	2.10	182.16	0	14:13
J15	JUNCTION	1.29	2.08	182.26	0	14:02
J16	JUNCTION	1.26	2.02	182.53	0	13:34
J17	JUNCTION	2.01	2.97	180.18	0	18:27
J18	JUNCTION	1.08	2.08	183.72	0	12:37
J19	JUNCTION	0.70	1.20	184.40	0	11:42
J2	JUNCTION	2.06	2.96	180.83	0	17:29
J20	JUNCTION	0.75	1.27	185.27	0	11:26
J21	JUNCTION	1.23	2.00	181.75	0	15:03
J22	JUNCTION	1.49	2.32	181.42	0	15:48
J23	JUNCTION	1.69	2.48	181.16	0	16:29
J24	JUNCTION	2.07	2.99	180.85	0	17:27
J25	JUNCTION	0.22	1.73	188.88	0	08:23
J26	JUNCTION	1.06	1.36	188.36	0	10:50
J27	JUNCTION	0.93	1.63	184.03	0	09:35
J28	JUNCTION	0.60	1.71	185.11	0	08:59
J29	JUNCTION	0.54	1.67	186.07	0	08:52
J3	JUNCTION	0.44	2.64	183.59	0	09:19
J30	JUNCTION	0.52	1.99	187.39	0	08:40
J31	JUNCTION	0.41	2.05	188.45	0	08:23
J32	JUNCTION	1.32	1.41	180.41	0	17:40
J33	JUNCTION	1.54	2.08	180.83	0	17:32
J34	JUNCTION	0.35	0.64	184.04	0	09:38
J35	JUNCTION	0.55	1.19	180.99	0	17:02
J36	JUNCTION	1.18	1.92	182.83	0	13:08
J37	JUNCTION	0.79	3.15	189.75	0	08:53
J37500	JUNCTION	2.11	3.01	179.81	0	17:15
J38	JUNCTION	0.81	1.78	183.98	0	12:06
J39	JUNCTION	2.22	3.16	180.26	0	18:24
J39001	JUNCTION	2.09	3.00	179.90	0	17:16
J4	JUNCTION	1.89	2.79	180.89	0	17:22
J40323	JUNCTION	2.09	3.03	180.03	0	17:16
J41	JUNCTION	0.59	0.94	188.44	0	10:26
J41106	JUNCTION	2.07	3.00	180.10	0	18:29
J42	JUNCTION	0.38	0.49	188.49	0	18:08
J43501	JUNCTION	2.37	3.33	180.23	0	18:25
J44	JUNCTION	0.77	1.41	187.62	0	11:01
J45	JUNCTION	1.34	2.20	180.90	0	17:23
J46	JUNCTION	0.76	1.39	187.11	0	10:57
J46102	JUNCTION	2.23	3.18	180.28	0	18:23
J46203	JUNCTION	1.89	2.81	180.51	0	17:51
J47	JUNCTION	1.20	2.49	183.71	0	12:38
J5	JUNCTION	2.13	3.04	179.84	0	17:15
J51	JUNCTION	0.48	1.23	184.43	0	11:16
J54	JUNCTION	0.39	1.28	187.83	0	08:53
J55	JUNCTION	0.99	2.08	186.58	0	10:03
J55.5	JUNCTION	0.25	1.71	188.82	0	08:24
J56	JUNCTION	0.35	1.42	187.51	0	08:59
J57	JUNCTION	0.69	4.21	194.54	0	08:21
J58.7	JUNCTION	0.77	6.52	196.79	0	08:12
J6	JUNCTION	0.47	2.55	189.73	0	09:37
J60	JUNCTION	0.70	1.78	186.58	0	10:03
J61	JUNCTION	0.59	1.50	185.75	0	09:55
J7	JUNCTION	1.39	2.19	180.99	0	17:02
J77	JUNCTION	0.88	2.06	184.26	0	11:33
J8	JUNCTION	0.89	1.61	181.16	0	16:30
J80	JUNCTION	0.86	1.44	187.02	0	10:59
J81	JUNCTION	0.66	1.19	187.69	0	11:13
J82	JUNCTION	1.47	2.76	183.67	0	12:40
J83	JUNCTION	1.00	1.52	180.92	0	17:25
J88	JUNCTION	0.94	1.06	188.06	0	17:47
J89	JUNCTION	0.46	0.59	188.14	0	18:19
J9	JUNCTION	1.71	2.53	181.21	0	16:20
J92	JUNCTION	1.30	2.19	181.95	0	14:36
J93	JUNCTION	1.82	2.66	181.33	0	16:02
J94	JUNCTION	1.52	2.30	181.10	0	16:40
J95	JUNCTION	1.29	2.14	180.94	0	17:13
J96	JUNCTION	1.99	2.89	180.89	0	17:22
J98	JUNCTION	1.99	2.93	180.14	0	18:28
J99	JUNCTION	0.85	1.37	180.32	0	18:36
J5205	OUTFALL	2.10	3.18	179.88	0	22:36
S2020	STORAGE	1.00	1.65	188.55	0	14:00
S2030	STORAGE	1.06	1.82	187.12	0	16:02
S2035	STORAGE	1.03	1.70	187.60	0	14:31
S2045	STORAGE	0.99	1.81	185.51	0	15:30
S2050	STORAGE	1.01	1.78	186.68	0	15:33
S2055	STORAGE	1.13	1.94	184.64	0	16:14
S2060	STORAGE	0.96	1.58	185.48	0	16:13
S2065	STORAGE	1.02	1.53	187.75	0	16:16
S2075	STORAGE	1.02	1.67	189.17	0	16:36
S2080	STORAGE	1.05	2.09	189.59	0	14:11
S2085	STORAGE	1.09	1.73	189.48	0	17:45
S2090	STORAGE	0.92	1.68	184.10	0	17:06
S2095	STORAGE	1.06	1.71	184.61	0	18:01
S2100	STORAGE	1.13	1.90	183.82	0	16:44
S2105	STORAGE	1.04	1.81	184.21	0	16:41
S2110	STORAGE	0.99	1.77	183.33	0	15:02
S2115	STORAGE	0.87	1.56	183.12	0	16:51
S2125	STORAGE	1.00	1.63	182.23	0	17:30
S2130	STORAGE	1.00	1.50	184.40	0	16:16
S2133	STORAGE	0.95	1.51	185.41	0	16:00
S2135	STORAGE	1.05	1.76	181.93	0	16:21
S2140	STORAGE	1.14	1.92	181.62	0	18:41
S2155	STORAGE	1.10	1.79	181.97	0	17:21
S2165	STORAGE	1.09	1.68	181.58	0	18:23
S2175	STORAGE	1.53	1.95	180.75	0	23:25
S2180	STORAGE	1.37	2.19	180.29	0	19:02
S2185	STORAGE	1.17	1.74	181.24	0	19:37
S2190	STORAGE	1.38	1.86	181.11	0	20:11
S2200	STORAGE	0.99	1.42	180.87	0	20:24
S2210	STORAGE	1.41	1.77	180.67	0	18:38
S2215	STORAGE	1.21	1.69	181.19	0	17:30

Node Inflow Summary

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days	hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr
J1	JUNCTION	0.000	6.882	0	11:02	0.000	503.522
J10	JUNCTION	0.000	23.405	0	14:32	0.000	1947.849
J108	JUNCTION	0.000	0.735	0	14:08	0.000	97.770
J109	JUNCTION	0.000	0.700	0	15:52	0.000	98.390
J11	JUNCTION	0.000	6.847	0	11:42	0.000	502.731
J110	JUNCTION	0.000	2.260	0	13:12	0.000	114.924
J111	JUNCTION	0.000	1.806	0	12:42	0.000	94.580
J12	JUNCTION	0.000	23.634	0	13:46	0.000	1861.991
J13	JUNCTION	0.000	2.158	0	09:45	0.000	52.584
J14	JUNCTION	0.000	23.939	0	13:14	0.000	1866.152
J15	JUNCTION	0.000	23.142	0	13:01	0.000	1749.533
J16	JUNCTION	0.000	23.221	0	12:47	0.000	1751.722
J17	JUNCTION	6.060	26.808	0	17:59	38.284	3016.779
J18	JUNCTION	0.000	18.246	0	09:44	0.000	1152.901
J19	JUNCTION	0.000	6.860	0	11:29	0.000	502.426
J2	JUNCTION	0.000	24.067	0	16:10	0.000	2377.938
J20	JUNCTION	0.000	6.868	0	11:15	0.000	502.881
J21	JUNCTION	0.000	23.766	0	13:35	0.000	1862.495
J22	JUNCTION	0.000	23.816	0	14:01	0.000	1930.741
J23	JUNCTION	0.000	23.998	0	15:03	0.000	2062.275
J24	JUNCTION	0.000	24.122	0	16:07	0.000	2281.222
J25	JUNCTION	4.810	4.810	0	08:10	23.566	23.563
J26	JUNCTION	0.000	2.252	0	08:24	0.000	115.408
J27	JUNCTION	0.000	18.183	0	09:28	0.000	1156.554
J28	JUNCTION	0.000	16.482	0	08:53	0.000	429.258
J29	JUNCTION	0.000	17.616	0	08:43	0.000	342.812
J3	JUNCTION	14.257	14.257	0	08:19	128.408	128.397
J30	JUNCTION	0.000	22.399	0	08:26	0.000	268.377
J31	JUNCTION	11.028	19.700	0	08:18	56.611	178.328
J32	JUNCTION	0.000	0.499	0	17:29	0.000	68.014
J33	JUNCTION	0.000	0.655	0	13:17	0.000	50.769
J34	JUNCTION	0.000	1.131	0	09:06	0.000	74.905
J35	JUNCTION	0.000	0.721	0	12:03	0.000	58.249
J36	JUNCTION	0.000	22.836	0	12:40	0.000	1702.212
J37	JUNCTION	31.446	37.807	0	08:13	222.915	280.947
J37500	JUNCTION	0.000	27.570	0	17:17	0.000	3095.589
J38	JUNCTION	0.000	10.852	0	10:37	0.000	467.204
J39	JUNCTION	0.000	25.941	0	18:00	0.000	2885.910
J39001	JUNCTION	0.000	27.427	0	18:18	0.000	3097.796
J4	JUNCTION	0.000	0.909	1	02:29	0.000	132.830
J40323	JUNCTION	0.000	27.435	0	18:14	0.000	3098.548
J41	JUNCTION	3.724	3.724	0	08:09	72.631	72.629
J41106	JUNCTION	0.000	27.446	0	18:10	0.000	3099.348
J42	JUNCTION	0.000	0.532	0	17:43	0.000	65.446
J43501	JUNCTION	0.000	25.924	0	18:03	0.000	2875.363
J44	JUNCTION	6.020	6.020	0	08:09	108.964	375.061
J45	JUNCTION	0.000	0.948	0	12:52	0.000	133.379
J46	JUNCTION	7.305	8.676	0	08:11	38.741	504.416
J46102	JUNCTION	0.000	25.840	0	17:43	0.000	2803.830
J46203	JUNCTION	0.000	23.689	0	16:29	0.000	2355.265
J47	JUNCTION	0.000	10.712	0	10:58	0.000	465.017
J5	JUNCTION	0.000	27.419	0	18:23	0.000	3096.524
J51	JUNCTION	0.000	10.908	0	10:20	0.000	416.458

J54	JUNCTION	3.140	10.996	0	08:51	9.898	278.961
J55	JUNCTION	0.000	0.027	0	08:22	0.000	0.084
J55.5	JUNCTION	0.000	4.764	0	08:10	0.000	23.569
J56	JUNCTION	0.000	10.979	0	08:52	0.000	278.969
J57	JUNCTION	0.000	12.397	0	08:10	0.000	65.998
J58.7	JUNCTION	12.397	12.397	0	08:10	66.005	65.998
J6	JUNCTION	10.485	10.485	0	08:09	44.541	52.512
J60	JUNCTION	0.000	10.899	0	08:59	0.000	369.517
J61	JUNCTION	0.000	10.555	0	10:03	0.000	367.607
J7	JUNCTION	0.000	23.833	0	15:36	0.000	2107.893
J77	JUNCTION	0.000	10.892	0	10:33	0.000	467.566
J8	JUNCTION	4.480	4.480	0	08:09	58.894	60.113
J80	JUNCTION	0.000	6.885	0	10:52	0.000	503.823
J81	JUNCTION	0.000	2.980	0	14:10	0.000	266.536
J82	JUNCTION	0.000	24.420	0	09:50	0.000	1711.083
J83	JUNCTION	0.000	0.952	0	12:54	0.000	133.458
J88	JUNCTION	0.000	1.197	0	17:38	0.000	151.614
J89	JUNCTION	0.000	0.532	0	18:08	0.000	65.730
J9	JUNCTION	0.000	23.170	0	14:51	0.000	1947.955
J92	JUNCTION	0.000	23.853	0	13:26	0.000	1864.414
J93	JUNCTION	0.000	23.752	0	14:11	0.000	1949.555
J94	JUNCTION	0.000	23.717	0	15:22	0.000	2051.961
J95	JUNCTION	0.000	23.612	0	15:48	0.000	2104.799
J96	JUNCTION	0.000	24.330	0	15:58	0.000	2286.065
J98	JUNCTION	0.000	27.453	0	18:08	0.000	3100.116
J99	JUNCTION	0.000	3.142	0	14:27	0.000	432.878
J5205	OUTFALL	0.000	28.913	0	17:16	0.000	3095.107
S2020	STORAGE	13.655	13.927	0	08:10	62.940	63.601
S2030	STORAGE	12.773	12.845	0	08:10	98.095	99.291
S2035	STORAGE	14.682	14.682	0	08:10	75.787	76.522
S2045	STORAGE	8.642	8.642	0	08:10	52.846	52.842
S2050	STORAGE	12.843	12.843	0	08:10	81.995	82.233
S2055	STORAGE	9.394	9.394	0	08:10	56.179	56.369
S2060	STORAGE	11.353	11.353	0	08:19	97.448	98.113
S2065	STORAGE	15.960	16.181	0	08:19	114.042	114.465
S2075	STORAGE	12.570	12.570	0	08:10	96.832	96.824
S2080	STORAGE	4.094	4.094	0	08:09	45.609	45.606
S2085	STORAGE	9.154	9.154	0	08:10	75.311	75.305
S2090	STORAGE	6.388	6.388	0	08:10	52.774	52.771
S2095	STORAGE	10.524	10.524	0	08:19	94.470	94.578
S2100	STORAGE	7.694	7.694	0	08:10	45.130	45.668
S2105	STORAGE	7.953	7.953	0	08:10	52.065	52.061
S2110	STORAGE	8.805	8.805	0	08:10	44.100	44.096
S2115	STORAGE	9.089	9.089	0	08:10	83.960	83.954
S2125	STORAGE	10.080	10.080	0	08:19	80.494	80.487
S2130	STORAGE	11.317	11.317	0	08:19	80.075	80.300
S2133	STORAGE	10.998	10.998	0	08:19	85.378	85.371
S2135	STORAGE	4.108	4.108	0	08:09	20.068	20.066
S2140	STORAGE	9.039	9.039	0	08:10	62.878	62.873
S2155	STORAGE	10.766	10.766	0	08:10	66.456	66.450
S2165	STORAGE	19.276	19.276	0	08:19	152.730	152.717
S2175	STORAGE	8.638	8.638	0	08:10	44.632	47.031
S2180	STORAGE	11.456	11.456	0	08:19	89.286	91.738
S2185	STORAGE	8.536	8.536	0	08:10	57.410	57.405
S2190	STORAGE	10.939	10.939	0	08:10	74.101	74.094
S2200	STORAGE	39.339	39.339	0	08:20	511.473	511.444
S2210	STORAGE	9.291	9.291	0	08:10	53.896	53.890
S2215	STORAGE	12.358	12.358	0	08:19	93.713	93.705

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Node Surcharge Summary
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J37	JUNCTION	3.83	0.416	1.850
J58.7	JUNCTION	7.03	4.943	0.000
S2180	STORAGE	40.95	1.193	2.807

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Node Flooding Summary
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No nodes were flooded.

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Storage Volume Summary
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	E&I Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
S2020	28.636	15	0	48.904	26	0 14:00	0.409
S2030	40.766	16	0	72.110	29	0 16:02	0.742
S2035	34.099	16	0	58.299	27	0 14:31	0.498
S2045	18.901	15	0	35.880	28	0 15:30	0.413
S2050	30.918	16	0	56.362	28	0 15:33	0.615
S2055	24.744	17	0	44.211	31	0 16:14	0.399
S2060	39.579	15	0	66.837	25	0 16:13	0.667
S2065	58.191	16	0	89.463	24	0 16:16	0.603
S2075	37.063	16	0	62.965	27	0 16:36	0.668
S2080	10.299	15	0	21.812	32	0 14:11	0.686
S2085	27.900	17	0	46.051	27	0 17:45	0.532
S2090	15.701	14	0	29.680	26	0 17:06	0.424
S2095	38.933	16	0	64.853	27	0 18:01	0.618
S2100	21.223	17	0	37.298	30	0 16:44	0.299
S2105	21.072	16	0	37.991	28	0 16:41	0.371
S2110	17.118	15	0	31.696	27	0 15:02	0.313
S2115	25.884	13	0	47.727	24	0 16:51	0.673
S2125	32.918	15	0	55.287	26	0 17:30	0.505
S2130	41.340	15	0	63.978	24	0 16:16	0.426
S2133	36.732	14	0	60.064	24	0 16:00	0.528
S2135	8.333	15	0	14.620	26	0 16:21	0.151
S2140	23.353	17	0	40.870	31	0 18:41	0.482
S2155	28.046	17	0	47.159	28	0 17:21	0.436
S2165	66.152	17	0	105.593	27	0 18:23	0.952
S2175	31.948	24	0	41.839	31	0 23:25	0.254
S2180	27.327	27	0	43.868	44	0 19:02	2.371
S2185	27.721	18	0	42.393	27	0 19:37	0.374
S2190	41.363	21	0	57.558	30	0 20:11	0.377
S2200	194.896	15	0	286.867	23	0 20:24	3.142
S2210	34.326	22	0	43.912	28	0 18:38	0.205
S2215	47.689	19	0	68.457	27	0 17:30	0.499

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Outfall Loading Summary
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Outfall Node	Flow Freq. Pcnt.	Avg. Flow CMS	Max. Flow CMS	Total Volume 10^6 ltr
J5205	99.40	14.391	28.913	3095.107
System	99.40	14.391	28.913	3095.107

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Link Flow Summary
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Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	27.570	0 17:17	0.62	1.50	0.93
C10	CONDUIT	23.089	0 14:57	0.88	2.31	1.00
C11	CHANNEL	3.032	0 14:20	0.27	0.07	0.39
C12	CONDUIT	24.067	0 16:10	0.55	0.79	0.80
C13	CHANNEL	0.948	0 12:52	0.47	0.09	0.53
C14	CHANNEL	6.868	0 11:15	0.56	0.10	0.37
C15	CHANNEL	0.476	0 11:54	0.32	0.01	0.51
C16	CHANNEL	16.019	0 09:03	0.84	0.22	0.48
C17	CHANNEL	16.482	0 08:53	0.77	0.22	0.51
C18	CHANNEL	17.616	0 08:43	0.71	0.30	0.55
C19	CHANNEL	18.833	0 08:26	0.74	0.33	0.58
C2	CHANNEL	1.861	0 09:45	0.24	0.03	0.63
C20	CHANNEL	0.511	0 12:13	0.21	0.02	0.40
C21	CHANNEL	0.499	0 17:40	0.21	0.01	0.19
C22	CONDUIT	22.836	0 12:40	3.09	8.84	0.86
C23	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C24	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C25	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C26	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C27	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C28	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C29	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C3	CHANNEL	0.027	0 08:22	0.20	0.00	0.74
C30	CONDUIT	10.852	0 10:37	1.98	6.45	0.91
C31	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C32	CONDUIT	25.659	0 17:51	0.43	0.97	1.00
C33	CHANNEL	0.000	0 00:00	0.00	0.00	0.00
C34	CONDUIT	6.839	0 11:46	1.50	2.25	0.68
C35	CHANNEL	0.754	0 09:05	0.09	0.01	0.34
C37	CHANNEL	2.071	0 08:26	0.29	0.05	0.35
C38	CHANNEL	0.532	0 18:08	0.20	0.01	0.16
C4	CONDUIT	26.775	0 18:06	0.74	1.47	0.57
C5	CHANNEL	1.859	0 10:50	0.25	0.02	0.27
C6	CONDUIT	23.766	0 13:35	1.63	3.93	0.84
C6000	CHANNEL	10.326	0 08:54	1.24	1.80	0.73
C6007	CHANNEL	6.571	0 08:18	0.44	0.37	0.97
C6015a	CHANNEL	10.979	0 08:52	1.17	0.23	0.63

C6015b	CHANNEL	10.899	0	08:59	0.66	0.16	0.48
C6025a	CHANNEL	10.339	0	08:21	1.58	0.32	0.63
C6030	CHANNEL	10.555	0	10:03	0.50	0.26	0.50
C6040	CHANNEL	3.636	0	08:29	0.82	0.26	0.56
C6045a	CHANNEL	10.609	0	10:18	0.68	0.16	0.41
C6045b	CHANNEL	10.811	0	10:27	0.56	0.09	0.50
C6055a	CHANNEL	10.712	0	10:58	0.64	0.22	0.58
C6055d	CHANNEL	10.421	0	11:32	0.44	0.20	0.79
C6090a	CHANNEL	22.815	0	12:46	0.37	0.13	0.46
C6090b	CHANNEL	23.142	0	13:01	0.34	0.16	0.48
C6090c	CHANNEL	23.053	0	13:13	0.32	0.17	0.49
C6090d	CHANNEL	23.853	0	13:26	0.36	0.16	0.50
C6100a	CHANNEL	6.860	0	11:29	0.53	0.12	0.37
C6100b	CHANNEL	6.847	0	11:42	0.43	0.11	0.42
C6100c	CHANNEL	15.027	0	09:46	0.34	0.08	0.56
C6110a	CHANNEL	23.634	0	13:46	0.38	0.14	0.51
C6110b	CHANNEL	23.647	0	14:11	0.29	0.14	0.58
C6120a	CHANNEL	23.405	0	14:32	0.26	0.22	0.59
C6120b	CHANNEL	23.170	0	14:51	0.27	0.17	0.58
C6120c	CHANNEL	23.717	0	15:22	0.28	0.19	0.55
C6135a	CHANNEL	23.560	0	15:33	0.33	4.23	0.52
C6135b	CHANNEL	23.612	0	15:48	0.43	2.66	0.50
C6145	CHANNEL	1.716	0	09:02	0.31	0.05	0.59
C6150	CHANNEL	23.499	0	15:54	0.30	0.07	0.58
C6160a	CHANNEL	24.122	0	16:07	0.21	4.85	0.67
C6160b	CHANNEL	23.689	0	16:29	0.43	0.45	0.70
C6170e	CHANNEL	23.325	0	16:37	0.39	0.32	0.75
C6170f	CHANNEL	25.924	0	18:03	0.34	0.25	0.81
C6170l	CHANNEL	25.903	0	18:10	0.33	0.23	0.79
C6180a	CHANNEL	27.446	0	18:10	0.56	0.03	0.56
C6180b	CHANNEL	27.435	0	18:14	0.98	0.01	0.38
C6180c	CHANNEL	27.427	0	18:18	0.80	0.06	0.59
C6180d	CHANNEL	27.419	0	18:23	0.64	0.06	0.59
C6180e	CHANNEL	28.913	0	17:16	0.78	0.02	0.49
C6190	CHANNEL	3.305	1	02:30	0.15	0.07	0.69
C6220	CHANNEL	6.513	0	09:20	0.88	0.66	0.56
C7	CHANNEL	6.882	0	11:02	0.48	0.16	0.39
C7025	CONDUIT	12.397	0	08:10	5.36	41.91	1.00
C7040	CHANNEL	4.764	0	08:10	1.17	0.41	0.66
C7075	CONDUIT	6.885	0	10:52	1.14	0.17	0.59
C8	CONDUIT	23.376	0	14:02	0.96	1.65	0.67
C9	CHANNEL	18.246	0	09:44	0.48	0.09	0.42
CJ0.5	CHANNEL	0.749	0	21:14	1.28	0.02	0.61
CJ0.75	CHANNEL	0.735	0	14:08	0.51	0.09	0.48
CJ0.8	CHANNEL	2.260	0	13:12	0.20	0.02	0.86
CJ0.9	CHANNEL	1.544	0	13:12	0.26	0.03	0.75
CJ4	CHANNEL	0.934	1	02:31	0.17	0.01	0.79
CJ4.5	CHANNEL	0.909	1	02:29	0.47	0.09	0.78
CJ81	CHANNEL	5.738	0	11:02	0.34	0.16	0.42
CJ88	CHANNEL	1.197	0	17:47	0.27	0.02	0.25
CJ89	CHANNEL	0.532	0	18:42	0.16	0.06	0.17
P1	PUMP	0.000	0	00:00		0.00	
OR2020-1	ORIFICE	0.104	0	14:27			1.00
OR2020-2	ORIFICE	0.305	0	14:00			1.00
OR2030-1	ORIFICE	0.182	0	20:23			1.00
OR2030-2	ORIFICE	0.563	0	17:02			1.00
OR2035-1	ORIFICE	0.136	0	17:38			1.00
OR2035-2	ORIFICE	0.363	0	14:31			1.00
OR2045-1	ORIFICE	0.108	0	17:50			1.00
OR2045-2	ORIFICE	0.306	0	15:30			1.00
OR2050-1	ORIFICE	0.165	0	17:28			1.00
OR2050-2	ORIFICE	0.451	0	15:33			1.00
OR2055-1	ORIFICE	0.098	0	21:48			1.00
OR2055-2	ORIFICE	0.301	0	21:48			1.00
OR2060-1	ORIFICE	0.175	0	18:23			1.00
OR2060-2	ORIFICE	0.493	0	16:13			1.00
OR2065-1	ORIFICE	0.150	1	01:52			1.00
OR2065-2	ORIFICE	0.453	1	00:58			1.00
OR2075-1	ORIFICE	0.161	0	16:28			1.00
OR2075-2	ORIFICE	0.507	0	16:28			1.00
OR2080-1	ORIFICE	0.103	0	17:38			1.00
OR2080-2	ORIFICE	0.319	0	17:38			1.00
OR2085-1	ORIFICE	0.130	0	17:43			1.00
OR2085-2	ORIFICE	0.402	0	17:43			1.00
OR2090-1	ORIFICE	0.115	0	17:06			1.00
OR2090-2	ORIFICE	0.308	0	17:06			1.00
OR2095-1	ORIFICE	0.158	0	21:25			1.00
OR2095-2	ORIFICE	0.460	0	21:25			1.00
OR2100-1	ORIFICE	0.070	0	09:10			1.00
OR2100-2	ORIFICE	0.233	0	23:49			1.00
OR2105-1	ORIFICE	0.095	0	23:17			1.00
OR2105-2	ORIFICE	0.275	0	22:57			1.00
OR2110-1	ORIFICE	0.081	0	10:20			1.00
OR2110-2	ORIFICE	0.234	0	18:22			1.00
OR2115-1	ORIFICE	0.173	0	22:44			1.00
OR2115-2	ORIFICE	0.509	0	17:20			1.00
OR2125-1	ORIFICE	0.136	0	11:02			1.00
OR2125-2	ORIFICE	0.381	1	00:49			1.00
OR2130-1	ORIFICE	0.102	0	21:32			1.00
OR2130-2	ORIFICE	0.324	0	21:32			1.00
OR2133-1	ORIFICE	0.142	0	16:00			1.00
OR2133-2	ORIFICE	0.386	0	16:00			1.00
OR2135-1	ORIFICE	0.037	0	10:52			1.00
OR2135-2	ORIFICE	0.115	0	11:07			1.00
OR2140-1	ORIFICE	0.120	0	11:56			1.00
OR2140-2	ORIFICE	0.362	0	11:56			1.00
OR2155-1	ORIFICE	0.123	0	11:22			1.00
OR2155-2	ORIFICE	0.318	0	11:49			1.00
OR2165-1	ORIFICE	0.243	0	12:54			1.00
OR2165-2	ORIFICE	0.709	0	12:54			1.00
OR2175-1	ORIFICE	0.068	0	10:39			1.00
OR2175-2	ORIFICE	0.189	0	11:04			1.00
OR2180-1	ORIFICE	2.371	0	09:52			1.00
OR2185-1	ORIFICE	0.100	0	11:39			1.00
OR2185-2	ORIFICE	0.278	0	12:09			1.00
OR2190-1	ORIFICE	0.094	0	12:53			1.00
OR2190-2	ORIFICE	0.284	0	12:53			1.00
OR2200-1	ORIFICE	1.011	0	14:18			1.00
OR2200-2	ORIFICE	2.136	0	14:36			0.98
OR2210-1	ORIFICE	0.051	0	15:33			1.00
OR2210-2	ORIFICE	0.154	0	15:33			1.00
OR2215-1	ORIFICE	0.125	0	17:29			1.00
OR2215-2	ORIFICE	0.374	0	17:29			1.00
W2020	WEIR	0.000	0	00:00			0.00
W2030	WEIR	0.000	0	00:00			0.00
W2035	WEIR	0.000	0	00:00			0.00
W2045	WEIR	0.000	0	00:00			0.00
W2050	WEIR	0.000	0	00:00			0.00
W2055	WEIR	0.000	0	00:00			0.00
W2060	WEIR	0.000	0	00:00			0.00
W2065	WEIR	0.000	0	00:00			0.00
W2075	WEIR	0.000	0	00:00			0.00
W2080	WEIR	0.266	0	14:11			0.09
W2085	WEIR	0.000	0	00:00			0.00
W2090	WEIR	0.000	0	00:00			0.00
W2095	WEIR	0.000	0	00:00			0.00
W2100	WEIR	0.000	0	00:00			0.00
W2105	WEIR	0.000	0	00:00			0.00
W2110	WEIR	0.000	0	00:00			0.00
W2115	WEIR	0.000	0	00:00			0.00
W2125	WEIR	0.000	0	00:00			0.00
W2130	WEIR	0.000	0	00:00			0.00
W2133	WEIR	0.000	0	00:00			0.00
W2135	WEIR	0.000	0	00:00			0.00
W2140	WEIR	0.000	0	00:00			0.00
W2155	WEIR	0.000	0	00:00			0.00
W2165	WEIR	0.000	0	00:00			0.00
W2175	WEIR	0.042	0	17:29			0.03
W2185	WEIR	0.000	0	00:00			0.00
W2190	WEIR	0.000	0	00:00			0.00
W2200	WEIR	0.000	0	00:00			0.00
W2210	WEIR	0.000	0	00:00			0.00
W2215	WEIR	0.000	0	00:00			0.00

****
Flow Classification Summary
****

	Adjusted	--- Fraction of Time in Flow Class ----							Avg.	Avg.
	/Actual		Up	Down	Sub	Sup	Up	Down	Froude	Flow
Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Number	Change
C1	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0000
C11	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.12	0.0000
C12	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.06	0.0000
C13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.21	0.0000
C15	1.00	0.01	0.01	0.00	0.98	0.00	0.00	0.00	0.02	0.0000
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.22	0.0000
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.19	0.0000
C19	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0000
C2	1.00	0.00	0.00	0.00	0.98	0.00	0.00	0.01	0.03	0.0000
C20	1.00	0.02	0.00	0.00	0.78	0.00	0.00	0.20	0.07	0.0000
C21	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.00	0.06	0.0000
C22	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.46	0.0001
C23	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C24	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C25	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C26	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C27	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C28	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C29	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.0000
C30	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0001
C31	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C32	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.04	0.0000
C33	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000
C34	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.24	0.0000
C35	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C37	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000

C38	1.00	0.02	0.01	0.00	0.98	0.00	0.00	0.00	0.10	0.0000
C4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C5	1.00	0.01	0.01	0.00	0.98	0.00	0.00	0.00	0.08	0.0000
C6	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.24	0.0000
C6000	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C6007	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
C6015a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.34	0.0000
C6015b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.07	0.0000
C6025a	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.21	0.0000
C6030	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.15	0.0000
C6040	1.00	0.00	0.00	0.00	0.08	0.00	0.00	0.92	0.18	0.0000
C6045a	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.25	0.0000
C6045b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.16	0.0000
C6055a	1.00	0.00	0.00	0.00	0.71	0.00	0.00	0.29	0.17	0.0000
C6055d	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.04	0.0000
C6090a	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.09	0.0000
C6090b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C6090c	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.08	0.0000
C6090d	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.09	0.0000
C6100a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.20	0.0000
C6100b	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.14	0.0000
C6100c	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.06	0.0000
C6110a	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.08	0.0000
C6110b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.05	0.0000
C6120a	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.05	0.0000
C6120b	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.05	0.0000
C6120c	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.06	0.0000
C6135a	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.07	0.0000
C6135b	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.10	0.0000
C6145	1.00	0.00	0.00	0.00	0.98	0.00	0.00	0.01	0.01	0.0000
C6150	1.00	0.00	0.02	0.00	0.98	0.00	0.00	0.00	0.06	0.0000
C6160a	1.00	0.00	0.00	0.00	0.97	0.00	0.00	0.02	0.04	0.0001
C6160b	1.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00	0.10	0.0000
C6170e	1.00	0.00	0.02	0.00	0.97	0.00	0.00	0.00	0.09	0.0000
C6170f	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C6170l	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.08	0.0000
C6180a	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C6180b	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.23	0.0000
C6180c	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
C6180d	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.14	0.0000
C6180e	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.19	0.0000
C6190	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.03	0.0000
C6220	1.00	0.00	0.00	0.00	0.93	0.00	0.00	0.07	0.05	0.0000
C7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.17	0.0000
C7025	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.01	0.0005
C7040	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.06	0.0000
C7075	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.18	0.0000
C8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.12	0.0000
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.10	0.0000
CJ0.5	1.00	0.03	0.00	0.00	0.65	0.00	0.00	0.33	0.40	0.0000
CJ0.75	1.00	0.02	0.00	0.00	0.97	0.00	0.00	0.00	0.19	0.0000
CJ0.8	1.00	0.01	0.00	0.00	0.98	0.00	0.00	0.01	0.01	0.0000
CJ0.9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.02	0.0000
CJ4	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.01	0.0000
CJ4.5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.04	0.0000
CJ81	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.13	0.0000
CJ88	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.15	0.0000
CJ89	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.09	0.0000

****
Conduit Surcharge Summary
****

Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	0.01	0.01	0.01	18.39	0.01
C10	0.01	0.01	0.01	21.85	0.01
C22	0.01	0.01	0.01	47.12	0.01
C30	0.01	0.01	0.01	20.06	0.01
C32	9.19	9.19	9.19	0.01	9.19
C34	0.01	0.01	0.01	17.31	0.01
C4	0.01	0.01	0.01	17.73	0.01
C6	0.01	0.01	0.01	33.19	0.01
C6000	0.01	0.01	0.01	6.31	0.01
C6135a	0.01	0.01	0.01	38.63	0.01
C6135b	0.01	0.01	0.01	28.75	0.01
C6160a	0.01	0.01	0.01	44.25	0.01
C7025	6.99	6.99	6.99	10.05	6.99
C8	0.01	0.01	0.01	10.76	0.01

****
Pumping Summary
****

Pump	Percent Utilized	Number of Start-Ups	Min Flow CMS	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr	Power Usage Kw-hr	% Time Off Pump Curve Low	% Time Off Pump Curve High
P1	0.00	0	0.00	0.00	0.00	0.000	0.00	0.0	0.0

Analysis begun on: Thu Sep 07 16:31:45 2017
Analysis ended on: Thu Sep 07 16:32:17 2017
Total elapsed time: 00:00:32

APPENDIX I

Hydraulics

1603-11265 Upper Little River
Flood Elevations
2017-09-01

Road	ERCA Floodplain Mapping		Twin Oaks Business Park			Current PC-SWMM model							Survey Data			
	By MacLaren (1985)		by Lafontaine, etc. (1997)			Existing			Proposed							
	100 yr Water Level (m)	Flow (m^3/s)	100 yr Water Level (m)	Flow (m^3/s)		100 yr Water Level (m)	Change in WL relative to ERCA (m)	Flow (m^3/s)	100 yr Water Level (m)	Change in WL relative to ERCA (m)	Flow (m^3/s)		Ground u/s of road crossing (m)	Road Spill (m)	Road at Crossing (m)	Proposed Conditions Flooding (m)
Baseline Road	184.04	24.4				184.13	0.09	34.7	183.67	-0.37	24.4		183.9	184.3	184.5	-0.2
Country Road 42	182.63	24.4				183.20	0.57	39.8	181.95	-0.68	23.9		182.2	182.6	182.9	-0.3
Lauzon Parkway	182.12	24.4				182.52	0.40	40.1	181.49	-0.63	23.6		182.2	182.3	183.7	-0.7
Lauzon Road	181.72	27.7				182.01	0.29	43.7	181.21	-0.51	23.2		181.3	181.6	182.0	-0.1
Railway	181.56	34.0	181.13	39.4		181.64	0.08	45.4	180.85	-0.71	24.1		181.1	182.4	182.4	-0.3
Twin Oaks Drive	180.91	39.5	180.86	39.6		180.97	0.06	49.5	180.28	-0.63	25.8		180.5			-0.2
E.C. Row Expressway	180.72	42.8	180.77	40.5		180.81	0.09	50.6	180.18	-0.54	26.8		180.0	181.4	183.0	0.2
Forest Glade Drive	180.39	42.8				180.41	0.02	51.4	179.84	-0.55	27.4		179.5	180.5	181.0	0.3

Existing

Location	ERCA Floodplain Mapping		Twin Oaks Business Park			Current Study			Elevation Data			
	By MacLaren (1985)		by Lafontaine, etc. (1997)			By Stantec (2017)			Windsor Airport (1990)			
	100 yr Water Level (m)	Flow (m^3/s)	100 yr Water Level (m)	Flow (m^3/s)		100 yr Water Level (m)	Change in WL relative to ERCA (m)	Flow (m^3/s)	Ground u/s of road crossing (m)	Road Spill (m)	Road at Crossing (m)	
Baseline Road	184.04	24.4				184.13	0.09	34.7	183.9	184.3	184.5	
Country Road 42	182.63	24.4				183.20	0.57	39.8	182.2	182.6	182.9	
Lauzon Parkway	182.12	24.4				182.52	0.40	40.1	182.2	182.3	183.7	
Lauzon Road	181.72	27.7				182.01	0.29	43.7	181.3	181.6	182.0	
Railway	181.56	34.0	181.13	39.4		181.64	0.08	45.4	181.1	182.4	182.4	
Twin Oaks Drive	180.91	39.5	180.86	39.6		180.97	0.06	49.5	180.5			
E.C. Row Expressway	180.72	42.8	180.77	40.5		180.81	0.09	50.6	180.0	181.4	183.0	
Forest Glade Drive	180.39	42.8				180.41	0.02	51.4	179.5	180.5	181.0	

Proposed

Road	Current PC-SWMM model					Survey Data			
	Existing		Proposed						
	100 yr Water Level (m)	Flow (m^3/s)	100 yr Water Level (m)	Flow (m^3/s)		Ground u/s of road crossing (m)	Road Spill (m)	Road at Crossing (m)	Proposed Conditions Flooding (m)
Baseline Road (J5090/J82)	184.13	34.7	183.67	24.4		183.9	184.3	184.5	-0.2
Country Road 42 (J5110/J92)	183.20	39.8	181.95	23.9		182.2	182.6	182.9	-0.3
Lauzon Parkway (J12)	182.52	40.1	181.49	23.6		182.2	182.3	183.7	-0.7
Lauzon Road (J9)	182.01	43.7	181.21	23.2		181.3	181.6	182.0	-0.1
Railway (J24)	181.64	45.4	180.85	24.1		181.1	182.4	182.4	-0.3
Twin Oaks Drive (J46102)	180.97	49.5	180.28	25.8		180.5			-0.2
E.C. Row Expressway (J17)	180.81	50.6	180.18	26.8		180.0	181.4	183.0	0.2
Forest Glade Drive (J5)	180.41	51.4	179.84	27.4		179.5	180.5	181.0	0.3

APPENDIX J

Fluvial Geomorphology

DRAFT REPORT

Sandwich South Employment Lands Upper Little River Existing Conditions

Date: February 2012

Ref: 01-11-46

PARISH geomorphic

PARISH geomorphic

2500, Meadowpine Blvd. Suite 200 Address
Mississauga, Ontario, L5N 6C4
Canada
(905) 877-9531 Telephone
(905) 877-4143 Fax
www.parishgeomorphic.com Internet

Document Title:	Sandwich South Employment Lands – Upper Little River Existing Conditions
Status:	Draft Report
Version:	01
Date:	December 2012
Project name:	Sandwich South Employment Lands
Project number:	01-11-46
Client:	Stantec
Reference:	01-11-46/01 - draft

Drafted by:	Tatiana Hrytsak, M.Sc
Checked by:	Benjamin Swanson, PhD
Date checked:	December 10, 2012
Approved by:	John Parish P.Geo.
Date of approval:	

Contents

1. Introduction

Property is currently being developed for mixed land uses in Windsor between Highway 401, the E.C. Row Expressway, Walker Road, and Banwell Road. Due to the proposal for future development and the anticipated decrease of permeable surfaces in the watershed, a geomorphic assessment was required. This study builds upon a previous report from 2004, in which, a detailed desktop analysis of the study area was conducted and monitoring cross-sections were installed to establish a baseline of conditions in the area. This study entails:

- A field reconnaissance of the study area using rapid channel assessments to confirm the findings of the background review. The site reconnaissance also serves to identify and confirm any physical rates of channel adjustments;
- Establishment of meander belt widths;
- Detailed geomorphic field assessments including collection of cross-sectional and survey data and re-monitoring of the historic channel cross-sections established in 2004;
- Detailed geomorphic analyses to determine erosion threshold assessments;
- Restoration recommendations for the channels areas;

2. Background Review

In 2004/2005, a desktop analysis was initially conducted to determine the general characteristics of watercourses in the study area. The amount and size of sediment inputs, valley shape, land use or vegetation cover, and other parameters that influence channel form often change as you move downstream along a waterway. In order to account for these changes, channels are often separated into "reaches". Reaches can be defined as stretches of channel that flow through a nearly constant valley setting and incorporate similar physical characteristics along their lengths. Thus, reaches experience similar controlling and modifying influences, which are reflected in similar geomorphological form, function, and process. Watercourses within the subject area were divided into reaches, as illustrated in **Figure 2.1**. Reach lengths were measured and are provided in **Table 2.1**.

The study area is located in the physiographic region known as the St. Clair Clay Plain which contains both the Essex and Lambton Clay Plains. Little River is located on the Essex Clay Plain which ranges in thickness from 30 to 60 meters (Chapman and Putnam, 1984). The till is described as clayey-silt and glaciolacustrine clay. The underlying bedrock surface consists of sedimentary rocks such as limestone and dolostone. Some small areas of glaciolacustrine sand are also found bordering Little River, but the Quaternary geology of the area is primarily till. Two tills have been identified in the area, Catfish Creek and the overlying Tavistock till.

A historic analysis was also conducted for each reach using aerial photographs from 1955 and 1978 as well as digital imagery from 2004 to document changes in land use and channel planform. It was noted that the surrounding land use was predominantly agriculture and most of the study reaches had been altered or straightened – most before 1955. A description of observed changes is outlined in **Table 2.2**. Seven monitoring cross-sections were installed following the desktop assessment in order to establish baseline conditions within the study area. An initial draft of the current document was prepared in 2007, but it did n not include meander belt information or erosion threshold values.

Table 2.1: Summary of delineated reaches and measured lengths.

Watercourse Name	Reach	Length (m)
Little River	LR-2	1865.33
	LR-3	1208.62
	LR-4	1181.89
	LR-5	378
	LR-6	1383.74
Little River Drain	LRD-1	754.38
	LRD-2	922.33
	LRD-3	407.62
	LRD-4	1282.56
Rusette Drain	RD-1	1218.19
	RD-2	4010.88
McGill Drain	MD-1	1249.44
	MD-2	645.53
	MD-3	1821.31
Lappan Drain	LD-1	1979.61
	LD-2	870.43
Rivard Drain	RID-1	NA
Lachance Drain	LAD-1	1362.32
Desjardein Drain	DD-1	2151.23
Soulliere Drain	SD-1	1582.87
	SD-2	666.03
Baseline Road Drain	BRD-1	682.37
Ninth Concession Drain	NCD-1	2228.24
Sixth Concession Drain	SCD-1	1053.01
	SCD-2	1027.2
	SCD-3	1516.11
Hurley Relief Drain	HR-1	992.97

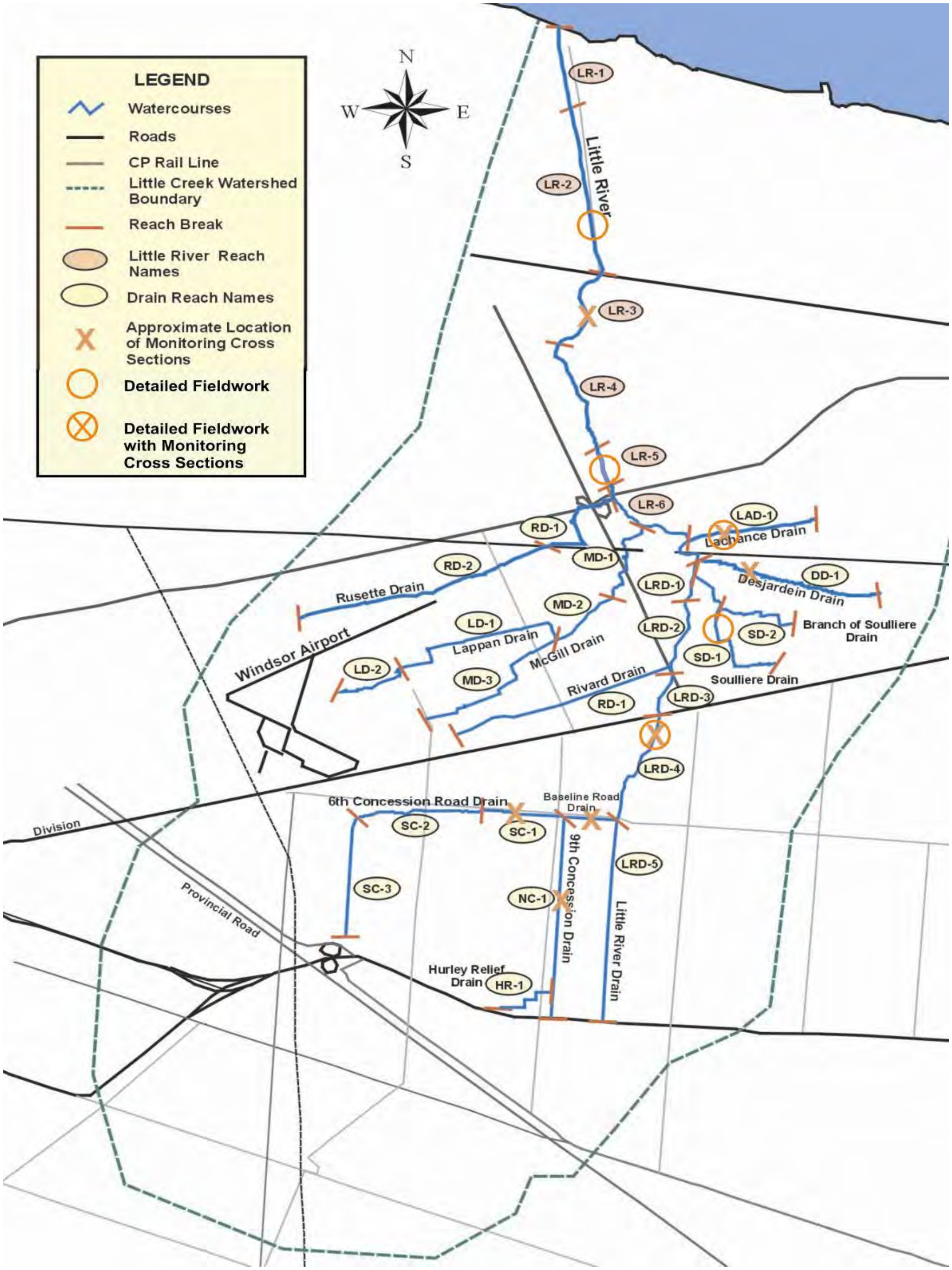


Figure 2.1: Delineated reaches and locations of monitoring cross-sections and detailed fieldwork.

Table 2.2: Historical Analysis Summary

Watercourse Name	Reach Name	Land Use Change	Channel Change
Little River	LR-1	1955 - agricultural on both banks, some residential development on western side of channel	1955 - straightened prior to this date, no observable bar formations or islands
		1978 - significant increase in residential development along western side of channel, also increase in residential development on eastern side of channel, nursery located on eastern side of channel has matured from 1954	1978 - channel still straight, no apparent changes in channel form or function, vegetation has matured along top of banks
		2004 - no coverage for this reach	2004 - no coverage for this reach
	LR-2	1955 - agricultural on both banks with a little residential land use on the western bank	1955 - straightened prior to 1954 with no bar formations or island apparent
		1978 - significant increase in residential development along the western bank, development of water treatment facility on eastern bank, lots of vegetation removed when development occurred	1978 - no apparent change in channel form, still straight with no bars are islands, no additional road crossings constructed since 1954
		2004 - no coverage	2004 - no coverage
	LR-3	1955 - mainly agricultural with a few crossings and associated buildings	1955 - appears to have been altered prior to 1954, engineered
		1978 - increase in the amount of industrial land use with associated parking lots and impermeable surface, some agricultural land use still being worked	1978 - does not appear to be any significant changes in channel form since 1954, no increase in bar formations or islands of any kind
		2004 - incomplete mapping available, no apparent changes in land use except for a small increase in the amount of residential development present since 1978	2004 - because of the incomplete coverage it is hard to distinguish if channel changes have occurred

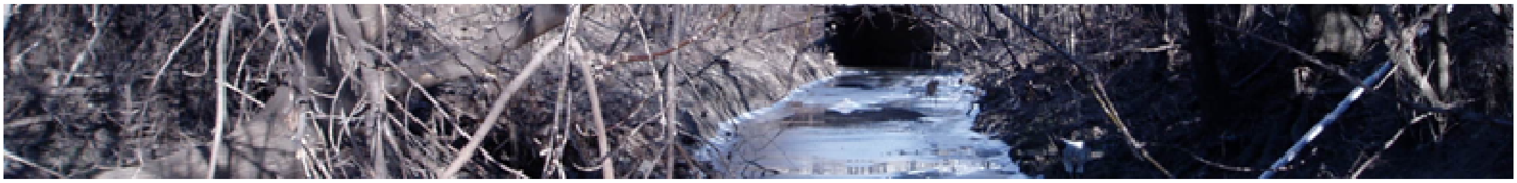
	LR-4	1955 - land use appears to be a golf course with very little bank coverage	1955 - channel appears in natural state with no straightening obvious
		1978 - land use remains a golf course, vegetation has grown in and was maintained, minor increase in residential development near upstream portion of reach break	1978 - no change in channel form, no new crossings added, vegetation more mature on banks
		2004 - remains a golf course, no apparent change in land use or increase in residential development past 1978	2004 - no apparent change in channel form, no straightening or engineering obvious from photo
	LR-5	1955 - mainly agricultural land use with associated out buildings	1955 - no evidence of channel alterations prior to 1955
		1978 - remains agricultural land use with a little more vegetative cover compared with 1954	1978 - channel does not appear to have been changes since 1955, no increase in crossings etc.
		2004 - change in land use from agricultural to parkland and residential/commercial with a new crossing constructed prior to 2004	2004 - channel appears to have been straightened slightly since the installation of the new crossing and change to parkland
	LR-6	1955 - mostly agricultural land use along both banks, some forested area on the western bank	1955 - channel appears in natural state with only on road crossing in centre of reach
		1978 - land use changed to a golf course prior to 1978 aerial photograph with associated buildings and parking area, few new residential buildings as well	1978 - channel does not appear to be altered however there were at least 6 new cart path crossings over the watercourse prior to 1978
		2004 - land use changed again to industrial with associated large impervious areas (parking lots and buildings) with the removal of the road crossing in centre of reach, and removal of foot bridges installed for the golf course prior to 1978	2004 - channel appears to have been altered/engineered prior to 2004, cart path bridges have been removed, road crossing present in existing years has been removed, and the banks look to be armoured/altered throughout most of the reach

Little River Drain	LRD-1	1955 - agricultural land use through all of reach	1955 - channel appears to be in natural state with no bar formations or islands, some erosion along outside of meander bends obvious
		1978 - mainly agricultural land use with a slight increase in the residential development along western portion of the watercourse	1978 - does not appear to be any changes in channel form, erosion still evident on outside of meander bends, no bar formations or islands obvious
		2004 - agricultural remains the dominant land use with no increase in the residential development along watercourse	2004 - no apparent change in channel form noted, no increase in erosion along bends, no obvious signs of bar formation or islands
	LRD-2	1955 - mainly agricultural land use with some scrub forest in upstream portion of reach	1955 - channel appears to have been altered prior to 1955, more like a drain through agricultural fields
		1978 - mainly agricultural land use with an obvious increase in the maturity of the scrub forest in the upstream portion of the reach	1978 - no apparent change in channel form but most of reach obscured by vegetation and poor quality of aerial photograph
		2004 - mixture of agricultural land use and forested area with the construction of a new road along the forested area, also a slight increase in the residential land use along this reach	2004 - no apparent change in channel form except for the installation of the new road crossing prior to 2004
	LRD-3	1955 - mainly agricultural lands inter-mixed with some scrub forest to road crossing	1955 - downstream portion of the reach appears to have been altered prior to 1955, upstream portion appears natural
		1978 - land use remained agricultural with a slight increase in the density of the scrub forest prior to 1978	1978 - no apparent change in the channel form from 1955, only addition of a new crossing in the downstream portion of reach
		2004 - no apparent change in the land use for this reach, the forest continued to increase in density	2004 - no apparent change in channel form from 1978
	LRD-4	1955 - majority of the reach is surrounded by agricultural land use with some scrub forest	1955 - channel appears in natural state but may be ephemeral with an undefined channel through the upstream portion of the reach
		1978 - remained agricultural	1978 - channel appears to have been straightened and now flows along the roadway
		2004 - remained agricultural	2004 - no apparent change in channel form since 1978
Baseline Road Drain	BRD-1	1955 - not apparent in aerial photograph	1955 - if present it appears to flow along the roadside as a ditch
		1978 - not obvious in aerial photograph	1978 - if present flows along roadside as a ditch

		2004 - agricultural land use for entire reach	2004 - flows along the roadside as a ditch with no apparent changes in channel form
9th Concession Drain	NCD-1	1955 - not apparent	1955 - channel ditches prior to 1955
		1978 - not apparent	1978 - no apparent changes in channel form
		2004 - mainly agricultural land use with the roadside and residential land uses as well	2004 - no apparent changes in channel form, a roadside ditch
6th Concession Drain	SCD-1	1955 - mainly agricultural with roadside and residential development as well	1955 - channel straightened into roadside ditch prior to 1955
		1978 - mainly agricultural with residential and infrastructure, no apparent change from 1955	1978 - no obvious change in channel form since 1955
		2004 - no apparent change from 1955	2004 - no obvious change in channel form since 1955
	SCD-2	1955 - mainly agricultural land use with residential back yards fronting onto watercourse	1955 - channel appears to have been altered prior to 1955, into a drainage channel along the backside of the residential properties
		1978 - no aerial photo coverage of this reach	1978 - no aerial photo coverage of this reach
		2004 - remained agricultural for the most part with a slight increase in infrastructure (road crossing) prior to 2004	2004 - no obvious changes in channel form except the road crossing
	SCD-3	1955 - no aerial photo coverage	1955 - no aerial photo coverage
		1978 - no aerial photo coverage	1978 - no aerial photo coverage
		2004 - surrounding land use is agricultural	2004 - ditched prior to 2004, straightened channel into ditch
Hurley Relief Drain	HR-1	1955 - no aerial photo coverage	1955 - no aerial photo coverage
		1978 - no aerial photo coverage	1978 - no aerial photo coverage
		2004 - mixture of agricultural, residential/parkland and water storage facilities	2004 - nothing to compare the channel to, however it does appear to have been altered prior to 2004 into a drainage feature
Rusette Drain	RD-1 and RD-2	1955 - mainly agricultural lands with a few road crossings and a nursery in the upstream end of the reach, airport was just being build so there was some clearing of the lands surrounding the channel for this development	1955 - appears to have been a dug ditch prior to this aerial photograph
		1978 - surrounding land use remained agricultural with road crossings and the rail line, airport runway now fully developed , nursery in the upstream area of the reach was removed and	1978 - channel appears as a well defined ditch with little vegetation around banks

		scrubland now in its place, large reservoir was constructed on the north side of RD-2	
		2004 - only a small portion of the channel remains agricultural, now a lot of residential development built up along the ditch in the upstream portion of the channel on the northern bank and the airport on the southern bank with some scrub meadow	2004 - not a lot of vegetation has grown in since the digging, development now right up to the top of bank of portions of the drain
Lappan Drain	LD-1 and LD-2	1955 - not well defined channel however land use is mainly agricultural in the area where the land looks wet	1955 - no defined channel clear in aerial photograph
		1978 - well defined channel that has been dug, ditched, , land use is mainly agricultural with some scrub forest in the upstream portion of the channel, few road crossings	1978 - well defined channel appears and dug prior to 1978
		2004 - now all agricultural lands, forest has been removed and all land receives run off from the airport	2004 - well defined channel, no apparent changes in channel planform from 1978
McGill Drain	MD-1	1955 - agricultural lands, with some scrub forest in the downstream portion	1955 - appears to have been ditched prior to 1955
		1978 - agricultural lands, and a golf course in the downstream portion	1978 - remains straightened without obvious changes to the planform
		2004 - remains agricultural with some urbanization in the form of industrial parklands in the downstream portion of the channel	2004 - channel is still straight with a few extra crossings over it, otherwise unchanged
	MD-2	1955 - agricultural lands with little other vegetation present	1955 - Channel appears to have been ditched prior to 1955
		1978 - remains agricultural with some trees maturing on the banks	1978 - no apparent changes in channel planform, banks have become more defined
		2004 - continues to be agricultural land use with a few trees and scrubland immediately adjacent to channel	2004 - very well defined drainage ditch but no apparent changes in channel planform
	MD-3	1955 - agriculture appears to be the dominant land use but the channel is hard to see, mainly looks like a drainage swale	1955 - cannot make a lot of the channel out so it is assumed that the drainage was ditched after 1955
		1978 - agricultural land use dominates with a few scrub forest areas present along its length	1978 - channel ditched prior to 1978, well established with vegetation on the banks
		2004 - remains agricultural for extent of the reach	2004 - does not appear to be any channel changes from 1978
Rivard Drain	RID-1	1955 - mainly agricultural with some scrub forest	1955 - channel was ditches prior to 1955

		1978 - mainly agricultural with some scrub forest and new crossings	1978 - does not appear to be any channel changes since before 1955
		2004 - a mixture of agricultural and scrub forest	2004 - channel remains straightened with no apparent changes in channel planform
Lachance Drain	LAD-1	1955 - mainly agricultural land use with a small portion of scrub forest at the confluence with Little River	1955 - channel appears to have been dug prior to 1955
		1978 - mainly agricultural land use with a small portion of the drain in the downstream end near the confluence located in a golf course	1978 - downstream portion of the channel was altered when the golf course was built, prior to 1978, appears to be straightened and foot bridges cross over it
		2004 - the upstream portion is all agricultural land use but the downstream portion near the confluence is surrounded by scrubland and industrial parkland	2004 - upstream portion appears to not have been altered at all, however the downstream portion appears to have been moved prior to 2004 as there is now an industrial building where the channel used to be and the channel is no longer well defined in this area
Desjardein Drain	DD-1	1955 - agricultural land use dominated this reach with one road crossing	1955 - channel appears to have been ditched prior to 1955
		1978 - agricultural land use dominates with minor residential development and back yard, one road crossing	1978 - no apparent change in channel planform since 1955
		2004 -dominated by agricultural land use	2004 - no obvious channel changes since before 1955
Soulliere Drain	SD-1	1955 - agricultural land use most dominant	1955 - channel not well defined in the upstream portion of the channel, downstream looks natural
		1978 - agricultural land use remains most dominant	1978 - channel more defined with clear banks in upstream portion and natural in the downstream portion
		2004 - remains agricultural throughout most of the channel	2004 - channel does not appear to have changes since 1978
	SD-2	1955 - agricultural land use is dominant	1955 - channel not well defined but portions that are visible appear to be ditched prior to 1955
		1978 - agricultural land use remains dominant	1978 - channel still not well defined in this photograph but portions of it remained ditched
		2004 - agricultural land use remains dominant	2004 - channel was well defined with clear banks, ditched throughout whole reach



3. Synoptic Surveys

3.1 Rapid Assessment

In order to provide insight regarding existing geomorphic conditions and document any evidence of active erosion, site visits were conducted in 2007. During the visit, channel conditions along the study reaches were evaluated using two established synoptic surveys: the Rapid Geomorphic Assessment and the Rapid Stream Assessment Technique.

Rapid Geomorphic Assessment

The Rapid Geomorphic Assessment (RGA) was designed by the Ontario Ministry of Environment (1999) to assess urban stream channels. It is a qualitative technique based on the presence and (or) absence of key indicators of channel instability such as exposed tree roots, bank failure, excessive deposition, etc. The various indicators are grouped into four categories representing specific geomorphic process: 1) Aggradation, 2) Degradation, 3) Channel Widening, and 3) Planimetric Form Adjustment. Over the course of the survey, the existing geomorphic conditions of each reach are noted and the presence or absence of the specific geomorphic indicators is documented. Upon completion of the field inspection, the indicators are tallied within each category and the subsequent results are used to calculate an overall reach stability index. This index value corresponds to one of three stability classes representing the relative degree of channel adjustment and (or) sensitivity to altered sediment and flow regimes (**Table 3.1**).

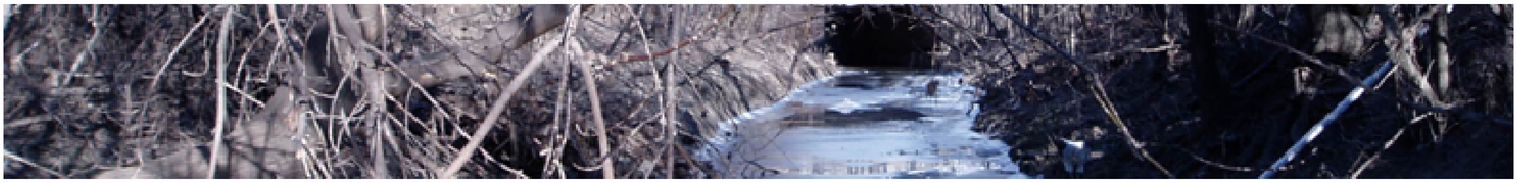


Table 3.1: RGA Classification

Index	Classification	Interpretation
≤0.20	In Regime or Stable (Least Sensitive)	The channel morphology is within a range of variance for streams of similar hydrographic characteristics – evidence of instability is isolated or associated with normal river meander propagation processes
0.21-0.40	Transitional/Stressed (Moderately Sensitive)	Channel morphology is within the range of variance for streams of similar hydrographic characteristics but the evidence of instability is frequent
≥0.41	In Adjustment (Most Sensitive)	Channel morphology is not within the range of variance and evidence of instability is wide spread

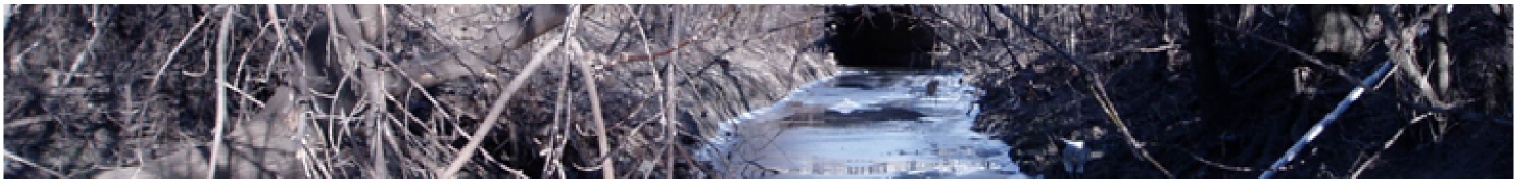
(Source: Ontario Ministry of Environment, 2003 – Appendix C3)

Rapid Stream Assessment Technique

The Rapid Stream Assessment Technique (RSAT; Galli, 1996) provides a purely qualitative assessment of the overall health and function of a reach in order to provide a quick assessment of local stream conditions and to identify and prioritize restoration needs on a watershed scale. This system integrates visual estimates of channel conditions and numerical scoring of stream parameters using six categories:

- Channel Stability
- Erosion and Deposition
- Instream Habitat
- Water Quality
- Riparian Conditions
- Biological Indicators

Once each condition has been assigned a score, values are totaled to produce an overall stream stability score, or health rating, based on a 50 point total. The recommended value is then categorized into one of three classes: low (poor health), moderate (moderate health), and high (good health).



- <20 Low (Poor Health)
- 20-35 Moderate
- >35 High (Good Health)

Although the RSAT grades streams from a more biological and water quality perspective than the RGA, this information is still relevant within a geomorphic context. In general, the types of physical features that generate good habitat for aquatic organisms tend to represent healthy geomorphic systems as well (e.g., native fish may prefer a well established riffle-pool sequence with little fine material on the riffles, quality riparian conditions provide food and shade to streams, woody debris and overhanging banks provide habitat structure, etc).

Along with the above mentioned stream assessment protocols, the Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines were taken into consideration in identifying the headwater drainage features. Bank and bed substrates, channel stability, morphology and any discharge points were noted during the field survey.

The results (**Table 3.1**) classified all the reaches included in the rapid assessments as either 'transitional/stressed' or 'in adjustment'. The main mode of adjustment is widening, followed by aggradation. These processes were indicated by woody debris jams, bank erosion/slumping, and bar formation. Reaches were characterized by common elements of urban channels such as road crossings, stormwater outfalls, and bank protection/modification. Evidence of modification and straightening was also prevalent, such as the steel walls bordering the downstream Little River reaches (LR-1 and LR-2). Channel dimensions were largest for the main channel reaches ranging from 6-30 m in bankfull width and 1-2.5 m for bankfull depth. While the drain reaches were much narrower, 2-8 m bankfull width, they were somewhat comparable in depth with a range of 0.3-1.2 m. This is indicative of the entrenchment that can occur in straightened agricultural drains.

Table 3.1: Summary of RGA results

Reach	Stability Index (RGA)	Condition (RGA)	Dominant Process (RGA)	Assessment Score (RSAT)	Stability Ranking (RSAT)	Bankfull Width (m)	Bankfull Depth (m)	Comments
LR-3	0.41	In Adjustment	Aggradation Widening	22	Moderate	18-26	0.8-1.8	road crossings, weir, storm drainage, woody debris, sandbag with concrete lining on right bank, concrete cinder blocks on left bank, metal retaining wall acting as weir, lateral bar formation, channel migration to right bank
LR-5	0.29	Transitional/ Stressed	Widening	23	Moderate	6-12	0.8-1.6	tile drain, man-made riffles, slumped banks, road crossings, turbid, culvert, stagnant water, densely vegetated
LAD-1	0.34	Transitional/ Stressed	Widening	24.5	Moderate	3-6	0.6-1.2	culvert, road crossing and surrounding concrete drainage outfalls, failing concrete walls, channel highly entrenched, "U" shaped agricultural drain, little riparian cover, soft unconsolidated bed, ducks and 2 dead turtles
SD-1	0.29	Transitional/ Stressed	Widening Aggradation	---	---	2-4	0.3-0.6	culvert, confluence, cinder blocks, very little water, upstream vegetation controlled
DD-1	0.34	Transitional/ Stressed	Widening	24	Moderate	4-8	0.6-1.2	woody debris jams, densely vegetated, stagnant water not connected to main flow, channel appeared natural but altered
MD-1	0.26	Transitional/ Stressed	Aggradation Widening	22	Moderate	2-5	0.4-0.8	road crossings, rail line, riprap, woody debris jams, lined bed, very thin riparian corridor, channel flows as an altered drain through agricultural fields
LRD-4	0.3	Transitional/ Stressed	Widening	31	Moderate	4-6	0.6-1.2	road crossings, urban debris, tile drainage, right bank bridge abutment was exposed, wide straight reach with good riffle-pool delineation, majority of bed consisted of beach sands, ripples forming along bed, scour observed along rocks
LRD-1	0.3	Transitional/ Stressed	Widening Aggradation	27	Moderate	4-8	0.6-1	stormwater outfalls, urban debris, road crossings, gabions, man-made riffles, terra blocks, woody debris jams, two

								retention ponds, thatch on banks, urban debris, terraced banks
LR-6	0.31	Transitional/ Stressed	Aggradation	21	Moderate	6-15	0.8-1.2	vegetation controlled, road crossings, terra blocks, thatch on banks, vegetation in channel
LRD-2	0.31	Transitional/ Stressed	Widening	32	Moderate	4-6	0.6-1	road crossings, riprap, urban debris, erosion on banks, densely vegetated, thalweg out of alignment, bridge
LRD-3	0.26	Transitional/ Stressed	Widening	33	Moderate	4-7	0.6-1	road crossings, woody debris, terraced banks, erosion on banks, exposed roots
6th Concession	0.22	Transitional/ Stressed	Widening	26	Moderate	2-6	0.8-1.2	road crossings, urban debris, roadside ditch, basal scour on banks
Baseline Drain	0.34	Transitional/ Stressed	Widening	---	---	2-6	0.4-1.2	road crossings, bank slumping, islands in channel
LRD-5	0.32	Transitional/ Stressed	Widening	24	Moderate	2-4	0.4-0.8	road crossings, woody debris jams, densely vegetated, narrow straight drain with little bar formation, exposed clay along bank, exposed tree roots, leaning trees, groundwater seepage from right bank at crossing
9th Concession	0.26	Transitional/ Stressed	Aggradation Widening	22.5	Moderate	3-6	0.6-1.2	road crossings, woody debris jams, bar formations, extensive basal scour, roadside ditch, good riffle-pool spacing, numerous freeway crossings
LR-1	0.25	Transitional/ Stressed	Aggradation	30	Moderate	18-30	1.0-2.5	riprap, bridges, outfalls, steel wall, marine/docks, residential land uses, algae, overhanging vegetation
LR-2	0.22	Transitional/ Stressed	Aggradation	30	Moderate	17-25	1.0-2.0	road & rail crossings, urban debris, outfalls, riprap, steel wall, stagnant water, sediment accumulation mid-channel

4. Meander Belt Width Assessment

4.1 Meander Belt Width Delineation

Streams and rivers are dynamic features on the landscape. Changes in configuration and position occur through the development and evolution of meanders, and migration processes. Erosion and deposition of sediment is a key component of channel migration, enabling changes in shape and shifts in the position of a watercourse. These changes may cause loss or damage to private property and/or structures located too close to the transitioning watercourse. It is for this reason that, when infrastructure, development or other activities are proposed near a watercourse, it is desirable to designate a corridor intended to contain all of the existing and expected meander development and migration processes. Outside of this corridor, it is assumed that private property and structures will be safe from the erosion potential of the watercourse. The space that a meandering watercourse occupies on its floodplain, and in which all of the natural channel processes occur, is commonly referred to as the meander belt. Due to the spatial variability of modifying and controlling influences on channel form, two reaches situated immediately up/downstream of each other could show marked differences in planform configuration. It is for this reason that meander belt width delineation occurs on a reach-by-reach basis.

4.2 Preliminary Meander Belt Width

A preliminary meander belt width was delineated for each reach in the study area (**Table 4.2**). Standard methods for delineating meander belt widths rely on air photo analysis. First, a meander belt axis was identified, following the general down-valley orientation of the meander pattern. The meander belt is essentially centered along the meander axis. Second, the preliminary meander belt is established by drawing lines parallel to the governing outermost meanders of the existing channel planform, following the meander axis. This methodology is not applicable when a channel has been altered or straightened, erasing any indication of natural planform configuration. Historical analysis of aerial photos revealed that most of the reaches within the study area have been altered and exhibit very little natural change in planform between 1955 and 2004. A small number of reaches retained planform characteristics which allowed the traditional methodology to be applied. These reaches are labeled ‘planform’ in **Table 4.2**.

In the event that a watercourse has been altered and/or necessary data is insufficient, a meander belt width can be derived by means of an empirical analysis based on channel parameters. This involves basic field data collection to quantify channel dimensions for use in calculating an appropriate belt width, such as channel width, depth, or cross-sectional area. The following selected equations (**Table 4.1**) provide an estimate of meander belt width dimensions. These empirical relations are based on measurements of real watercourses; however, their transferability to watercourses situated within southern Ontario maybe limited due to differences in hydrologic regime, drainage area, and general controlling factors compared to the areas where the formulas were developed. Reviewed collectively, they provide results that are typically comparable to results attained through use of the standard belt width delineation procedures. Because most of the channels in the study area are straight agricultural drains, the empirical method was used for the majority of the reaches. Where field data was not obtained, meander belt widths were estimated using similar, nearby reaches as references. Reaches that required this method are identified in **Table 4.2** as 'reference'.

4.3 Erosion Setbacks

From a geomorphic perspective, the 100-year migration rate typically represents the erosion setback to be applied to either side of the meander belt width in order to account for bank erosion and channel migration over time (100 years). However, due to the high degree of planform alteration, 100-year migration rates could not be quantified for this channel. In lieu of applying the 100-year migration rate, an erosion setback representing 10% of the preliminary meander belt width was applied to either side of the channel. The preliminary and final belt width results are given in **Table 4.2** and illustrated in **Figure 4.1 – Figure 4.4**.

Belt widths are the smallest for the agricultural drain reaches which are primarily draining headwater areas where small channel dimensions and relatively low gradients limit migration. These conditions results in belt widths between 24 to 35 m. Further downstream, some planform characteristics have been retained

(such as SD-3) and these channels have slightly larger belt widths to encompass a more sinuous pattern. The Little River drain reaches (LRD) have belt widths in the range of 40-80 m. The surrounding smaller drains converge with the LRD reaches providing more flow with which to alter channel dimensions resulting in the need for larger belt widths. The main channel reaches (LR) have belt width values that range from 100-200 m. These values result from the increased channel dimensions as well as some large meanders which have been preserved in the channel planform. While these meanders are unlikely to change significantly due to heavy alteration, they are indicative of the channels past migration based on its flow capacity.

Table 4.1: Empirical formulas for estimating meander belt width dimensions (Reach LAD-1 values provided as an example).

Meander Belt Empirical Analysis			
Source	**Equation**		**Meander Belt Width (m)**
Williams (1986) – channel area (m^2)	$18Ac^{0.65}$	=	33.3
Williams (1986) – width (m)	$4.3W^{1.12}$	=	22.0
Ward (2002) - width (ft) - no factor of safety	$4.8W^{1.08}$	=	25.5
Lorenz et al. (1985) - width (m)	$7.53W^{1.01}$	=	32.9
AVERAGE		=	28.4
STANDARD DEVIATION		=	5.56

Table 4.2: **Summary of Meander Belt Width Results**

Reach	Preliminary MBW	Final MBW for adjusted (add 10% setback	Method
LR-1	128	154	Reference
LR-2	128	154	Field
LR-3	120	143	Field
LR-4	85	102	Reference
LR-5	85	102	Field
LR-6	180	216	Planform
LRD-1	41	50	Field
LRD-2	50	60	Planform
LRD-3	50	60	Field
LRD-4	72	86	Planform
LRD-5	30	36	Planform
LAD-1	28	34	Field
DD-1	36	42	Field
SD-3	60	72	Planform
SD-1	20	24	Field
SD-2	20	24	Reference
RD-1	60	72	Planform
RD-2	23	30	Reference
MD-1	23	28	Field
MD-2	23	28	Reference
MD-3	23	28	Reference
LD-1	23	28	Reference
LD-2	23	28	Reference
RD-1	23	28	Reference
BRD-1	28	32	Field
NC-1	28	32	Field
SC-1	28	32	Field
SC-2	28	32	Reference
SC-3	28	32	Reference

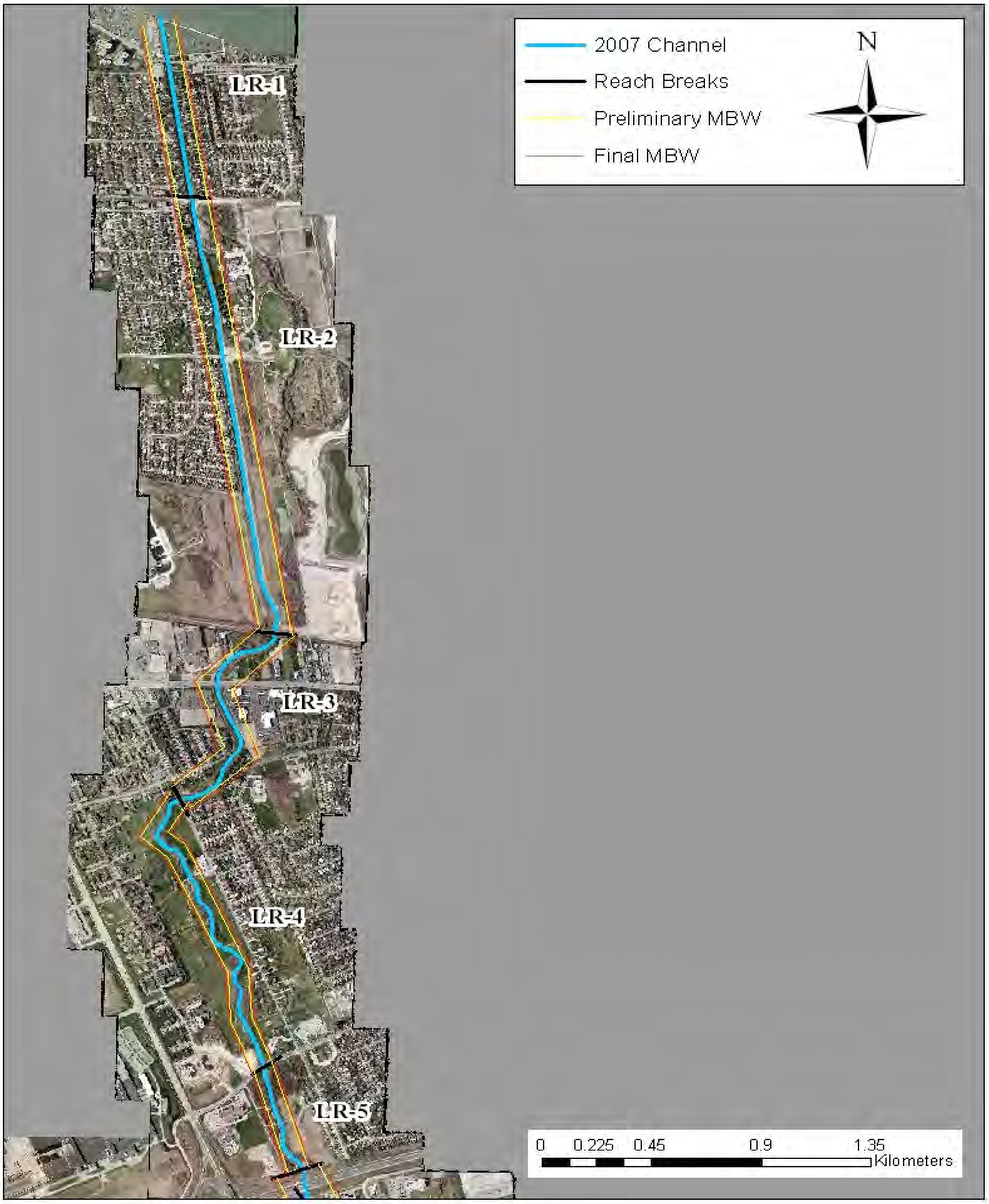


Figure 4.1: Meander Belt Width Map – North Reaches

Figure 4.2: Meander Belt Width Map – Central and Eastern Reaches

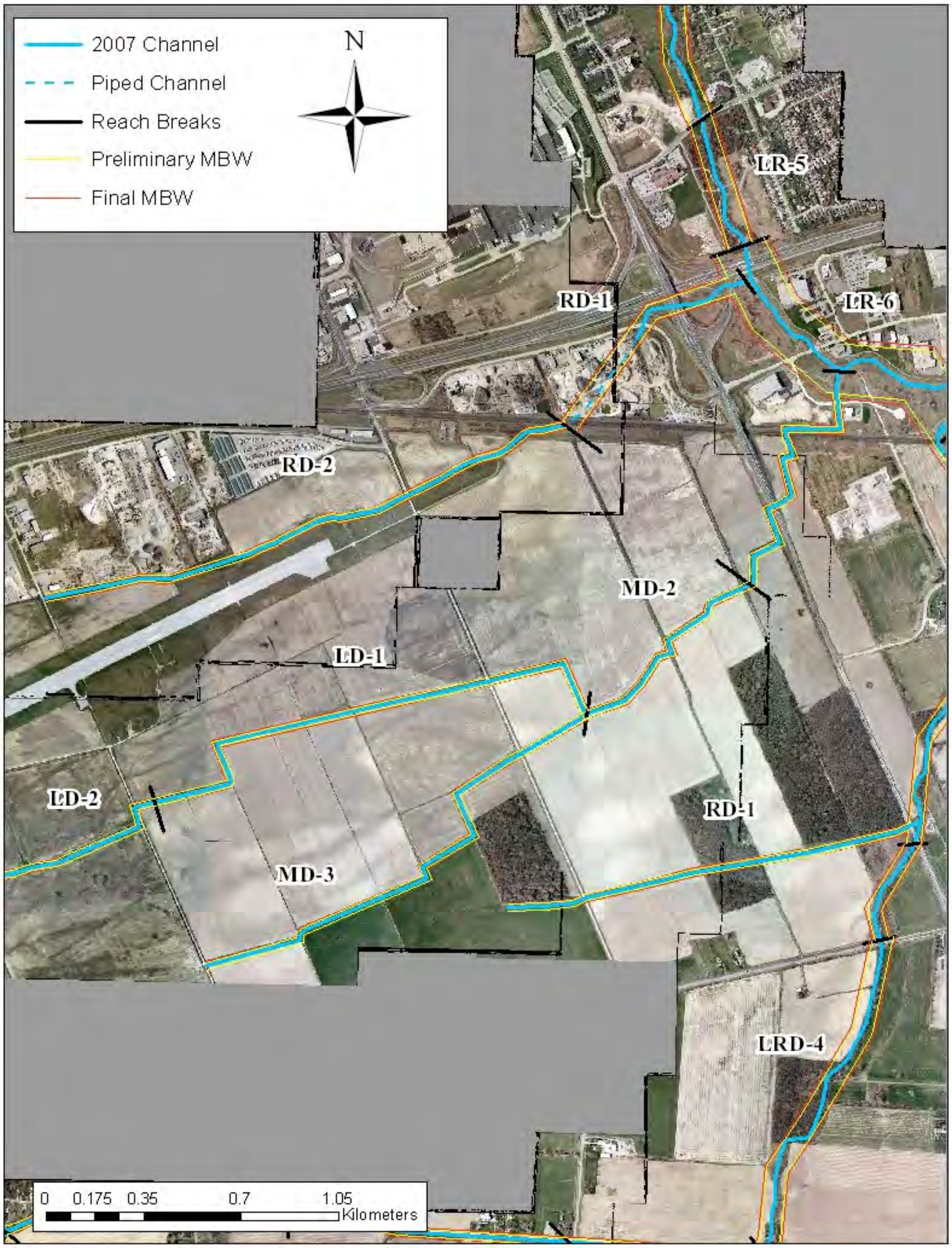


Figure 4.3: Meander Belt Width Map – Western Reaches

Figure 4.4: Meander Belt Width Map: Southern Reaches

5. Detailed Field Data Collection

5.1 Monitoring Cross-Section Sites (2004, 2007, 2011)

Once the desktop analysis of the study area was completed in 2004, a monitoring program was established to track changes in the channels over time. This activity involved the installation of seven cross sections throughout the study area so that historical data could be collected. By monitoring the cross sections over a period of time, historical trends and channel changes can be observed and inferences can be made pertaining to development impacts on the watercourses in the subject area. The locations of the detailed sites were determined to provide a representative coverage of the study area, both from a spatial and morphologic perspective. Monitoring provides frequent, “low-tech” observations which enhance our understanding of a river system. It also enables direct measurements of a channel changes, such as bank erosion and bed scour, which can be linked to the historic assessment and provide a clearer picture of channel dynamics. The seven sites were located in Reaches LR-3, LRD-4, LAD-1, DD-1, BRD-1, NC-1, and SC-1 (**Figure 2.1**). The cross-sections were benchmarked by installing monuments on the top of both banks such that topographic detail between the pins could be accurately measured on a recurring basis. The cross-sections were again measured in May 2007, but not all cross-sections could be relocated, in some cases, because maintenance along the drain had stripped or buried the monitoring pins. An attempt was also made in September 2011 to update the monitoring, but the field crew was only able to relocate one of the sites (NC-1). Below are brief descriptions of the general characteristics at each site and the results of the cross-section monitoring. If monitoring is planned for the future, new monitoring locations will need to be established at the sites.

Reach LR-3

Reach LR – 3 is situated in an urban parkland area surrounded by residential development and associated infrastructure. The banks were covered by reeds, trees, an understory of shrubs, and groundcover of grasses and herbaceous vegetation. Reeds extended into the channel along the right bank. There appeared to be a high flow channel along the right bank below the bankfull elevation that was dry during the site visit in December 2004. The estimated bankfull width was 18.20m with a bankfull depth of 1.06m.

The average water depth for this monitoring cross section was measured at 0.15m with a wetted width of approximately 6.80m. Channel substrate consisted of a mixture of gravel and pebble sized particles. During the 2004 site visit a medial bar was observed upstream of the monitoring cross section that was also composed of a gravel and pebble mixture. One erosion pin was installed in the right bank of the monitoring cross section to measure changes in bank stability and mobility over the course of the monitoring program. A wetland was also noted along the right bank of the cross section. Below, are some monumented photographs that were taken at this monitoring location (**Figure 5.2**). Comparison of the cross sections from 2004 and 2007 show only a minor change in shape (**Figure 5.3**). The right bank shows slight aggradation.

Figure 5.2: Example photographs for monitoring location at LR-3 (Dec 2004).

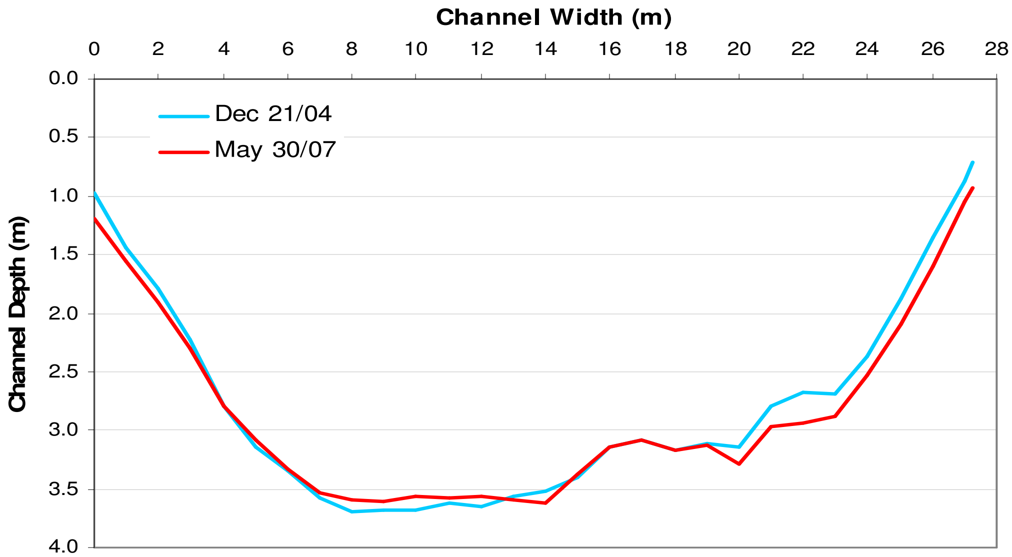


Figure 5.3: Monitoring cross section overlay for Reach LR-3.

Reach LRD-4

Reach LRD-4 is located in a residential parkland area with some commercial/industrial land use. This portion of Little River Drain appears to have been previously straightened as the channel has a wide ‘U’-shape. The banks appeared to be eroding evidenced by exposed tree roots. Sparse vegetation was present on the banks during the site visit with little evidence of growth in the summer. The bank vegetation consisted of mature trees and shrubs growing out of a sand-silt soil. The soil appears to have been deposited during high flows. Channel substrate consisted of a pebble-sand-silt mixture with little-to-no channel vegetation present. Bankfull width was estimated to be 6.15 m with a depth of 0.67m, and a wetted width of 4.04m and depth of 0.20 m. There were no erosion pins installed at this monitoring cross section during the site visit. Below are the monumented photographs taken for this monitoring site (**Figure 5.4**). The channel bed has been elevated due to aggradation between the monitoring in December 2004 and May 2007 (**Figure 5.5**). Minor changes in bank shape support the contention that bank soil is being deposited during high flows.

Figure 5.4: Example photographs for monitoring location at LRD-4 (Dec 2004).

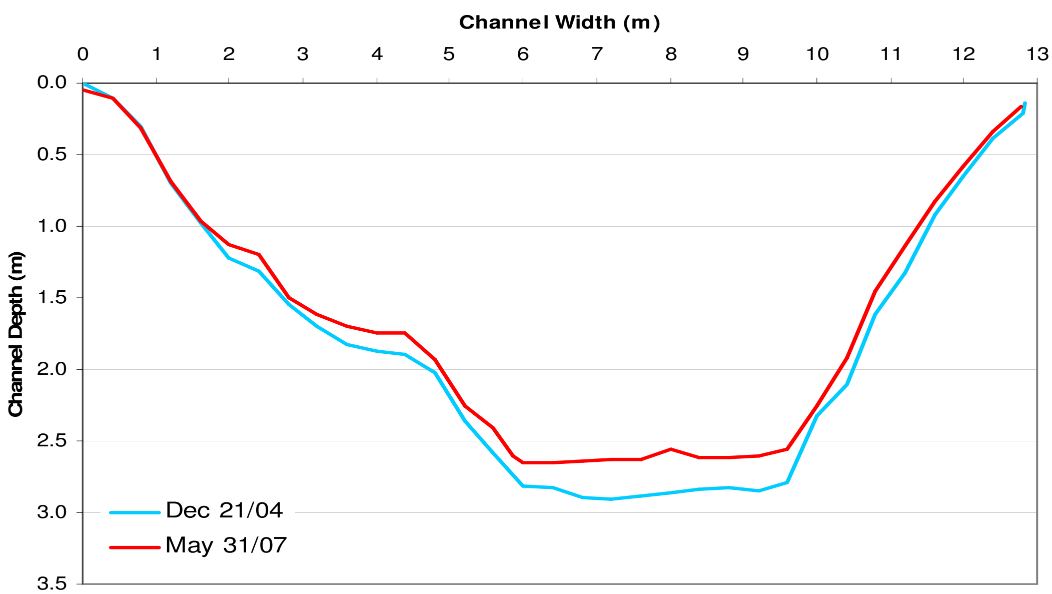


Figure 5.5: Monitoring cross section overlay for Reach LRD-4.

Reach LAD-1

Reach LAD-1 is a tributary of Little River known as Lachance Drain. It appears to be a straight, dug drainage ditch flowing through mainly agricultural land with some commercial/industrial land uses in the downstream portion. The downstream portion of the reach is also located near the rail line servicing the northern portion of Windsor. The channel appeared to be highly entrenched with a distinctive 'v'-shape to the valley. There was no noticeable bank erosion and the channel appears to convey low flows only. The bankfull width calculated for this site was 8.5m with a bankfull depth of 0.78m. The channel was at low flow during the site visit. The wetted width was 2.56m with an average depth of 0.035m. Bed substrate consisted of a mixture of silt and fine sands with a lot of vegetation (cattails) growing throughout most of the reach. Below are the monumented photographs taken for this monitoring cross section (**Figure 5.6**). Field crews were unable to relocate the monitoring cross section in 2007; therefore comparative cross section overlays cannot be shown (
Figure 5.7).

Figure 5.6: Example photographs for monitoring location at LAD-1 (Dec 2004).

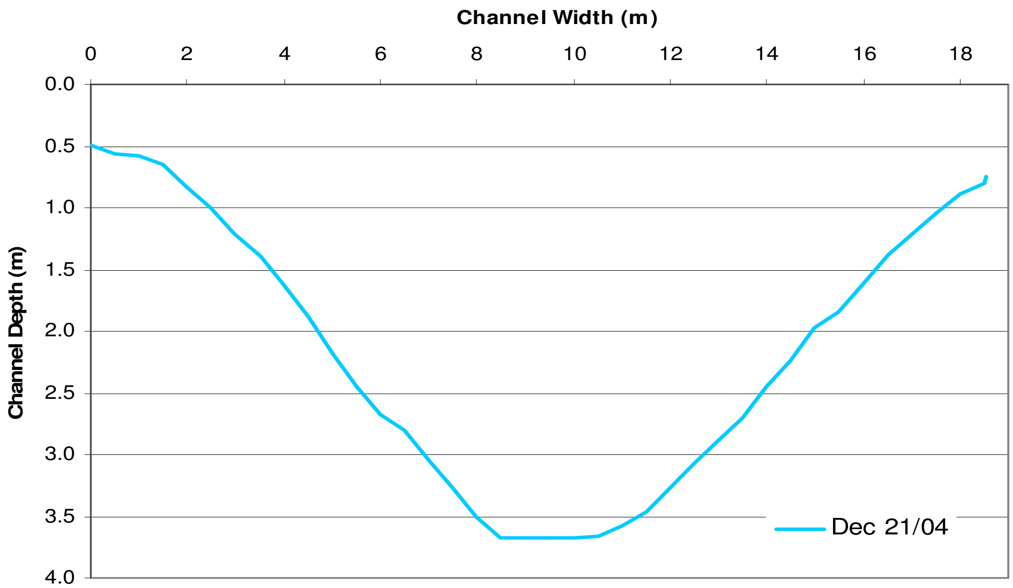


Figure 5.7: Monitoring cross section overlay for Reach LAD-1.

Reach DD-1

This reach flows as an agricultural drain into the eastern edge of Little River upstream of Lachance Drain. The surrounding land use is dominated by agricultural fields and scrub lands. Bank vegetation consisted of trees, shrubs (raspberry bushes), and tall and short herbaceous vegetation. During the site inspection, there was sufficient woody debris in the channel to create barriers to flow and backwater. Bank erosion that extended to the top of bank in some areas was also noted along a portion of the reach. There did not appear to be a lot of under-story vegetation present near the monitoring cross section and the trees located along the bank did not appear to be leaning, suggesting that the bank erosion is slow. Channel substrate consisted of sandy silt to sand mixture. Estimated bankfull width for this monumented site was 5.1m and the bankfull depth was 0.88m. The wetted width observed for this site was 1.21m with an average wetted depth of 0.07m. One erosion pin was installed at this cross section in the left bank approximately 5m downstream of the monitoring cross section. Monumented photographs for this reach can be found below (**Figure 5.8**). Field crews were unable to relocate the monitoring cross section in 2007; therefore comparative cross section overlays cannot be shown (**Figure 5.9**).

Figure 5.8: Example photographs for monitoring location at DD-1 (Dec 2004).

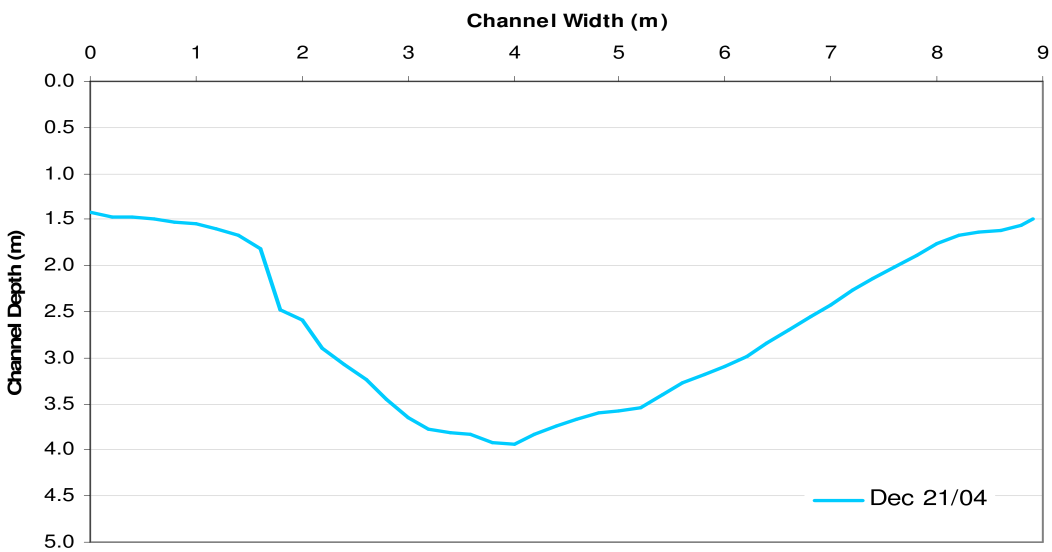


Figure 5.9: Monitoring cross section overlay for Reach DD-1.

Reach BRD-1

Baseline Road Drain (BRD-1) joins the Little River Drain near 6th Concession Road. The entire reach is surrounded by agricultural land and appears to flow as a drainage ditch along 6th Concession Road. Bank vegetation consisted of a mix of shrubs with tall and short herbaceous vegetation. Channel substrate consisted of a mixture of fine sand and silt. There did not appear to be woody debris in the channel during this site visit. Bankfull was estimated to be 4.6m width, with a depth of 0.59m, a wetted width of 1.42m and an average wetted depth of 0.19m. Two erosion pins were installed at this monitoring cross section. The first was installed in the left bank approximately 2.0m upstream of the monitoring cross section, and the other one was installed approximately 8.5 m downstream of the cross section. The photographs below illustrate the site characteristics (**Figure 5.10**). The site was re-measured in May 2007 (**Figure 5.11**). The changes in channel shape suggest that the ditch was cleaned out with the help of a backhoe. This is a standard practice in rural areas when municipal drains become overgrown with channel and bank vegetation.

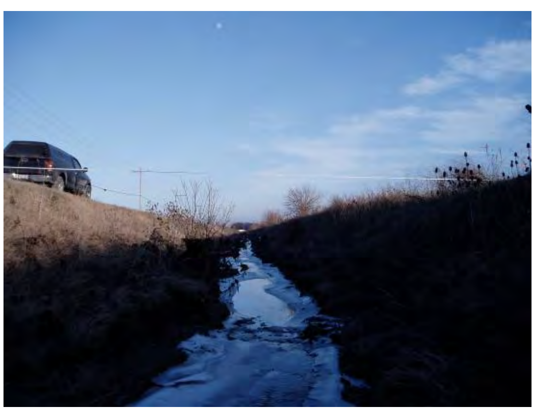


Figure 5.10: Example photographs for monitoring location at LRD-4 (Dec 2004).

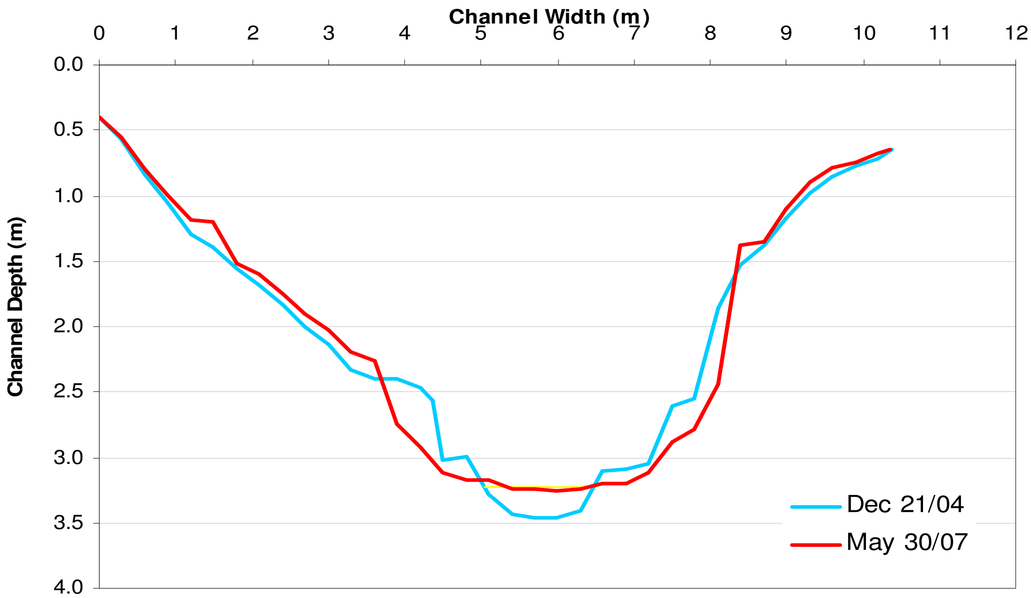


Figure 5.11: Monitoring cross section overlay for the Baseline Road Drain Reach 1.

Reach SC-1

This reach is the terminal section of the 6th Concession Road drain before it becomes the Baseline Road Drain which ultimately flows into the Little River Drain. The surrounding land use for this portion of the 6th Concession drain consisted mainly of residential development and associated infrastructure, with some agricultural land use still visible. The left bank of the channel abuts 6th Concession Road. Bank vegetation consisted of a mixture of tall and short grasses and herbaceous vegetation with some trees and shrubs along the residential side of the channel. The left bank appeared to be slumping with some scars visible along the bank. Channel substrate consisted of a mixture of silt and fines. Observed bankfull width was 3.7m with a bankfull depth of 0.43m. The wetted width was not that deep during the site visit with a wetted width of 1.32m and an average wetted depth of 0.12m. Two erosion pins were installed at this monitoring cross section, one in the right bank and the other in the left bank, both immediately at the cross section. The monumented photographs taken for this reach are below (**Figure 5.12**). Cross-section measurement was repeated in May 2007 (**Figure 5.13**). Change in cross-sectional shape indicates slumping of the left bank and toe erosion of the right bank.

Figure 5.12: Example photographs for monitoring location at SC-1 (Dec 2004).

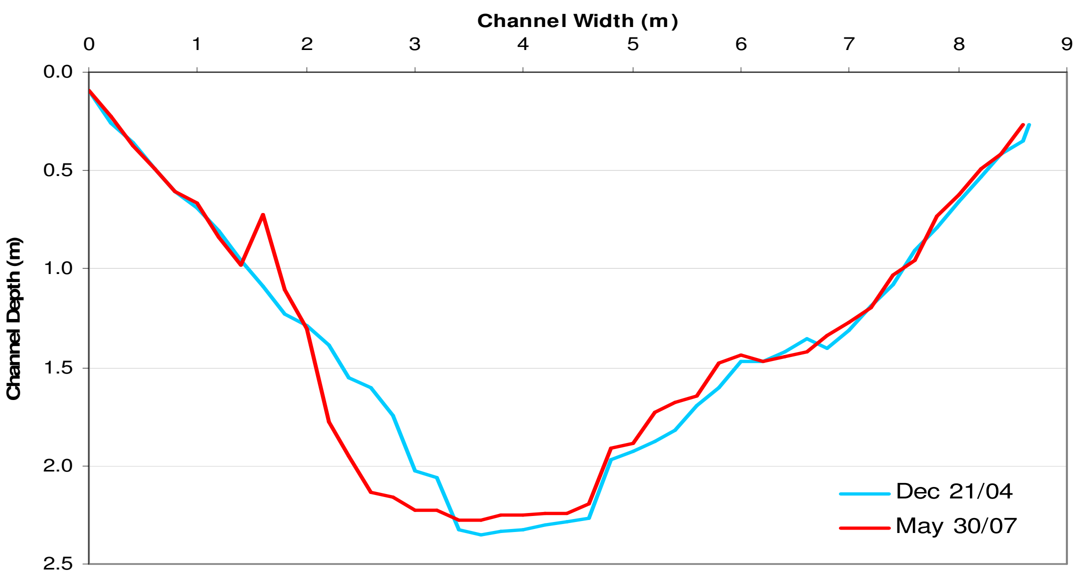


Figure 5.13: Monitoring cross section overlay for the Sixth Concession Drain Reach 1.

Reach NC-1

This reach flows along the 9th Concession Roadway as a roadside ditch, before joining with 6th Concession Drain (SC-1) and becoming the Little River Drain (LRD). Surrounding land use consists mainly of agricultural fields with some residential development and associated infrastructure. Bank vegetation consisted of a mixture of tall and short grasses and herbaceous vegetation. Channel substrate consisted of a pebble-sand mixture with some large boulders in the channel near the cross section. Bankfull width was estimated to be 4.3m with a bankfull depth of 0.57m. The wetted width from this cross section was observed to be 1.34m width with an average depth of 0.12m. There were no erosion pins installed at this monitoring cross section. The monumented photographs below highlight the findings for this reach (**Figure 5.14**). The cross section for Reach NC-1 was the only monitoring site that could be re-located in both 2007 and 2011 (**Figure 5.15**). Between December 2004 and May 2007 the channel appears to have been cleaned out creating more of a "U-shape". There also appears to have been some slumping along the left bank during that time period. The shape does not seem to have changed significantly between May 2007 and September 2011. The left bank has eroded to create a gentler bank profile, while the right bank has remained relatively stable.

Figure 5.14: Example photographs for monitoring location at ND-1 (Dec 2004).

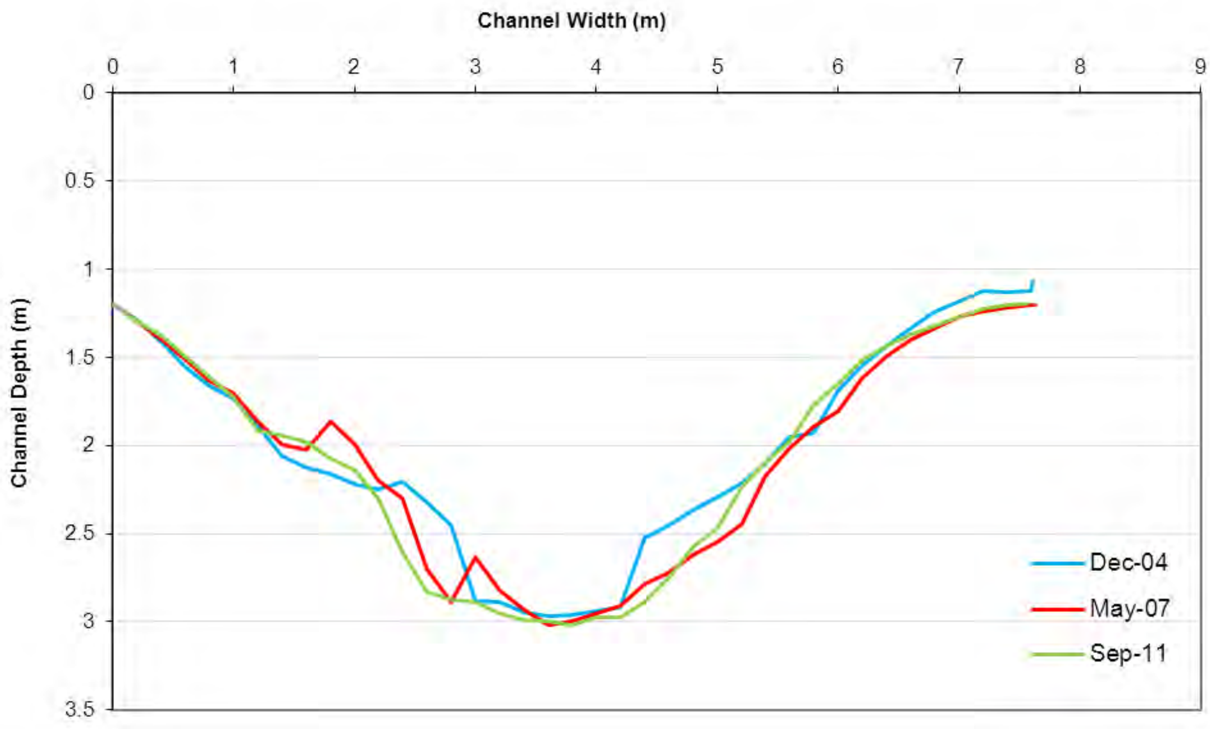


Figure 5.15: Monitoring cross section overlay for the Ninth Concession Drain Reach 1.

5.2 Detailed Sites (2007)

Detailed work was carried out in May 2007 at five sites selected to provide representative coverage of the study area, both from a spatial and morphologic perspective. The selected reaches included Reach LR-2, LR-5, LAD-1, SD-1 and LRD-4 (**Figure 2.1**). Three of these sites were new to the study and two were already included as part of the monitoring program (LRD-4 and LAD-1). Detailed field assessments involved standard protocols and known field indicators used to quantify bankfull cross-sectional dimensions (e.g. bankfull depth and width) at five representative locations. A modified pebble count based on Wolman (1954) was used to characterize the surficial channel bed materials, whereby approximately 40 particles were randomly sampled and the length of the median axis was recorded. Sub-pavement materials were also characterized by separating a sub-surface sample qualitatively by particle size, and evaluating each fraction as a percentage of the overall sample. Note that the channel bed surface is defined

in thickness as two diameters of the largest sediments. In addition to noting bank characteristics, an *in situ* shear stress test was performed on bank materials. Finally, a level survey of the channel bottom and bankfull elevations provided a measure of the local energy gradient.

A description of each reach is provided below including general characteristics and bankfull geometry. Channel form is thought to be a response to the water and sediment supplied to the system, coupled with valley constraints, such as bedrock and vegetation. The bankfull channel dimensions (**Table 5.1**) likely formed to carry a certain discharge. Therefore, bankfull discharge and other important flow characteristics, including the main driver of sediment entrainment, shear stress (**Table 5.2**), can be estimated using channel gradient and bankfull channel cross-sections measured in the field.

Reach LR-2

Reach LR-2 is a straight, dug canal that leads into Lake St. Clair. There are berms that are built on both sides of the channel with retaining walls sporadically found throughout the reach. A storm outlet and floodgate contribute to flows in the channel during high flow periods. The bankfull width ranged from 18.47 m to 19.16 m with an average bankfull depth of 1.08 m. The banks were uniform in height at 4 m, composed of silt and clay supported by riprap or retaining walls. The water was relatively deep at time of measurement, with no defined pool-riffle sequences observed. The bed substrate varied from clay to riprap material, believed to have come from the riprap lining of the banks. The median grain size (D_{50}) was 5.30 mm and the D_{84} (ie., size where 84% of the samples are finer) was 49.28 mm. This indicates that while the substrate spans the range of clay to riprap most of the bed material is classified as pebbles/fine gravel with the largest material being mostly very coarse gravel. Average bankfull discharge is estimated to be 21.92 m^3/s which moves at an average rate of 0.88 m/s, producing an average shear stress of 8.42 N/m^2.

Table 5.1: Average bankfull geometry results from the 5 detailed study sites

Cross-section Name:	*SD-1*	*LAD-1*	*LRD-4*	*LR-5*	*LR-2*
Bankfull Width (m)	2.59	4.34	5.39	7.72	18.84
Average Bankfull Depth (m)	0.34	0.59	0.57	0.85	1.08
Maximum Bankfull Depth (m)	0.51	0.89	0.78	1.05	1.51
Bankfull Width:Depth	7.71	7.31	9.52	9.23	17.52
Cross-sectional Area (m^2)	0.89	2.55	3.12	6.60	20.96
Wetted Perimeter (m)	2.92	4.82	5.85	8.74	19.53
Hydraulic Radius (m)	0.30	0.52	0.53	0.76	1.07
Left Bank Angle (^{o})	36.98	34.77	31.77	45.69	19.31
Right Bank Angle (^{o})	31.43	29.57	30.25	54.24	22.81
Gradient	0.43%	0.11%	0.07%	0.06%	0.08%

Table 5.2: Average bankfull hydraulics results from the 5 detailed study sites

Cross-section Name:	*SD-1*	*LAD-1*	*LRD-4*	*LR-5*	*LR-2*
Bankfull Discharge (m^3/s)	0.87	1.84	1.76	4.31	20.02
Average Bankfull Velocity (m/s)	0.83	0.61	0.49	0.59	0.80
Maximum Bankfull Velocity (m/s)	1.17	0.86	0.63	0.72	1.07
Average Shear Velocity [u*] (m/s)	0.11	0.08	0.06	0.07	0.09
Stream Power (W/m)	36.87	19.89	12.06	25.36	157.15
Stream Power per unit Width (W/m^2)	14.20	4.55	2.22	3.33	8.34
Average Shear Stress (N/m^2)	12.82	5.66	3.64	4.46	8.42
Maximum Shear Stress (N/m^2)	21.00	9.48	5.32	6.14	11.76
Left Bank Shear Stress (N/m^2)	8.61	4.03	2.43	3.08	6.15
Right Bank Shear Stress (N/m^2)	8.14	4.05	2.52	3.14	6.28
Critical Particle Diameter for Analysis (m)	clay	clay	0.0032	0.0057	0.0049
Hydraulic Roughness	0.035	0.035	0.035	0.035	0.035

Reach LR-5

Reach LR-5 was located in a parkland area behind residential buildings south of Forest Glade Drive and east of Lauzen Parkway. It is a straight reach with no natural pool-riffle sequences; however, there were some man-made riffle features at an outlet of a storm drain. The bankfull width ranged from 6.89 m to 9.90 m with an average bankfull depth of 0.85 m. The water was turbid at the time of the field investigation with nearly stagnant flow. The bed substrate was composed of clay to cobble within this range most

sediment was classified as very coarse sand as the median grain size was 4.0 mm. The larger material (D_{84}) was classified as coarse gravel. The banks consisted of steep berms varying in height from 1 m to 4 m and were composed of clay, silt and very fine sand. The banks were heavily vegetated, but were experiencing basal scour (slumping) the length of the reach. There was urban debris found in the middle of the reach. The reach was heavily influenced by widening processes undermining the banks with basal scour leaving leaning/fallen trees and exposed roots. Average bankfull discharge is estimated to be 4.31 m^3/s which moves at an average rate of 0.59 m/s, producing an average shear stress of 4.46 N/m^2.

Reach LAD-1

Reach LAD-1 was a man-made ditch draining the surrounding agricultural fields. The straight channel lacks natural features including riffle-pool sequencing and a meandering planform. The channel was very entrenched with a distinctive “U”-shape. The bank heights were fairly uniform averaging 2.8 m and were composed of silt and very fine sands. The bankfull width ranged from 3.56 m to 4.76 m with an average bankfull depth of 0.59 m. The bed composition varied from clay to very coarse sand. The bulk of the material is silt with a median grain size of 0.0068 mm and the largest particles are classified as coarse sand with a D_{84} of 0.098 mm. The banks support a thin grass cover while the channel is nearly free of vegetation. Several relatively new culverts drained into the reach. A concrete wall surrounding the culvert road crossing at the upstream end of the reach had failed and fallen into the channel. Significant evidence of basal scour, siltation and scour pools downstream of culverts suggest a reach that is heavily stressed. Average bankfull discharge based on channel dimensions is estimated to be 1.84 m^3/s which moves at an average rate of 0.61 m/s, producing an average shear stress of 5.66 N/m^2.

Reach SD-1

Reach SD-1 was a man-made drainage ditch located amidst fallow agricultural fields. The channel was straight, turned only at right angles and was very entrenched. It lacked natural features like riffle-pool sequencing and a meander planform. The bankfull width ranged from 2.40 m to 2.97 m with an average bankfull depth of 0.34 m. The bank heights were fairly uniform averaging 1.8 m and were composed of

clay and silt. The bed composition varied from clay to gravel with a median grain size of 0.003 mm (clay) and a D_{84} of 0.326 (very fine sand). The upstream end of the reach was controlled by the abundant channel vegetation, which thinned out towards the downstream end. Water was located in isolated depressions in the bed. Average bankfull discharge based on channel dimensions is estimated to be 0.87 m^3/s which moves at an average rate of 0.83 m/s, producing an average shear stress of 12.82 N/m^2.

Reach LRD-4

Reach LRD-4 was a relatively wide, straight drainage ditch. The bankfull width ranged from 4.47 m to 5.98 m with an average bankfull depth of 0.55 m. The banks varied in height from 1 m to 3 m and were composed of clay, silt and very fine sand. The bed composition varied from clay to gravel with sand dominant and sporadic cobble bars. The grain size distribution indicated that most material was classified as coarse sand with a median grain size of 0.56 mm. The larger fraction (D_{84}) consisted mostly of very coarse sand. The bed also had a well defined riffle-pool sequence. The channel was littered with urban debris. Based on cross-sectional dimensions, average bankfull discharge was estimated to be 1.62 m^3/s which moves at an average rate of 0.47 m/s, producing an average shear stress of 3.52 N/m^2.

5.3 Erosion Threshold Analysis

In essence, an erosion threshold analysis determines the hydraulics, such as discharge, channel depth, or average channel velocity, at which the channel produces enough shear stress to initiate the mobilization of sediment of a give size, usually the D_{50}. The analysis also helps to evaluate a reach's erosion sensitivity by comparing the boundary shear stress associated with modeled flows to the critical shear stress required to entrain sediment. Nine different models were used to perform erosion threshold analysis for the Sandwich South Employment Lands, including models based on critical shear stress and permissible velocity, in order to consider a range of results. The model results were examined for convergence and compatibility with field observations. Selection of appropriate thresholds was also based on an understanding of site conditions and the assumptions and ranges of conditions under which the models are applicable.

The watercourses within the study area are mostly straightened constructed channels with relatively low gradients and finer bed materials. Providing erosion thresholds under these conditions is generally difficult, as most flows will move sand and finer materials, and there generally aren't enough true gravels to justify using the D_{65} or D_{84} (65^{th} or 84^{th} percentile grain size) as often done with bimodal sediment distributions. In this case, the median grain sizes for the entire sediment distribution in each reach (D_{50}) were used to estimate the erosion thresholds, including the cohesive clays at LAD-1 and SD-1. The Fischenich 2001 entrainment relationships provide reasonable results when dealing with the fine gravels found at the non-clay sites, but for the clays, the Shields equation was used, albeit modified by setting the critical shear to a given number based on estimates of cohesiveness and strength of the clay (Chow 1959, 4-9N/m^2). The calculated erosion threshold discharge values varied between 16% and 55% of estimated bankfull flows, with an average of 33%. Sediment generally begins moving at flows around 1/3 to 1/2 of bankfull, so the estimated values suggest that the entrenched channels with fine grained beds and banks might be relatively sensitive to increases in flows. LR-5 and LAD-1 appear to be less sensitive, whereas SD-1, which is steeper and flows through sandy clay, is expected to be the most sensitive.

In addition, it appears that many of the drains within the study site are maintained. Channel widening, bank steepening, and further entrenchment, which may or may not be associated with in-channel maintenance work, could alter the erosion threshold values, channel sensitivity, and the morphology in general (e.g., over steepened banks tend to fail, wider channel tend to have higher threshold discharges.) The current values are based on conditions over the last 5 years, and although we tried to be conservative, sites may have been altered more recently.

Table 5.3: Erosion Threshold Analysis Values

Parameter	LR-2	LR-5	LAD-1	SD-1	LRD-4
The Bankfull Geometry					
Average Bankfull Width (m)	18.84	7.72	4.34	2.59	5.20
Average Bankfull Depth (m)	1.08	0.85	0.59	0.34	0.55
Bankfull Gradient (%)	0.08	0.06	0.11	0.43	0.07
Bed Material					
D_{50} (mm)	5.30	4.0	0.0068	0.003	0.56
D_{84} (mm)	49.28	23.90	0.098	0.326	2.72
Bankfull Hydraulics					
Manning's n (estimate)	0.035	0.035	0.035	0.035	0.035
Average Bankfull Velocity (m/s)	0.88	0.59	0.61	0.83	0.47
Average Bankfull Discharge (m^3/s)	20.02	4.31	1.84	0.87	1.76
Thresholds					
Critical Particle Size	5mm	4mm	Clay	Clay	4mm
Method of analysis	Fischenich (2001)	Fischenich (2001)	Shields/Chow (1959)	Shields/Chow (1959)	Fischenich (2001)
Critical Discharge (m^3s^{-1})	5.46	2.35	0.85	0.14	0.4
Average Critical Velocity (ms^{-1})	0.54	0.48	0.51	0.49	0.31
Critical/Bankfull Discharge	28%	55%	46%	16%	23%

6. Restoration/Remediation Opportunities

1. Restoration of altered channels

   Previously altered channel sections could be restored and rehabilitated to channels that exhibit natural functions. The majority of the study areas are drains where natural channel design principals can be implemented. A lot of these channels are deep with high steep banks that are exhibiting erosion. Bank restructuring and floodplain terracing is an option for these entrenched watercourses, as the channels currently cannot access their floodplains due to the high banks. The result of the existing condition is greater stress being exerted on the bed during higher flows. The work should include re-grading the banks to create benches or terraces, which would help dissipate energy and re-connect the bankfull channel to a floodplain area. The re-graded banks should be re-vegetated to help stabilize the banks and create floodplain habitat.

2. Re-establish riparian vegetation

   Re-establishing a healthy riparian vegetation community will not only increase bank stability, but will also provide shading to the creek, contributing to aquatic habitat through the contribution of organic debris. It also contributes to the overall aesthetic impact of the system.

3. Construct channel bed morphology for fish habitat

   Many of the channels in the study area lack bed morphology to support any fish habitat due to over-widened channel widths and sediment accumulation. By constructing structures to narrow cross-sectional area (i.e. wood deflectors sticking out of the banks) to promote bed morphology and re-grade the banks to create benches or terraces to help dissipate energy and help sediment transport, fish may have a healthy habitat.

4. Removal of hard structures – bed and banks

There are reaches and portions of reaches in the Windsor Annex Lands that have hardened banks (e.g. LR-2, LRD-1 and MD-1). The conditions of the hard structures (concrete and retaining walls) vary with some failing and others being undermined and may eventually fail. By replacing these structures with a ‘softer’ bio-engineered approach such as vegetated riprap or brush layering, it offers the stability and erosion protection of an engineered structure with the aesthetic and ecological benefits of incorporated plantings. These techniques are ideal for the treatment of localized scour issues where lateral expansion or channel migration is undesirable.

5. Local bank stabilization area

   The majority of the reaches in the study area are experiencing bank erosion. In these areas, localized bank treatment could be considered to dissipate the expected increase in flow regime. Bio-engineering techniques such as brush layering and crib walls effectively increase the shear strength of the banks, allowing them to withstand higher flows than those tolerated by existing bare soils.

7. Conclusions

This report presents the findings of geomorphological reach characterization, meander belt width assessment, erosion threshold analysis at selected fieldwork sites, and cross-sectional monitoring. The report is intended to provide a characterization of existing conditions for Upper Little River and its associated drains contained within the Sandwich South Employment lands. Based on the report findings the following key conclusions can be drawn:

- **Meander belt widths**
  Meander belt widths were delineated for all reaches based on either current channel planform or current channel dimensions. Due to a history of alteration and straightening traditional methods of meander belt width delineation could not be used in which case channel dimensions (from field data) were used in conjunction with empirical relationships to calculate an appropriate belt width. Erosion setbacks were calculated as 10% of the preliminary belt width as historical migration rates could not be determined. Final belt widths ranged from a minimum of 28 m to a maximum of 216 m. Larger belt widths were determined for reaches with a more sinuous planform and larger channel dimensions. Any future development of the study area should occur outside of the meander belt widths to ensure channel stability.

- **Reach characterization**
  Within the study area, reaches can be grouped into three different categories: the main Little River channel (LR-1 to LR-6), the Little River drain (LRD-1 to LRD-5), and the agricultural drains (all remaining reaches). While the reaches differ widely in channel dimensions, characteristics are similar. The majority of the reaches have been straightened or altered in some way. Banks are protected by various structures ranging from gabions and terra blocks, to large steel retaining walls on the main Little River reaches. The agricultural drains appear to be mostly man-made straight ditches, lacking any natural geomorphic features. Bank erosion is prevalent in the entrenched, agricultural drains as well as in some of the larger reaches where bank protection is slightly undermined. Based on these characteristics noted during rapid assessments, all reaches were classified as in transition or adjustment. Most channels were widening with a secondary process of aggradation. As the channels widen and erode the banks, trees lean and fall into the channel creating woody debris which traps sediment leading to the secondary process of aggradation. Cross section monitoring results support this characterization as well. Both LR-3 and LRD-4 showed slight aggradation between the two times of measurement. Reaches BRD-1, NC-1, and SC-1 had evidence of bank slumping and erosion over the monitoring period.

- **Erosion thresholds**
  Erosion thresholds were done for five reaches: two on the Little River main channel, one on the Little River drain, and two on agricultural drains. This selection gave a representative sample of the reaches within the study area. The critical discharge was on average 33% of the bankfull discharge which is

relatively low. This is attributed to the entrenched nature of the majority of the reaches, resulting in a high bankfull discharge relative to grain size within the channel.

8. References

Chapman and Putnam. 1984. The Physiography of Southern Ontario (3rd Edition). Ontario Geological Survey, Special Volume 2. Ontario Ministry of Natural Resources, Toronto.

Chow, VT. 1959. Open Channel Hydraulics. McGraw Hill, Boston, MA. 680pp.

Fischenich. 2001. Stability Thresholds for Stream Restoration Materials. EMRRP Technical Notes Collection (ERDC TN-EMRRP-SR-29), U.S. Army Engineer Research and Development Center, Vicksburg, M.S. www.wes.army.mil/e/emrrp

Galli, J. 1996. Rapid stream assessment technique, field methods. Metropolitan Washington Council of Governments. 36pp.

Ministry of the Environment. 2003. Stormwater Management Planning and Design Manual, Ontario Ministry of Environment, March 2003.

Parish Geomorphic Ltd. 2004. Belt Width Delineation Procedures. Submitted to: Toronto and Region Conservation Authority.

Appendix A: Photographic Record of Reaches

Sixth Concession (SCD-1)
Looking downstream at right bank toe erosion

Sixth Concession (SCD-2)
Looking downstream at reach break and bank

Ninth Concession Drain (NCD-1)
Looking upstream from near middle of reach

Baseline Road Drain (BRD-1)
Looking downstream from end of reach at bank erosion

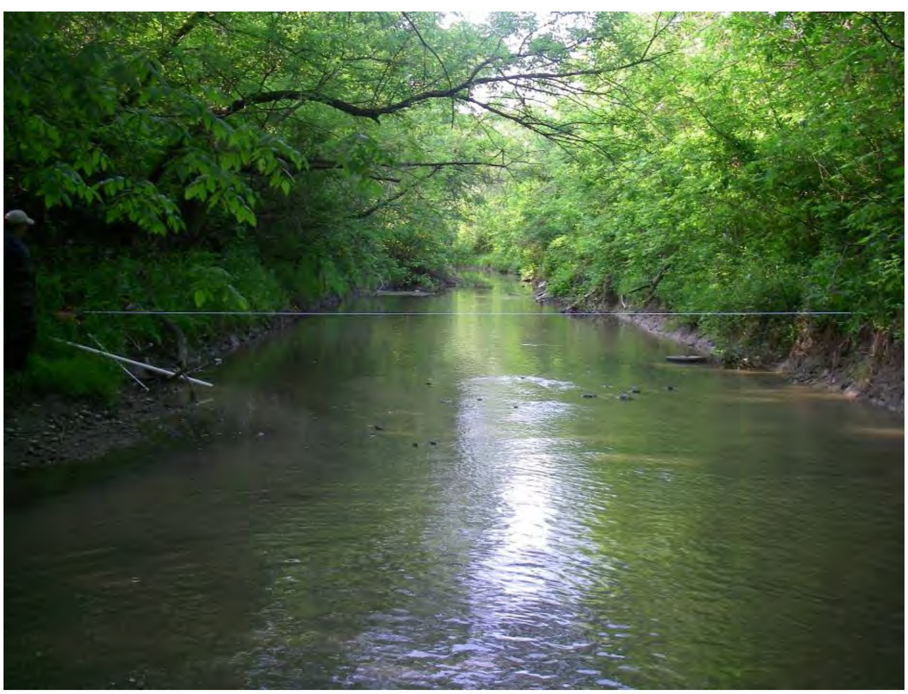
Lachance Drain Reach (LAD-1)
Cross section 6 looking upstream

Little River Reach (LR-1)
Looking downstream at retaining walls

Little River Reach (LR-2)
Cross section 2 looking downstream

Little River Reach (LR-3)
Looking at downstream end of reach at toe erosion of right bank

Little River Reach (LR-4)
Looking downstream from road crossing



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APPENDIX K

Preliminary Opinion of Probable Costs

Upper Little River Watershed Master Drainage and Stormwater Management Plan
Preliminary Opinion of Probable Costs

Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
	Do-Nothing	Off-Line Water Quality and no Water Quantity Control	On-line Water Quality and Quantity Controls Communal On-Line SWM	On-line Water Quantity and Off-line Water Quality Controls	Distributed Off-line Water Quality and Quantity Controls	Grouped Off-line Water Quality and Quantity Controls
Channel Improvements ($/m)	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000
Pond ($/ha of drainage area)	$ 5,000	$ 5,000	$ 7,000	$ 11,000	$ 11,000	$ 10,000
Improved Channel length (m)	-	28,000	28,000	28,000	28,000	28,000
Proposed area requiring SWM Facilities (ha)	-	3,000	3,000	3,000	3,000	3,000
Channel Improvements	$ -	$ 28,000,000	$ 28,000,000	$ 28,000,000	$ 28,000,000	$ 28,000,000
SWM Facilities	$ -	$ 15,000,000	$ 21,000,000	$ 33,000,000	$ 33,000,000	$ 30,000,000
Subtotal	$ -	$ 43,000,000	$ 49,000,000	$ 61,000,000	$ 61,000,000	$ 58,000,000
Allowance/Contingency (15%)	$ -	$ 6,450,000	$ 7,350,000	$ 9,150,000	$ 9,150,000	$ 8,700,000
Design/Construction Administration (10%)	$ -	$ 4,300,000	$ 4,900,000	$ 6,100,000	$ 6,100,000	$ 5,800,000
Grand Total	$ -	$ 53,750,000	$ 61,250,000	$ 76,250,000	$ 76,250,000	$ 72,500,000

Notes Alternatives 3 to 5 assume proposed flows are attenuated to the capacity of the existing municipal drain network
Alternatives 2 to 5 assume the existing municipal drain network is abandoned and offsetting measures are required
Costs include excavation, fine grading, hard servicing (headwalls, pipes, rip-rap, etc.), and landscaping
Costs do not include property or pump stations

APPENDIX L

Stage 1 Archaeology Assessment

Ministry of Tourism, Culture and Sport

Archaeology Programs Unit
Programs and Services Branch
Culture Division
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Tel.: (416) 212-8442
Email: kaye.boucher@ontario.ca

Ministère du Tourisme, de la Culture et du Sport

Unité des programmes d'archéologie
Direction des programmes et des services
Division de culture
401, rue Bay, bureau 1700
Toronto ON M7A 0A7
Tél. : (416) 212-8442
Email: kaye.boucher@ontario.ca

Ontario

May 16, 2016

Walter Frank McCall (P389)
Stantec Consulting
48 Charles Brantford ON N3T 1B3

RE: Review and Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 Archaeological Assessment: Upper Little River Watershed Master Plan and Stormwater Management Plan Various Lots and Concessions, Geographic Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario ", Dated Apr 8, 2015, Filed with MTCS Toronto Office on Apr 22, 2015, MTCS Project Information Form Number P389-0040-2014

Dear Dr. McCall:

This office has reviewed the above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c 0.18.[1] This review has been carried out in order to determine whether the licensed professional consultant archaeologist has met the terms and conditions of their licence, that the licensee assessed the property and documented archaeological resources using a process that accords with the 2011 Standards and Guidelines for Consultant Archaeologists set by the ministry, and that the archaeological fieldwork and report recommendations are consistent with the conservation, protection and preservation of the cultural heritage of Ontario.

The report documents the assessment of the study area as depicted in Figure 4 of the above titled report and recommends the following:

Stantec was retained by the City of Windsor to complete a Stage 1 archaeological assessment for a study area, measuring approximately 225 hectares in size, located on various Lots and Concessions, Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario (Figure 1).

The Stage 1 archaeological assessment, involving background research and a property inspection, resulted in the determination that portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological resources. As such, a Stage 2 archaeological assessment will be required for portions of the study area (Figure 4).

The Stage 2 archaeological assessment will include the systematic walking of open ploughed fields at five metre intervals as outlined in Section 2.1.1 of the MTCS; 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The MTCS standards further require that all agricultural land, both active and inactive, be recently ploughed and sufficiently weathered to improve the visibility of archaeological resources. Ploughing must be deep enough to provide total topsoil exposure, but not deeper than previous ploughing, and must be able to ensure at least 80% ground surface visibility.

Moreover, the Stage 2 archaeological assessment will include a test pit survey at five metre intervals in areas inaccessible for ploughing as outlined in Section 2.1.2 of the MTCS; 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The MTCS standards require that each test pit be approximately 30 centimetres in diameter, excavated to at least five centimetres in to subsoil, and have all soil screened through six millimetre hardware cloth to facilitate the recovery of any cultural material that may be present. Prior to backfilling, each test pit will be examined for stratigraphy, cultural features, or evidence of fill.

Should any areas of disturbance or features indicating that archaeological potential have been removed, including permanently wet areas, not previously identified during the Stage 1 property inspection be encountered during the Stage 2 archaeological assessment, they will be documented as outlined in Section 2.1.8 of the MTCS; 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011).

Additional archaeological assessment is required; hence the study area remains subject to Section 48(1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

Based on the information contained in the report, the ministry is satisfied that the fieldwork and reporting for the archaeological assessment are consistent with the ministry's 2011 Standards and Guidelines for Consultant Archaeologists and the terms and conditions for archaeological licences. This report has been entered into the Ontario Public Register of Archaeological Reports. Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require any further information regarding this matter, please feel free to contact me.

Sincerely,

Kaye Boucher
Archaeology Review Officer

cc. Archaeology Licensing Officer
Anna Godo,City of Windsor
Craig Newton,a. Environmental Approvals Branch Ministry of the Environment

[1]In no way will the ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report(s) or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report(s) is otherwise found to be inaccurate, incomplete, misleading or fraudulent.

Stage 1 Archaeological Assessment: Upper Little River Watershed Master Plan and Stormwater Management Plan

Various Lots and Concessions, Geographic Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario

Prepared for:
Ms. Anna Godo, P. Eng.
City of Windsor
350 City Hall Square West,
Windsor, ON N9A 6S1

Prepared by:
Stantec Consulting Ltd.
200 – 835 Paramount Drive
Stoney Creek, ON L8J 0B4
Tel: (905) 385-3234
Fax: (905) 385-3534

Licensee: Walter McCall, Ph.D.
License #: P389

PIF #: P389-0040-2014
Project #: 160311265

ORIGINAL REPORT

April 8, 2015

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Project Personnel

Archaeology Lead:	Walter McCall, Ph.D. (P389)
Licensed Archaeologist:	Walter McCall, Ph.D. (P389)
Licensed Field Director:	Darren Kipping, MA (422)
Report Writer:	Gemma Calgie, B.Sc. (R472)
Technical Review:	Jeffrey Muir, BA (R304)
Licensee Review:	Walter McCall, Ph.D. (P389)
Senior Review:	Jim Wilson, MA (P001)

Acknowledgements

Proponent Contact:	Ms. Anna Godo, P.Eng.
Ministry of Tourism, Culture and Sport:	Robert von Bitter

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by the City of Windsor to conduct a Stage 1 archaeological assessment on various Lots and Concessions, Geographic Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario prior to the construction of the stormwater management system within the study area.

This assessment serves to meet the requirements of the Master Plan Municipal Class Environmental Assessment under the *Environmental Assessment Act* (Government of Ontario 1990a: Schedule 6.1). These guidelines require that an archaeological assessment be conducted prior to any infrastructure projects. The Stage 1 archaeological assessment was conducted in accordance with the Ministry of Tourism, Culture and Sport's (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The objectives of the Stage 1 assessment were to compile all available information about the known and potential archaeological heritage resources within the study area and to provide specific direction for the protection, management and/or recovery of these resources. This Stage 1 archaeological assessment was conducted under archaeological consulting license P389 issued to Walter McCall, Ph.D., of Stantec by the MTCS. A site visit was undertaken on April 17, 2014 as per Section 1.2 of the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011)

The Stage 1 archaeological assessment, involving background research and a property inspection, resulted in the determination that portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological resources. As such, a Stage 2 archaeological assessment will be required for portions of the study area.

The Stage 2 archaeological assessment will include the systematic walking of open ploughed fields at five metre intervals as outlined in Section 2.1.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). All agricultural land, both active and inactive, should be recently ploughed and sufficiently weathered to improve the visibility of archaeological resources. Ploughing must be deep enough to provide total topsoil exposure, but not deeper than previous ploughing, with at least 80% ground surface visibility.

Moreover, the Stage 2 archaeological assessment will include a test pit survey at five metre intervals in areas inaccessible for ploughing as outlined in Section 2.1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The MTCS standards require that each test pit be approximately 30 centimetres in diameter, excavated to at least five centimetres in to subsoil, and have all soil screened through six

millimetre hardware cloth to facilitate the recovery of any cultural material that may be present. Prior to backfilling, each test pit will be examined for stratigraphy, cultural features, or evidence of fill.

The MTCS is asked to review the results presented and to accept this report into the Ontario Public Register of Archaeological Reports. Additional archaeological assessment is required; hence the study area remains subject to Section 48(1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

Stantec Consulting Ltd. (Stantec) was retained by the City of Windsor to conduct a Stage 1 archaeological assessment on various Lots and Concessions, Geographic Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario prior to the construction of the stormwater management system within the study area.

This assessment serves to meet the requirements of the Master Plan Municipal Class Environmental Assessment under the *Environmental Assessment Act* (Government of Ontario 1990a: Schedule 6.1). These guidelines require that an archaeological assessment be conducted prior to any infrastructure projects. The Stage 1 archaeological assessment was conducted in accordance with the Ministry of Tourism, Culture and Sport's (MTCS) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The objectives of the Stage 1 assessment were to compile all available information about the known and potential archaeological heritage resources within the study area and to provide specific direction for the protection, management and/or recovery of these resources. In compliance with the provincial standards and guidelines set out in the MTCS' *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 1 Archaeological Overview/Background Study are as follows:

- To provide information about the study area's geography, history, previous archaeological fieldwork and current land conditions;
- To evaluate in detail the study area's archaeological potential which will support recommendations for Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 survey.

To meet these objectives Stantec archaeologists employed the following research strategies:

- A review of relevant archaeological, historic and environmental literature pertaining to the study area;
- A review of the land use history, including pertinent historic maps;
- An examination of the Ontario Archaeological Sites Database (ASDB) to determine the presence of known archaeological sites in and around the project area; and
- Documentation of the study area during a property inspection.

Permission to enter and document the study area was provided by Ms. Anna Godo, P.Eng.

1.2 HISTORICAL CONTEXT

1.2.1 Post-Contact Aboriginal Resources

The post-contact Aboriginal occupation of Southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking communities by the New York State Iroquois and the subsequent arrival of Algonkian-speaking groups from northern Ontario at the end of the 17th century and beginning of the 18th century (Konrad 1981; Schmalz 1991). By 1690, Algonkian speakers from the north appear to have begun to repopulate Bruce County (Rogers 1978:761). This is the period in which the Mississaugas are known to have moved into southern Ontario and the lower Great Lakes watersheds (Konrad 1981). In southwestern Ontario, however, members of the Three Fires Confederacy (Chippewa, Ottawa, and Potawatomi) were immigrating from Ohio and Michigan in the late 1700s (Feest and Feest 1978:778-779).

The nature of Aboriginal settlement size, population distribution, and material culture shifted as European settlers encroached upon their territory. Despite this shift, however, "written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural expressions that confirms a deep historical continuity to Iroquoian systems of ideology and thought" (Ferris 2009:114). As a result, First Nations peoples of Southern Ontario have left behind archaeologically significant resources throughout Southern Ontario which show continuity with past peoples, even if they have not been recorded in historical Euro-Canadian documentation.

The study area first enters the Euro-Canadian historic record on May 19, 1790 as part of Treaty Number 2, which details the surrender of land to the Crown by the Odawa, Chippewa, Pottawatomi, and Huron. Treaty Number 2:

> *... was made with the O[dawa], Chippew[a], Pottawatom[i] and Huro[n] May 19th, 1790, portions of which nations had established themselves on the Detroit River all of whom had been driven by the Iroquois from the northern and eastern parts of the Province, from the Detroit River easterly to Catfish Creek and south of the river La Tranche [Thames River] and Chenail Ecarte, and contains Essex County except Anderdon Township and Part of West Sandwich; Kent County except Zone Township, and Gores of Camden and Chatham; Elgin County except Bayham Township and parts of South Dorchester and Malahide. In Middlesex County, Del[a]ware and Westminster Townships and part of North Dorchester [are included].*

Morris 1943:17

While it is difficult to exactly delineate treaty boundaries today, Figure 2 provides an approximate outline of Treaty Number 2.

1.2.2 Euro-Canadian Resources

The study area falls within the Geographic Townships of Sandwich East and South, Essex County, Ontario. Present day Essex County was originally part of the District of Hesse, one of four districts founded in 1788 after the British came into possession of most of North America. The District of Hesse comprised all British territories west of Long Point, which makes up most of Western Ontario. In 1792, Upper Canada re-organized into 19 counties. The District of Hesse was renamed the Western District and contained two counties, Kent and Essex. The original Township of Sandwich was first constituted in 1788, but was subdivided into municipalities alongside the growth of regional towns, until in 1861 the area comprised the Town of Sandwich, City of Windsor, Town of Walkerville, and Sandwich West, East, and South (Neal 1909: 12).

In 1615, the French merchant and navigator Samuel De Champlain conducted an expedition from Quebec to the Detroit River, where he launched an attack on an Iroquoian village, believed to have stood at the location of present day Detroit. However, his forces were repelled, and Euro-Canadian settlement in the region did not take hold until after 1701, when M. de la Mottee Cadillac, commissioned by the French Governor of Canada, established a military and trading post at the site. This initial outpost became known as Fort Pontchartrain, and attracted further domestic settlement for several miles along both banks of the Detroit River.

Settlement on the eastern bank of the river, from the southern shore of Lake St. Clair to the Canard River in what would later become the Township of Sandwich, intensified after 1750 when the French began to assign land near frontier posts to military veterans. The region, known as the parish of L'Assomption (associated with a Jesuit mission built in 1748), was laid out into long, narrow lots of 180 acres. These ran perpendicular to the waterfront, extending several miles inland (Neal 1909: 6), and are still visible in present day street plans.

Fort Pontchartrain was captured by Major Robert Rodgers for the British in 1760. Even though Detroit was officially surrendered to the newly-formed United States in 1783, the British maintained effective control until 1796, when the regional seat of government was transferred to the new county town of Sandwich. During this interval Loyalists who wished to remain under the British Crown began to settle the Canadian side of the Detroit River (Neal 1909: 12). In order to assist with new settlement and distribution of land in the District of Hesse, the Land Board of the Western District was created in 1788 to facilitate a survey of the region. British land surveyor Patrick McNiff was charged with the task in Sandwich Township, and completed his survey in 1793.

The study area lies in the vicinity of two major historic communities, Sandwich and Windsor. Planning work on the village of Sandwich began in 1788, when a one square mile block of land was acquired by the British from the Chiefs of the Wyandottes/Huron, the Chippewa, and Ottawa for the price of three hundred pounds worth of supplies. It was laid out into one acre sections and 24 acre residential lots, and named for the English borough of Sandwich in Kent. Sandwich was established as the new county town by the Honourable Peter Russell in 1796, and its administrative function stimulated rapid growth. Industries included fur, salt, brick manufacturing, and fish hatcheries. The village was the first to see action during the War of 1812, when General Hull crossed from Detroit with a force of over 2,000 men, and played an important role in the Underground Railroad after the abolition of slavery by the British in 1833. Sandwich was incorporated as a town in 1858 (Neal 1909: 133-134).

Although the village of Sandwich was chosen as the location of Essex County offices, the town of Windsor eventually outstripped the former in size and industry. Windsor was originally founded as South Detroit by James Dougall of Paisley, Scotland, who bought the land, laid it out as a village plot, and opened a store in 1830. In 1846, Windsor had a population of only 300. In 1853, the Great Western Railway had reached the village, and chose to terminate the line there rather than at Sandwich, as originally planned. Windsor was incorporated as a town in 1854 and by 1866, its population had increased to 4,500 (Neal 1909:136). The arrival of the railway marked the beginning of significant industrial development in Windsor. Several areas that are now within the city limits, such as Walkerville and Ford City, were developed in the late 1800s and early 1900s as industrial and commercial companies set up operations in the region (Archaeological Services Inc. 2008).

The Windsor Subdivision of the Canadian Pacific Railway runs east - west across the northern portion of the study area. This railway is present on McPhillips' 1898 *Plan of the Township of Sandwich* (McPhillips 1898). Part of the Trans-Canada railway commissioned by the government in 1880, it reached Windsor in 1890, and the line is still in operation today. (Andreae 1997).

The 1881 *Illustrated Historical Atlas of Essex County, Ont.*'s (Belden & Co. 1881) map of the Townships of East and South Sandwich (Figure 3) identifies landowners for ten of the 66 lots within the Stage 1 assessment area, as listed in Table 1. Within the boundary of the study area there are three homesteads and one schoolhouse visible on the map. The road system as depicted on the map still exists today.

Table 1: Landowner Information from the 1881 *Illustrated Historical Atlas of Essex County*

Lot	Concession	Owner	Comment
142	2	H. Morand	Owner of 50 acres. A small structure visible at the northern end of the lot, fronting Tecumseh Rd.
143	2	none	No structures visible.
115 - 125	3	none	No structures visible.
126 - 127	3	none	Schoolhouse depicted straddling the northern end of both lots.
134 - 140	3	none	No structures visible.
141	3	James Ross	Owner of 75 acres. No structures visible.
142 - 149	3	none	No structures visible.
16	6	none	No structures visible.

Lot	Concession	Owner	Comment
14-17	7	none	No structures visible.
10 - 14	8	none	No structures visible.
15	8	William Lyons	Owner of entire 200 acre lot. A small structure is visible in the northwest corner of the lot.
16	8	Jonathan Plant	Owner of 55 acres. A small structure is visible in the southeast corner of the lot, within the study area boundary.
17	8	none	Schoolhouse depicted in the southeast corner of the lot, within the study area boundary.
18	8	none	No structures visible.
10	9	none	No structures visible.
11	9	Robert Watson	Owner of 125 acres. A small structure is visible at the eastern end of the lot, near Pike Creek, and within the study area boundary.
12 – 14	9	none	No structures visible.
15	9	George Hurst	Owner of 75 acres. Two small structures are visible in the southwest corner of the lot, within the study area boundary.
16 – 18	9	none	No structures visible.
11 – 15	10	none	No structures visible.
16	10	Samuel McKenzie	Owner of entire 158 acre lot. A small structure is visible at the eastern end of the lot. During Stage 1 fieldwork, a heritage barn was noticed in the northwest corner of the lot.
17	10	none	No structures visible.
18	10	George Little	Owner of 115 acres. A small structure is visible in the northwestern corner of the lot.
19	10	none	No structures visible.
300	N/A	Alfred Renshaw	Owner of 50 acres. A small structure is visible on the eastern side of the lot.
301	N/A	Jeremiah McCarthy and James McCarthy	Jeremiah McCarthy is listed as the owner of 110 acres on the eastern side of the lot, and James McCarthy, 75 acres on the western side. A small structure is visible for each, both at the southern end of the lot.
302	N/A	none	A small structure labeled “Oldcastle P.O. Toll Gate” is depicted in the southwest corner of the lot, at a Talbot Road intersection.

Historical county atlases were produced primarily to identify factories, offices, residences and landholdings of subscribers and were funded by subscription fees. Landowners who did not subscribe were not always listed on the maps (Caston 1997:100). As such, all structures were not necessarily depicted or placed accurately (Gentilcore and Head 1984).

The majority of the region surrounding the study area has been subject to European-style agricultural practices for over 100 years, with Euro-Canadian farmers in the area by the mid-19th century. Much of the region today continues to be used for agricultural purposes, despite the urban spread of Windsor to the north and west of the study area.

1.3 ARCHAEOLOGICAL CONTEXT

The study area occupies all or part of Lots 10 to 19, Concessions 6 to 10, and singular Lots 300-302, Geographic Township of Sandwich South, and Lots 115 to 149, Concessions 2 to 3, Township of Sandwich East, Essex County, Ontario. It comprises approximately 225 hectares of active and inactive agricultural lands, woodlots, manicured lawns, commercial and residential properties, paved roads and highways, industrial installations, a railway, and land incorporated within the boundaries of Windsor Airport.

1.3.1 The Natural Environment

The study area is situated within the St. Clair Clay Plain (Chapman & Putnam 1986:146-147).

> *Adjoining Lake St. Clair in Essex and Kent County Counties and the St. Clair River in Lambton County are extensive clay plains covering 2,270 square miles. The region is one of little relief, lying between 575 and 700 feet a.s.l., except for the moraine at Ridgetown and Blenheim which rises 50 to 500 feet higher....Glacial Lake Whittlesey, which deeply covered all of these lands, and Lake Warren which subsequently covered nearly the whole area, failed to leave deep stratified beds of sediment on the underlying clay till except around Chatham, between Blenheim and the Rondeau marshes, and in a few other smaller areas. Most of Lambton and Essex Counties, therefore, are essentially till plains smoothed by shallow deposits of lacustrine clay which settled in the depressions while the knolls were being lowered by wave action.*
>
> *Chapman & Putnam 1986:147*

Two soil series are present within the Study Area. The primary soil series is Brookston Clay, a shaley and imperfectly drained clay till with medium lime content. Present also are small pockets of Brookston Clay Sand, a mixture of sand and Brookston Clay, which appears intermittently in areas of shallow sand knolls. Although not ideal, Brookston Clay and Brookston Clay Sand are suitable for pre-contact Aboriginal agriculture.

The closest extant sources of potable water are Little River, Pike Creek, and Canard River. These rivers and their sources bound the edges of the study area; Little River to the north, Pike Creek to the east, and Canard River to the southwest. The source of Little River lies within the study area itself. Further to these, the Detroit River runs 6.3 kilometres to the north and west of the study area, while the southern shore of Lake St. Clair is located 2.6 kilometres northeast.

1.3.2 Pre-contact Aboriginal Archaeological Resources

This portion of southwestern Ontario has been demonstrated to have been occupied by people as far back as 11,000 years ago as the glaciers retreated. For the majority of this time, people were practicing hunter gatherer lifestyles with a gradual move towards more extensive farming practices. Given the length of occupation of the study area prior to the arrival of Euro-Canadian settlers, the pre-contact Aboriginal archaeological potential of the study area is judged to be moderate to high. Table 2 provides a general outline of the cultural chronology of Essex County, based on Ellis and Ferris (1990).

Table 2: Cultural Chronology of Essex County

Period	Characteristics	Time Period	Comments
Early Paleo-Indian	Fluted Projectiles	9000 - 8400 B.C.	spruce parkland/caribou hunters
Late Paleo-Indian	Hi-Lo Projectiles	8400 - 8000B.C.	smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8000 - 6000 B.C.	slow population growth
Middle Archaic	Brewerton-like points	6000 - 2500 B.C.	environment similar to present
Late Archaic	Lamoka (narrow points)	2000 - 1800 B.C.	increasing site size
	Broad Points	1800 - 1500 B.C.	large chipped lithic tools
	Small Points	1500 - 1100B.C.	introduction of bow hunting
Terminal Archaic	Hind Points	1100 - 950 B.C.	emergence of true cemeteries
Early Woodland	Meadowood Points	950 - 400 B.C.	introduction of pottery
Middle Woodland	Dentate/Pseudo-Scallop Pottery	400 B.C. - A.D.500	increased sedentism
	Princess Point	A.D. 550 - 900	introduction of corn
Late Woodland	Early Ontario Iroquoian	A.D. 900 - 1300	emergence of agricultural villages
	Middle Ontario Iroquoian	A.D. 1300 - 1400	long longhouses (100m +)
	Late Ontario Iroquoian	A.D. 1400 - 1650	tribal warfare and displacement
Contact Aboriginal	Various Algonkian Groups	A.D. 1700 - 1875	early written records and treaties
Late Historic	Euro-Canadian	A.D. 1796 - present	European settlement

1.3.3 Previously Known Archaeological Sites and Surveys

In order to compile an inventory of archaeological resources, the registered archaeological site records kept by the MTCS were consulted. In Ontario, information concerning archaeological sites stored in the ASDB (Government of Ontario n.d.) is maintained by the MTCS. This database contains archaeological sites registered according to the Borden system. Under the Borden system, Canada is divided into grid blocks based on latitude and longitude. A Borden Block is approximately 13 kilometres east to west and approximately 18.5 kilometres north to south. Each Borden Block is referenced by a four-letter designator and sites within a block are numbered sequentially as they are found. The study area under review is within Borden Block AbHr.

Information concerning specific site locations is protected by provincial policy, and is not fully subject to the *Freedom of Information and Protection of Privacy Act*. The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to all media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MTCS will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

An examination of the ASDB has shown that there are three archaeological sites registered within a one-kilometre radius of the study area (Table 3): one is multi – component and two are Euro - Canadian (Government of Ontario n.d.). The multi – component site, AbHr-4, is located within the current study area on Lot 145, Concession 3. It comprised a 30 metre scatter of Euro – Canadian artifacts and one side notched point, and was observed and recorded by Mr. Frank Dieterman in 1991.

Table 3: Archaeological Sites Registered within One-Kilometre of Study Area

Borden Number	Site Name	Site Type	Cultural Affiliation
AbHr-17	-	Findspot	Euro-Canadian
AbHr-18	-	Homestead	Euro-Canadian
AbHr-4	-	Findspot	Multi – component

A total of six archaeological studies have been conducted within 50 metres of the study area (personal communication, Robert von Bitter, April 16, 2014; Government of Ontario n.d.), as summarized in Table 4.

Table 4: Archaeological Assessments Completed Within 50 metres of Study Area

Year	Title	Author
2010	Archaeological Assessment (Stages 1 and 2), Windsor Annex Sanitary Sewer Servicing, City of Windsor, Essex County, Ontario	Mayer Heritage Consultants Inc.
2011	Stage 1 Archaeological Assessment County Road 43/Banwell Road Improvements Class EA and Preliminary Design, County Road 42 northerly to CP Rail Line, County of Essex,	Archaeological Services Inc.

Year	Title	Author
	Ontario	
2012	Stage 2 Archaeological Assessment (AA): Windsor Railway Spur Extension within Part of Lots 136-140, Concession 3, McNiff's Survey, Geographic Township of Sandwich East, City of Windsor, Ontario	Archaeoworks
2013	Stage 1 Assessment of the Lauzon Parkway, County Road 17, County Road 42, Future East-West Arterial Road From Walker Road to County Road 17 Corridors, and the Sandwich South Secondary Plan, City of Windsor, County of Essex.	Woodley
2013	Stage 1: Background Study Tecumseh Hamlet Servicing Plan Between County Roads 22 & 42 (Geographic Township of Sandwich East), Town of Tecumseh, Essex County, Ontario	Woodley
2014a	Stage 1 Archaeological Assessment: Windsor Solar Project, Part of Lots 105 to 123, Concession 3 Petite Cote, Geographic Township of Sandwich, Now City of Windsor, Ontario	Stantec

The Stage 1-2 assessment above, conducted by Mayer Heritage Consultants Inc. (MHC) in 2010, and the Stage 2 assessment conducted by Archaeoworks in 2012, were undertaken within the limits of the current study area (see Figure 4).

MHC determined that the Stage 1-2 assessment area had cultural heritage value for both Aboriginal and Euro-Canadian sites. However, no artifacts or other archaeological resources were recovered during the Stage 2 fieldwork, and no further archaeological assessment was recommended (Mayer Heritage Consultants Inc. 2010).

The Stage 2 assessment conducted by Archaeoworks in 2012 revealed one small Euro-Canadian artifact scatter consisting of eight artifacts. However, this scatter was determined to have low cultural heritage value, and no further work was recommended (Archaeoworks 2012).

The Stage 1 assessment conducted by Stantec in 2014 on behalf of Windsor Solar Ltd. overlaps the current study area on Lots 116 to 123, Concession 3. The Stage 1 report is still forthcoming, but concludes that the area had cultural heritage value for both Aboriginal and Euro-Canadian sites and Stage 2 assessment was recommended.

In addition to the assessments discussed above, the City of Windsor's *Archaeological Master Plan Study Report* (CRM Group Limited *et al*. 2005) discusses the City of Windsor's archaeological context in general. As of 2005, archaeologists had registered only 23 archaeological sites within the city limits or within the immediate vicinity. However, the authors of the archaeological management plan recognized that a number of poorly documented sites exist and there are many sites still to be documented especially since the majority of the archaeological studies discussed in the archaeological management plan maps are concentrated along the Detroit River or in southwest Windsor (CRM Group Limited *et al*. 2005:3-1 to 3-23).

In addition, the northern portion of the Study Area is depicted in the archaeological management plan's archaeological potential mapping. Those portions identified as having archaeological potential are noted as such due to the present of existing water sources, presumably the municipal drains (CRM Group Limited *et al*. 2005:Figure 1). Ultimately, approximately half of the Study Area retains high archaeological potential according to the 2005 mapping (CRM Group Limited *et al*. 2005:Figure 4). The archaeological management plan's evaluation of archaeological potential is further discussed in Section 3.0.

2.0 FIELD METHODS

The Stage 1 archaeological assessment compiled the available information concerning any known and/or potential archaeological heritage resources within the study area. A property inspection was conducted under PIF P389-0040-2014 issued to Walter McCall, Ph.D., of Stantec by the MTCS. The property inspection was completed on April 17, 2014. In accordance with Section 1.2 of the MTCS' *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the property inspection involved random spot-checking of the entire property and its periphery to identify the presence or absence of any features of archaeological potential (Figure 4). During the property inspection the weather was warm and sunny, and visibility of land features was excellent. At no time were field or weather conditions detrimental to the identification of features of archaeological potential.

The study area occupies all or part of Lots 10 to 19, Concessions 6 to 10, and singular Lots 300-302, Geographic Township of Sandwich South, and Lots 115 to 149, Concessions 2 to 3, Township of Sandwich East, Essex County, Ontario. It comprises approximately 225 hectares of active and inactive agricultural lands, woodlots, manicured lawns, commercial and residential properties, paved roads and highways, industrial installations, a railway, and land incorporated within the boundaries of Windsor Airport.

The majority of the study area (80%) consists of active and inactive agricultural land accessible for ploughing. A smaller portion of the Study Area comprises woodlots (10%) and manicured lawns (5%) that are unable to be ploughed. The remaining 5 percent of the Study Area consists of roads and highway, a railway line, and private laneways. These areas are previously disturbed and are unable to be assessed.

The photography from the property inspection is presented in Section 7.1 and confirm that the requirement for a Stage 1 property inspection were met, as per Section 1.2 and Section 7.7.2 Standard 1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

Photos 1 to 8 demonstrate that the study area is primarily composed of relatively flat agricultural fields. In accordance with Section 2.1.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), these areas will require Stage 2 physical inspection using the pedestrian survey method at a five metre interval. Photos 9 to 11 depict areas of woodlot within the study area and Photos 12 and 13, examples of manicured lawns. Both are inaccessible for ploughing and, in accordance with Section 2.1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), will require Stage 2 physical inspection using the test pit survey method at a five metre interval.

A possible heritage property, a wooden barn, was noticed during fieldwork at the intersection of Concession Road 10 and Baseline Road. It is located in the northwest corner of Lot 16, Concession 10 (Table 1).

Photos 14 - 16 depict the Windsor Subdivision of the Canadian Pacific Railway running east - west across the northern portion of the study area. Although this railway is a historic transportation route, having been completed in 1890, and appearing on McPhillips' 1898 *Plan of the Township of Sandwich* (McPhillips 1898), previous disturbance due to maintenance and expansion designates it an area of low archaeological potential.

Photos 17 - 19 provide examples of the various paved roads that cross the Study Area as well as their associated right-of-ways and culvert systems. As per Section 2.1, Standard 2b of the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011) these areas have also been evaluated as having low potential due to deep land alteration that has severely damaged the integrity of archaeological resources and as such, Stage 2 survey is not required.

3.0 ANALYSIS AND CONCLUSIONS

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Stantec applied archaeological potential criteria commonly used by MTCS (Government of Ontario 2011) to determine areas of archaeological potential within the region under study. These variables include proximity to previously identified archaeological sites, distance to various types of water sources, soil texture and drainage, glacial geomorphology, elevated topography and the general topographic variability of the area.

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in southwestern Ontario have remained relatively stable over time, proximity to drinkable water is regarded as a useful index for the evaluation of archaeological site potential. In fact, distance to water is one of the most commonly used variables for predictive modeling of archaeological site location in Ontario. Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and, considered alone, may result in a determination of archaeological potential. However, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential. Finally, extensive land disturbance can eradicate archaeological potential (Wilson and Horne 1995).

As discussed above, distance to water is an essential factor in archaeological potential modeling. When evaluating distance to water it is important to distinguish between water and shoreline, as well as natural and artificial water sources, as these features affect sites locations and types to varying degrees. The MTCS categorizes water sources in the following manner:

- Primary water sources: lakes, rivers, streams, creeks;
- Secondary water sources: intermittent streams and creeks, springs, marshes and swamps;
- Past water sources: glacial lake shorelines, relic river or stream channels, cobble beaches, shorelines of drained lakes or marshes; and
- Accessible or inaccessible shorelines: high bluffs, swamp or marshy lake edges, sandbars stretching into marsh.

The closest extant sources of potable water are Little River, Pike Creek, and Canard River. These rivers and their sources bound the edges of the study area; Little River to the north, Pike Creek to the east, and Canard River to the southwest. The Little River originates in the northern portion of the study area. Further to these, the Detroit River runs 6.3 kilometres to the north and west of the study area, while the southern shore of Lake St. Clair is located 2.6 kilometres northeast of the latter. Moreover, additional ancient and/or relic tributaries of the Little River may have existed but are not identifiable today and are not indicated on historic mapping. These watercourses are also reflected in the archaeological potential mapping produced for the City of Windsor's archaeological management plan (CRM Group Limited *et al*. 2005).Furthermore, as indicated previously, although not ideal, Brookston Clay and Brookston Clay Sand are suitable for pre-contact and post-contact Aboriginal agriculture. Add to these observations the presence of one registered multi - component site within one kilometre of the study area, and the pre-contact Aboriginal archaeological potential of the study area is judged to be high.

For Euro-Canadian sites, archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements; early transportation routes; and properties listed on the municipal register or designated under the *Ontario Heritage Act* or property that local histories or informants have identified with possible historical events. The 1881 *Illustrated Historical Atlas of Essex County, Ont*. (Belden & Co. 1881) demonstrates that the study area and its environs were densely occupied by Euro-Canadian farmers by the later 19th century. Much of the established road system and agricultural settlement from that time is still visible today. Moreover, the ASDB recognizes two registered historic Euro-Canadian sites within one kilometre of the study area (Government of Ontario n.d.). Therefore, the Euro-Canadian archaeological potential of the study area is judged to be moderate to high.

The archaeological management plan for the City of Windsor (CRM Group *et al*. 2005) differs slightly from the archaeological potential determination here in that some portions of the Study Area are determined to have low archaeological potential. Examining the plan's mapping, it appears that the presence of watercourses is the factor that takes precedence in the weighting used to score archaeological potential in this area. However, the discussions in Section 1.2 and 1.3 above demonstrate the presence of First Nations groups in the area and a lack of documentation concerning possibly present Euro-Canadian structures in the historic mapping. These additional factors lend reason to believe that the majority of the Study Area could retain archaeological potential. Otherwise, some areas of low archaeological potential do exist within the Study Area, to include modern paved roads and railways, and various modern buidings and laneways, which exhibit disturbance from their construction. The municipal drains are natural watercourses that have been modified within the last century and retain low archaeological either due to the low, wet nature of the area or due to modern ditching and culvert construction.

When the above listed criteria are applied to the study area, the archaeological potential for pre-contact Aboriginal, post-contact Aboriginal, and historic Euro-Canadian sites is deemed to be moderate to high. Thus, in accordance with Section 1.3.1 of the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the Stage 1 archaeological assessment of the Upper Little River Watershed Master Plan and Stormwater Management Plan has determined that the study area exhibits moderate to high potential for the identification and recovery of archaeological resources (Figure 4).

4.0 RECOMMENDATIONS

Stantec was retained by the City of Windsor to complete a Stage 1 archaeological assessment for a study area, measuring approximately 225 hectares in size, located on various Lots and Concessions, Townships of Sandwich East and South, now City of Windsor and Town of Tecumseh, Essex County, Ontario (Figure 1).

The Stage 1 archaeological assessment, involving background research and a property inspection, resulted in the determination that portions of the study area exhibit a moderate to high potential for the identification and recovery of archaeological resources. As such, a Stage 2 archaeological assessment will be required for portions of the study area (Figure 4).

The Stage 2 archaeological assessment will include the systematic walking of open ploughed fields at five metre intervals as outlined in Section 2.1.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The MTCS standards further require that all agricultural land, both active and inactive, be recently ploughed and sufficiently weathered to improve the visibility of archaeological resources. Ploughing must be deep enough to provide total topsoil exposure, but not deeper than previous ploughing, and must be able to ensure at least 80% ground surface visibility.

Moreover, the Stage 2 archaeological assessment will include a test pit survey at five metre intervals in areas inaccessible for ploughing as outlined in Section 2.1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The MTCS standards require that each test pit be approximately 30 centimetres in diameter, excavated to at least five centimetres in to subsoil, and have all soil screened through six millimetre hardware cloth to facilitate the recovery of any cultural material that may be present. Prior to backfilling, each test pit will be examined for stratigraphy, cultural features, or evidence of fill.

Should any areas of disturbance or features indicating that archaeological potential have been removed, including permanently wet areas, not previously identified during the Stage 1 property inspection be encountered during the Stage 2 archaeological assessment, they will be documented as outlined in Section 2.1.8 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The Ministry of Tourism, Culture and Sport is asked to review the results presented and to accept this report into the Ontario Public Register of Archaeological Reports. Additional archaeological assessment is required; hence the study area remains subject to Section 48(1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Ontario Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act*.

The *Cemeteries Act*, R.S.O. 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ontario Ministry of Consumer Services.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

6.0 BIBLIOGRAPHY AND SOURCES

Andreae, Christopher. 1997. *Lines of Country: An Atlas of Railway and Waterway History in Canada*. Erin: The Boston Mill Press.

Archaeological Services Inc. 2008. *Detroit River International Crossing Study: Draft Cultural Heritage Resource Assessment*. Electronic document: http://www.partnershipborderstudy.com/pdf/CulturalHeritage/WEB_PracticalAltsWP_CulturalHeritage_April2008-appsonly.pdf. Last accessed on May 20, 2014.

Archaeoworks. 2012. *Stage 2 Archaeological Assessment (AA): Windsor Railway Spur Extension within Part of Lots 136-140, Concession 3, McNiff's Survey, Geographic Township of Sandwich East, City of Windsor, Ontario.* Report on file with the Ministry of Tourism, Culture and Sport, Toronto.

Belden & Co., H. 1881. *The Illustrated Historical Atlas of Essex County, Ontario*. Toronto: H. Belden & Co.

Caston, Wayne A. 1997. Evolution in the Mapping of Southern Ontario and Wellington County. *Wellington County History* 10:91-106.

Chapman, Lyman John and Donald F. Putnam. 1984. *The Physiography of Southern Ontario*. 3rd ed. Ontario Geological Survey Special Volume 2. Toronto: Ontario Ministry of Natural Resources.

Ellis, Chris J. and Neal Ferris (editors). 1990. *The Archaeology of Southern Ontario to A.D. 1650.* Occasional Publication of the London Chapter, Ontario Archaeological Society, Number 5.

Feest, Johanna E. and Christian F. Feest 1978. The Ottawa. In *Handbook of North American Indians*, *Vol.15 Northeast*, pp. 772-786. B.G. Trigger, ed. Washington: Smithsonian Institute.

Ferris, Neal. 2009. *The Archaeology of Native-Lived Colonialism: Challenging History in the Great Lakes*. Tucson: University of Arizona Press.

Gentilcore, R. Louis and C. Grant Head. 1984. *Ontario's History in Maps*. Toronto: University of Toronto Press.

Government of Ontario. 1990a. *Environmental Assessment Act, R.S.O. 1990, CHAPTER E.18.* Last amendment: 2010, c. 16, Sched. 7, s. 1. Electronic document: https://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90e18_e.htm. Last accessed May 15, 2014.

Government of Ontario. 1990b. *Ontario Heritage Act, R.S.O. 1990, CHAPTER O.18*. Last amendment: 2009, c. 33, Sched. 11, s. 6. Electronic document: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o18_e.htm. Last accessed May 15, 2014.

Government of Ontario. 2011. *Standards and Guidelines for Consultant Archaeologists*. Toronto: Ministry of Tourism, Culture and Sport.

Government of Ontario. n.d. *Archaeological Sites Database Files*. Toronto: Archaeology Programs Unit, Ministry of Tourism, Culture and Sport.

Konrad, Victor. 1981. An Iroquois Frontier: the North Shore of Lake Ontario during the Late Seventeenth Century. *Journal of Historical Geography* 7(2).

Mayer Heritage Consultants Inc. *2010. Archaeological Assessment (Stages 1 and 2), Windsor Annex Sanitary Sewer Servicing, City of Windsor, Essex County, Ontario.* Report on file with the Ministry of Tourism, Culture and Sport, Toronto.

McPhillips, G. 1898. *Plan of the Township of Sandwich – West, East and South of the Towns of Walkerville and Sandwich and the City of Windsor.* Electronic document. http://data2.archives.ca/nmc/n0011345_a2.pdf. Last accessed May 15, 2014.

Morris, J.L. 1943. *Indians of Ontario*. 1964 reprint. Toronto: Department of Lands and Forests.

Neal, F. 1909. *The Township of Sandwich (past and present)… : An Interesting History of the Canadian Frontier Along the Detroit River, Including the Territory Which Now Embrace the Present City of Windsor, the Towns of Sandwich and Walkerville and the Sandwich Townships, and Also a Brief Account of the Present County of Essex.* Sandwich: Frederick Neal.

Rogers, Edward S. 1978. Southeastern Ojibwa. In *Handbook of North American Indians, Vol. 15 Northeast*, pp. 760-771. B.G. Trigger, ed. Washington: Smithsonian Institution.

Schmalz, Peter S. 1991. *The Ojibwa of Southern Ontario*. Toronto: University of Toronto Press.

Wilson, J.A and M. Horne. 1995. *City of London Archaeological Master Plan*. London: City of London, Department of Planning and Development.

7.0 IMAGES

7.1 PHOTOS

Photo 1: Agricultural Field, facing west

Photo 2: Agricultural Field, facing east

Photo 3: Agricultural Field with Road and Municipal ROW in foreground, facing north west

Photo 4: Agricultural Field with Road and Municipal ROW in foreground, facing east

Photo 5: Agricultural Field, facing west

Photo 6: Agricultural Field with Municipal ROW in the foreground, facing west

Photo 7: Agricultural Field, facing northeast

Photo 8: Fallow Inactive Agricultural Field, facing north west

Photo 9: Woodlot, facing north

Photo 10: Inactive Agricultural Field with Woodlot in the background, facing south west

Photo 11: Woodlot with Little River flowing through, facing north east

Photo 12: Manicured Lawn, facing south

Photo 13: Manicured Lawn, facing south

Photo 14: Intersection of Lauzon Parkway and the railway, facing north

Photo 15: Railway and transmission lines, showing location of Union Gas pipeline, facing east

Photo 16: Railway, facing north west

Photo 17: Concession Road 9 and Highway 401 with Municipal ROW in the background, facing north

Photo 18: Intersection of Concession Road 9 and Baseline Road with Municipal ROW, facing north

Photo 19: Lauzon Road with Municipal ROW, showing culvert over Little River, facing south east

8.0 MAPS

All maps will follow on succeeding pages.

Stantec

Legend
- Project Area
- Archaeology Study Area
- Highway
- Major Road
- Watercourse

Ontario
Site Location
Lake Huron
Lake Ontario
Lake Erie
Sarnia
London
Toronto
Niagara Falls
KEY MAP

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
3. Orthoimagery © SWOOP, 2006

June 2014
160311265

Client/Project
City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.
1

Title
Project Location

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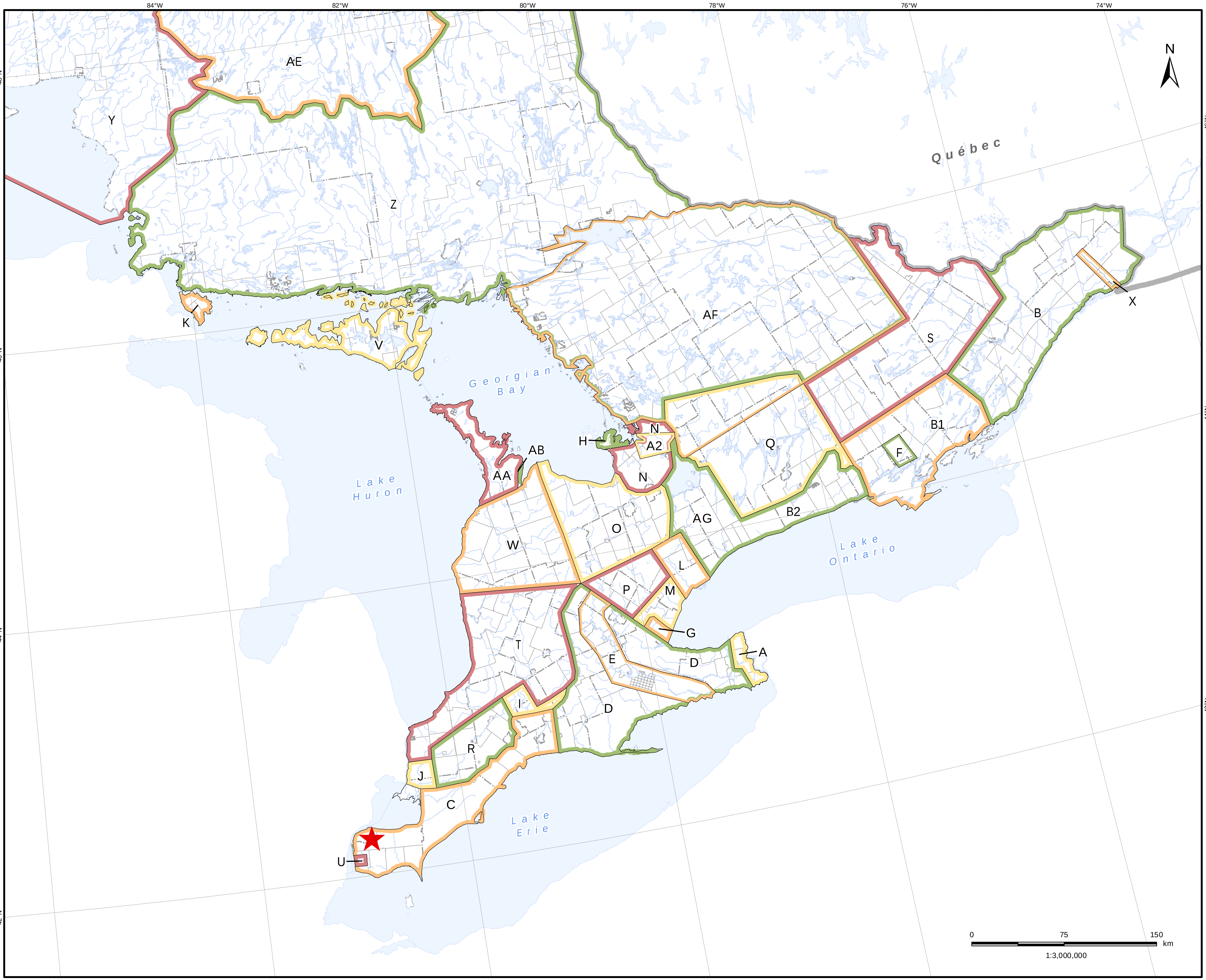
Revised: 2014-06-24 By: sallen



Legend

- Study Area
- Municipal Boundary - Upper Tier
- Municipal Boundary - Lower or Single Tier
- Watercourse
- Waterbody

A	Treaty No. 381, May 9th, 1781 (Mississauga and Chippewa)
B	Crawford's Purchase, October 9th, 1783 (Algonquin and Iroquois)
B1	Crawford's Purchase, October 9th, 1783 (Mississauga)
B2	Crawford's Purchases, 1784, 1787 And 1788 (Mississauga)
A2	John Collins' Purchase, 1785 (Chippewa)
C	Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomi, and Huron)
D	Treaty No. 3, December 2nd, 1792 (Mississauga)
E	Haldimand Tract:from the Crown to the Mohawk, 1793
F	Tyendinaga:from the Crown to the Mohawk, 1793
G	Treaty No. 3 3/4:from the Crown to Joseph Brant, October 24th, 1795
H	Treaty No. 5, May 22nd, 1798 (Chippewa)
I	Treaty No. 6, September 7th, 1796 (Chippewa)
J	Treaty No. 7, September 7th, 1796 (Chippewa)
L	Treaty No. 13, August 1st, 1805 (Mississauga)
M	Treaty No. 13A, August 2nd, 1805 (Mississauga)
N	Treaty No.16, November 18th, 1815 (Chippewa)
O	Treaty No. 18, October 17th, 1818 (Chippewa)
P	Treaty No. 19, October 28th 1818 (Chippewa)
Q	Treaty No. 20, November 5th, 1818 (Chippewa)
R	Treaty No. 21, March 9th, 1819 (Chippewa)
S	Treaty No. 27, May 31st, 1819 (Mississauga)
T	Treaty No. 27½, April 25th, 1825 (Ojibwa and Chippewa)
U	Treaty No. 35, August 13th, 1833 (Wyandot or Huron)
V	Treaty No. 45, August 9th, 1836 (Chippewa and Odawa, "For All Indians To Reside Thereon")
W	Treaty No. 45½, August 9th, 1836 (Saugeen)
X	Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
Z	Treaty No. 61, September 9th, 1850 (Robinson Treaty:Ojibwa)
AA	Treaty No. 72, October 30th, 1854 (Chippewa)
AB	Treaty No. 82, February 9th, 1857 (Chippewa)
AF	Williams Treaty, October 31st and November 15th, 1923 (Chippewa and Mississauga)
AG	Williams Treaty, October 31st, 1923 (Chippewa)

Notes

1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Treaty boundaries adapted from Morris 1943 (1964 reprint). For cartographic representation only.

May 2014
160311265

Client/Project

City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.
2

Title
Treaties and Purchases (Adapted from Morris 1943)

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Revised: 2014-05-22 By: sallen

Legend
- Project Area
- Archaeology Study Area

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Essex County (Ontario Map Ref #1)
Essex supplement in Illustrated atlas of the Dominion of Canada.
Toronto : H. Belden & Co., 1881.

May 2014
160311265

Client/Project
City of Windsor
Upper Little River Stormwater
and Drainage Master Plan

Figure No.
3

Title
Portion of 1881 Belden
Historic Map of Essex County

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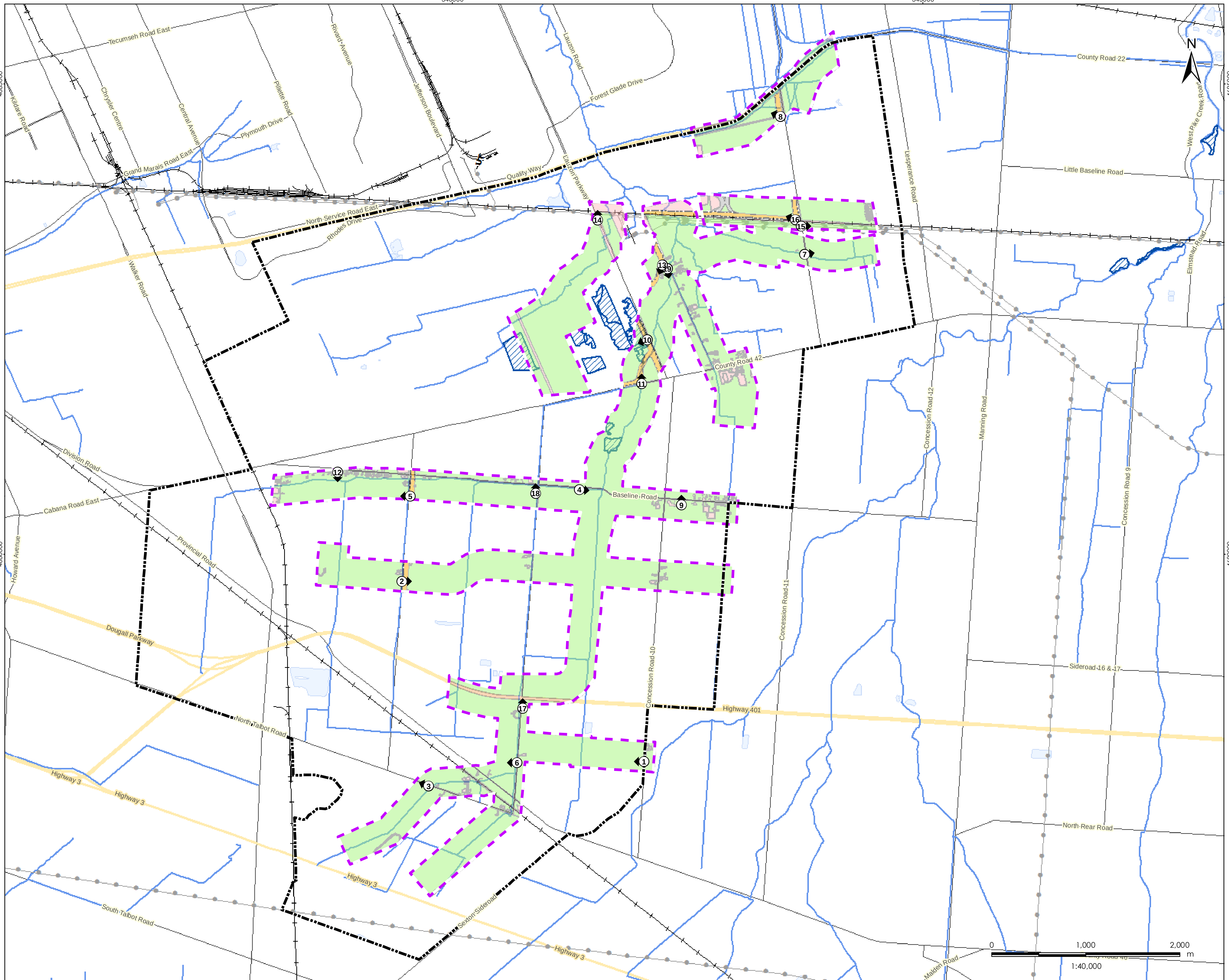
Revised: 2014-05-22 By: sallen



Stantec

Legend

- Photo Location
- Project Area
- Archaeology Study Area
- Moderate – High Archaeological Potential
- Previously Assessed, Mayer Heritage Consultants Inc. 2010
- Previously Assessed, Archaeoworks 2012
- Previously Disturbed
- Provincially Significant Wetland
- Watercourse
- Railway, Active
- Transmission Line
- UT Unknown Pipeline

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
3. Orthoimagery © SWOOP Imagery, 2006.

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Client/Project

City of Windsor
Upper Little River Stormwater and Drainage Master Plan

Figure No.
4

Title

Archaeological Potential

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Revised: 2014-06-24 By: sallen

9.0 CLOSURE

This report has been prepared for the sole benefit of the City of Windsor and may not be used by any third party without the express written consent of Stantec Consulting Ltd. and the City of Windsor. Any use which a third party makes of this report is the responsibility of such third party.

We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

STANTEC CONSULTING LTD.

Walt McCall

Licensee Review ____________________________________
(signature)

Walter McCall, Ph.D., Director of Archaeological Field Operations

Jim E. Wilson

Senior Review ____________________________________
(signature)

Jim Wilson, MA, Principal, Regional Discipline Lead, Archaeology

APPENDIX M

Source Water Protection

ERCA Vulnerable Areas

Essex Region Conservation Authority

Public Interactive Mapping

Legend

Surface Water Intake Protection Zone

- 1
- 2
- 3

Significant Groundwater Recharge Ar

- 2
- 4
- 6

Location

0 | 1,666.88 | 3,333.8

Meters

1: 75,000

12/11/2017

ERCA Geomatics THIS MAP HAS BEEN PRODUCED BY THE GENERAL PUBLIC AND NOT BY QUALIFIED ERCA STAFF.

Notes

ERCA Event Based Areas

Essex Region Conservation Authority

Public Interactive Mapping

Legend

Event Based Area (EBA)

Location

ERCA Geomatics THIS MAP HAS BEEN PRODUCED BY THE GENERAL PUBLIC AND NOT BY QUALIFIED ERCA STAFF.

Notes

0 1,666.88 3,333.8

Meters

1: 75,000

12/11/2017

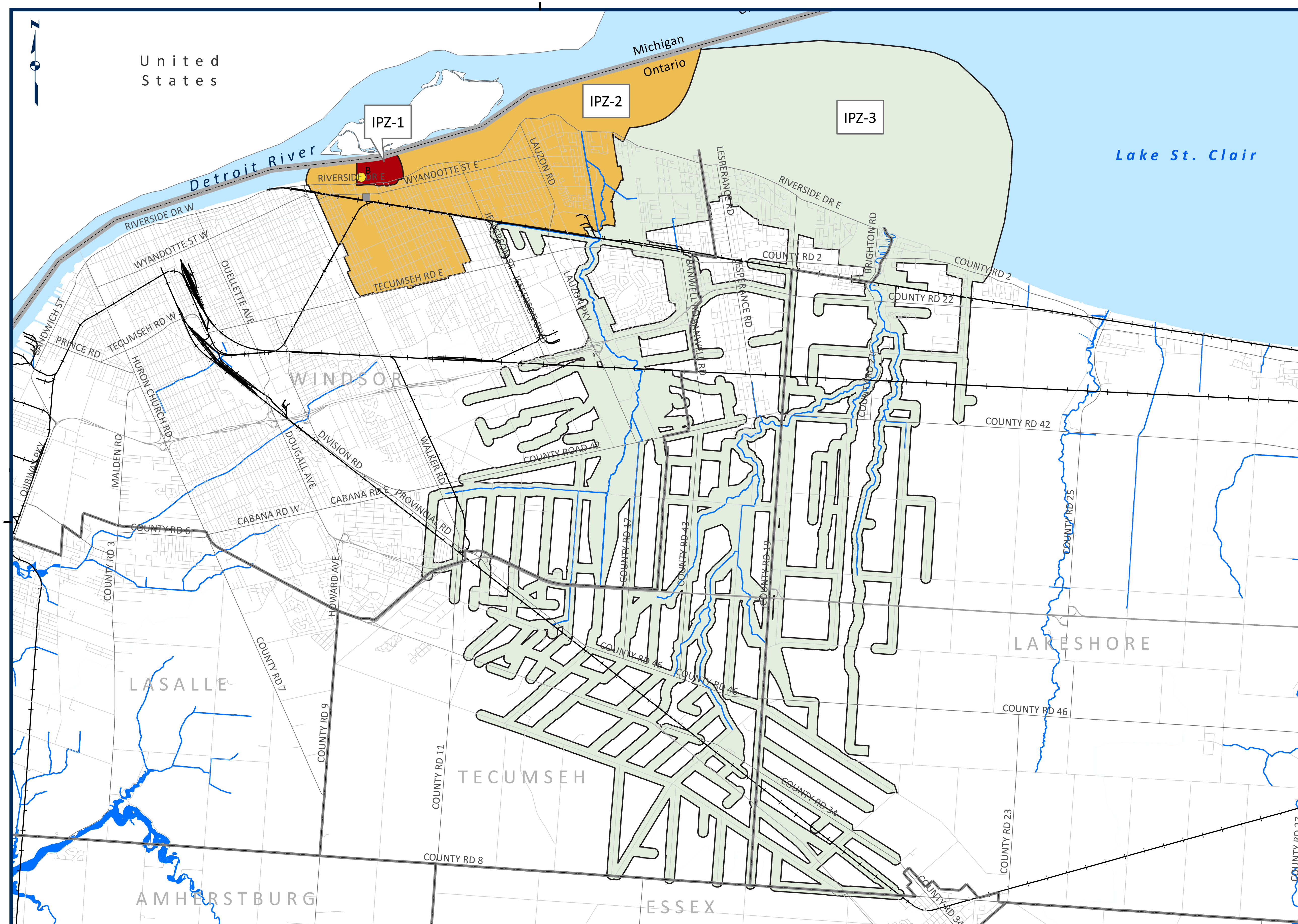
A. H. Weeks (Windsor) Water Treatment Plant East Intake IPZ 1, 2 and 3

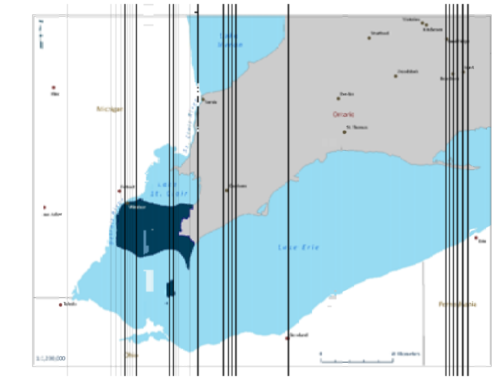
1:90,000

0 — 3 Kilometers

Made possible by the Government of Ontario

Ontario





Essex Region Source Protection Area Assessment Report Map 4.24b

Legend

- Intake - Type B
- Drinking Water System
- Municipal, Lower Tier
- International Boundary
- Road
- Railway
- Water and Drainage
- Water Body

Intake Protection Zones

- IPZ-1
- IPZ-2
- IPZ-3

This publication was produced by:

Essex Region Conservation Authority
360 Fairview Avenue West
Essex, ON N8M 1Y6

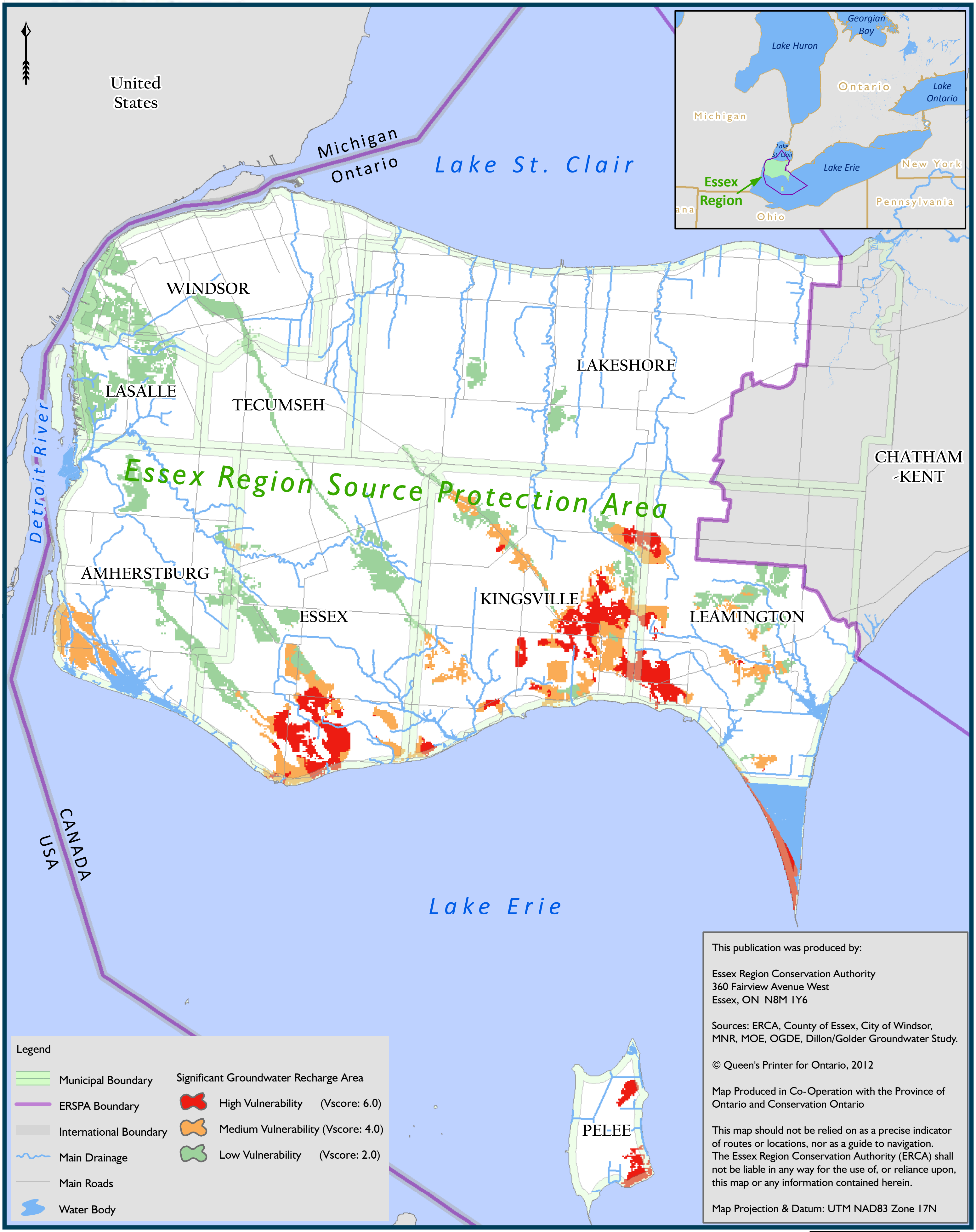
Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, Stantec Consultants, StatsCanada

Map Produced in Co-Operation with the Province of Ontario and Conservation Ontario

Map Projection & Datum: UTM NAD83 Zone 17N

Map 5: Significant Groundwater Recharge Areas

Made possible by the Government of Ontario



This publication was produced by:

Essex Region Conservation Authority
360 Fairview Avenue West
Essex, ON N8M 1Y6

Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, OGDE, Dillon/Golder Groundwater Study.

Map Produced in Co-Operation with the Province of Ontario and Conservation Ontario

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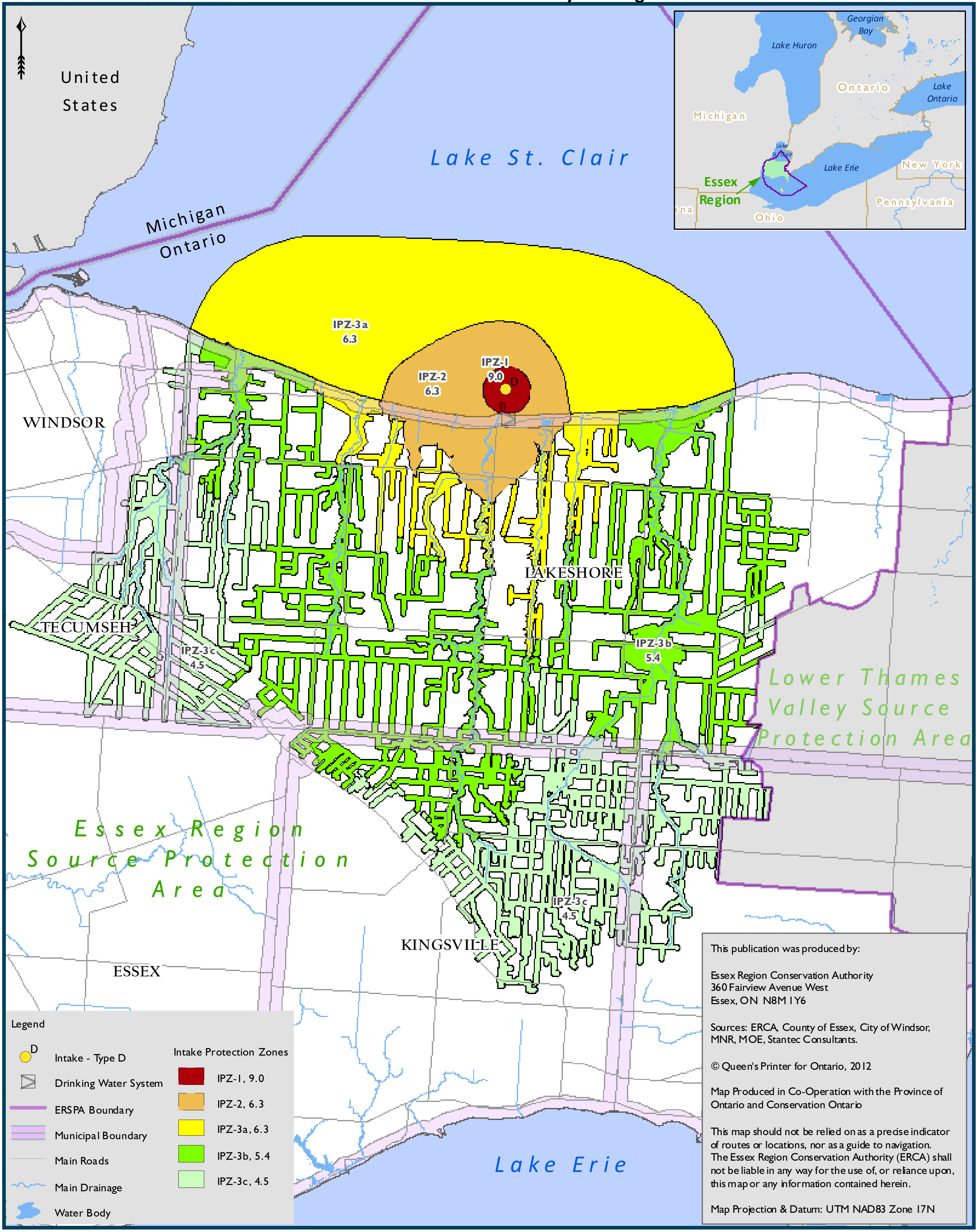
Map Projection & Datum: UTM NAD83 Zone 17N

1:320,000

Map 7: Lakeshore (Belle River) Water Treatment Plant IPZs and Vulnerability Scoring

Made possible through funding support from the Government of Ontario



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Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, Stantec Consultants.

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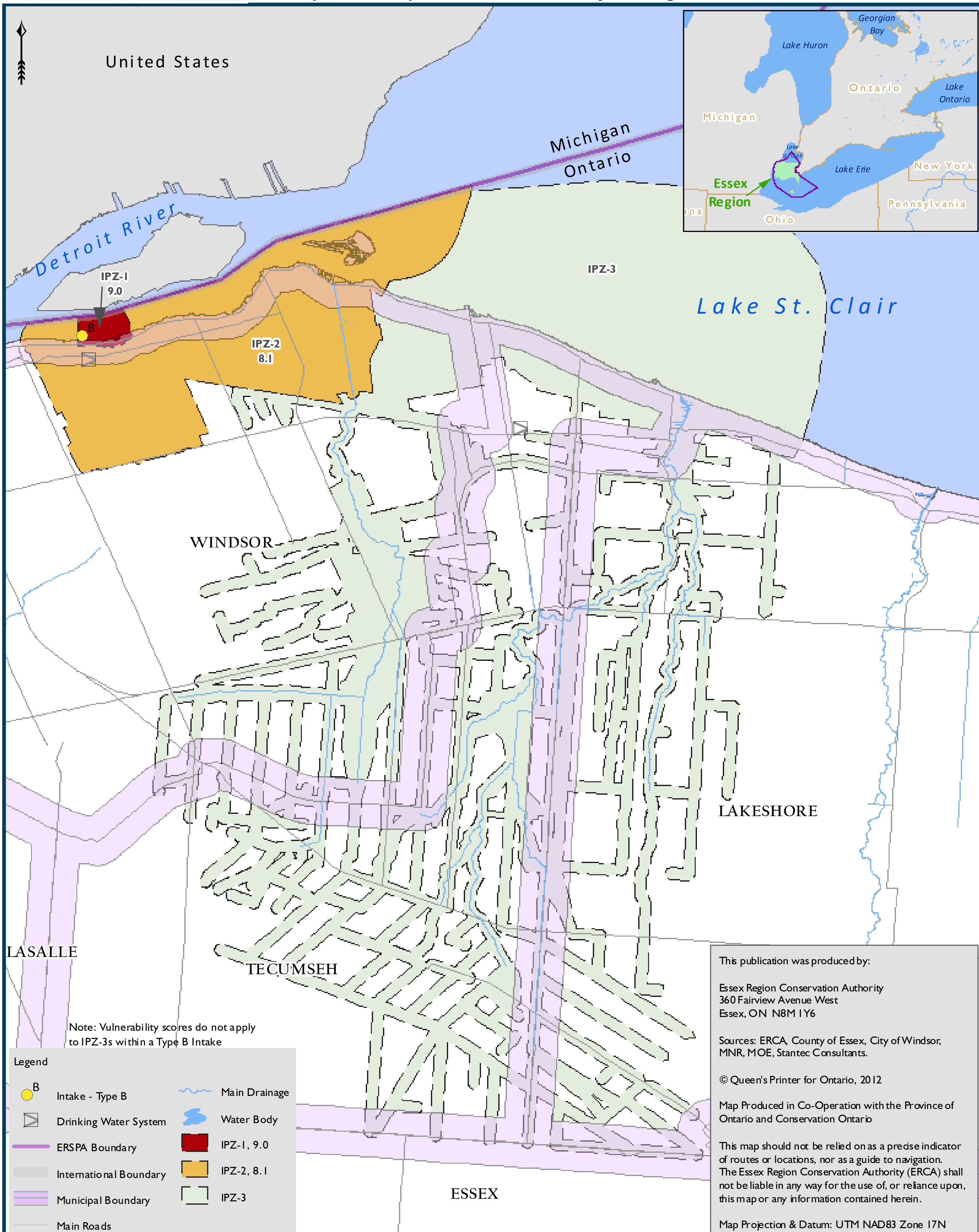
Map Projection & Datum: UTM NAD83 Zone 17N

1:200,000

DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

Map 8: A. H. Weeks (Windsor) Water Treatment Plant (East Intake) IPZs and Vulnerability Scoring

Made possible through funding support from the Government of Ontario



Note: Vulnerability scores do not apply to IPZ-3s within a Type B Intake

Legend

- Intake - Type B
- Drinking Water System
- ERSPA Boundary
- International Boundary
- Municipal Boundary
- Main Roads
- Main Drainage
- Water Body
- IPZ-1, 9.0
- IPZ-2, 8.1
- IPZ-3

This publication was produced by:

Essex Region Conservation Authority
360 Fairview Avenue West
Essex, ON N8M 1Y6

Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, Stantec Consultants.

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Map Projection & Datum: UTM NAD83 Zone 17N

1:100,000

0 5 Kilometers

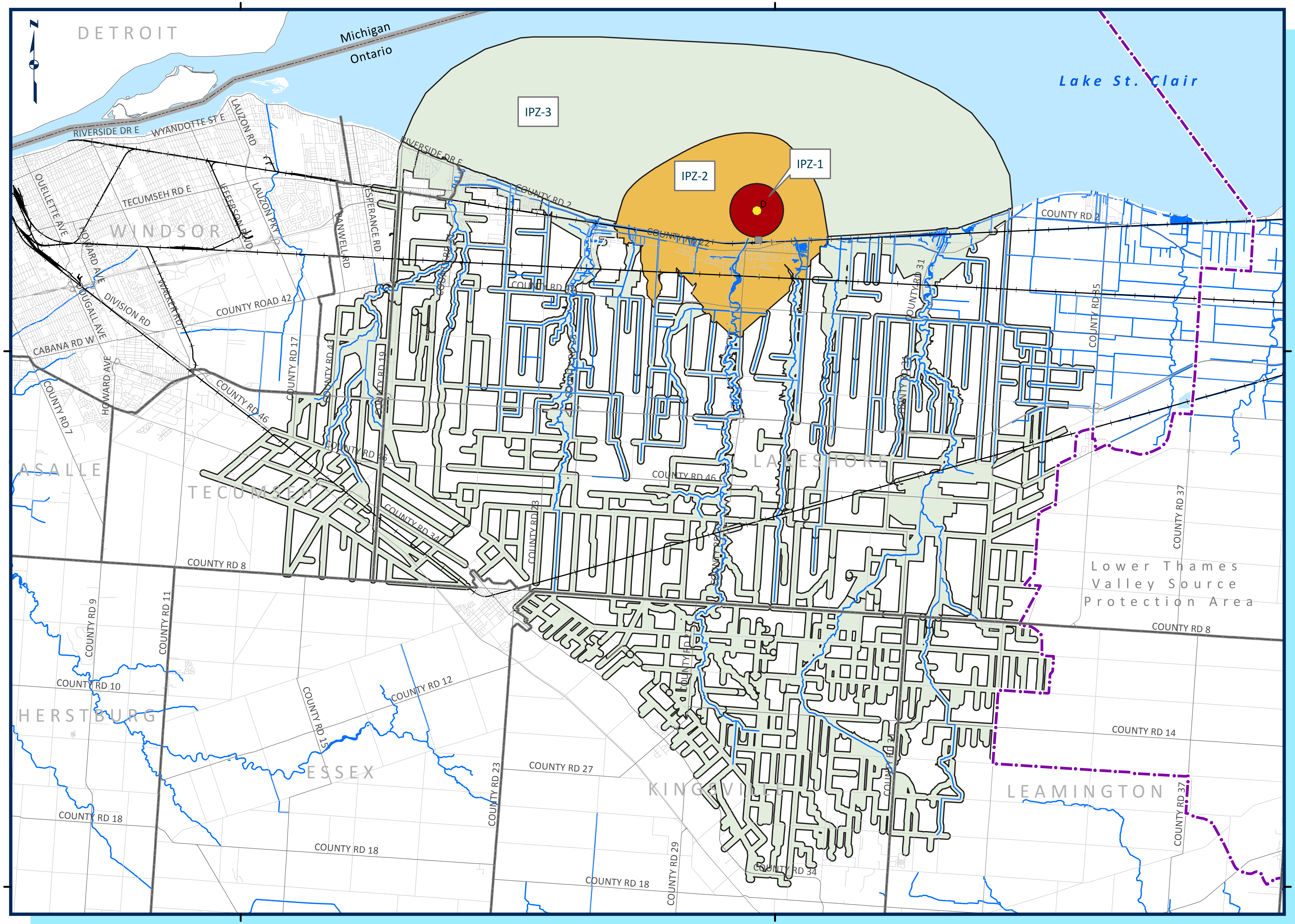
Lakeshore (Belle River) Water Treatment Plant Intake Protection Zones 1, 2 and 3

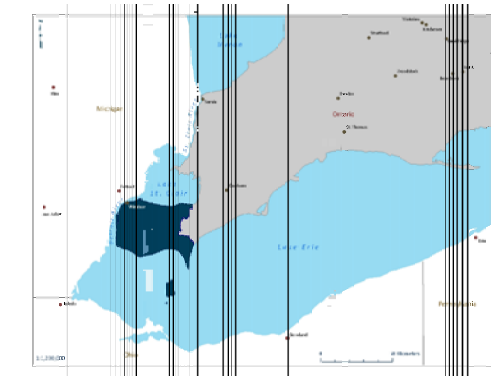
1:140,000

0 — 5 Kilometers

Made possible by the Government of Ontario

Ontario





Essex Region Source Protection Area Assessment Report Map 4.18b

Legend

- Intake - Type D
- Drinking Water System
- Source Protection Area Boundary
- Municipal, Lower Tier
- International Boundary
- Road
- Railway
- Water and Drainage
- Water Body

Intake Protection Zones

- IPZ-1
- IPZ-2
- IPZ-3

This publication was produced by:

Essex Region Conservation Authority
360 Fairview Avenue West
Essex, ON N8M 1Y6

Sources: ERCA, County of Essex, City of Windsor, MNR, MOE, Stantec Consultants, StatsCanada

Map Produced in Co-Operation with the Province of Ontario and Conservation Ontario

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Essex Region Conservation Authority (ERCA) shall not be liable in any way for the use of, or reliance upon, this map or any information contained herein.

Map Projection & Datum: UTM NAD83 Zone 17N

From: Katie Stammler <KStammler@erca.org>
Sent: 2017-12-07 5:06 PM
To: Innes, Jayson
Cc: John Henderson
Subject: RE: Source water protection in Essex Region
Attachments: A Guide to Using the ERCA Online Interactive Mapping Tool.pdf

Hi Jason,
Thanks for your call. I've attached a document that our Risk Management Official prepared to help with the use of our online mapping tool. Please feel free to share it with your colleagues. Our Source Water Protection Plan can be accessed here: http://essexregionsourcewater.org/resources/source_water_protection.cfm and the two policies that apply to the area in question are policy 31 and 32 – these are the policies that apply to the Event Based Area that the MOECC specifically asked about. You would address these policies by ensuring that any existing storage of fuel above the threshold limit (15,000L) has a Risk Management Plan and that ERCA is informed of the installation of any future fuel storage that exceeds these limits.

I noticed that their letter also asks that your EA consider other sources of drinking water that aren't covered by the Source Protection Plan. Our SPP only includes policies for municipal intakes, so this would be referring to any private source of drinking water in the area, which would be well water. I believe this could be addressed with the mapping of the Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas that I showed you. While we have no policies that apply to these areas, you may need to show that you are at least aware of whether your study area is within these boundaries.

Provided that your project does not include installing or altering a municipal drinking water intake, no new technical work nor amendments to the SPP will be required.

Katie

Essex Region Conservation Authority
sustaining the place for life

KATIE STAMMLER, PHD
Water Quality Scientist/Source Water Protection Project Manager
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 • Essex, Ontario • N8M 1Y6
P. 519-776-5209 x 342 • F. 519-776-8688
kstammler@erca.org www.essexregionconservation.ca

Follow us on Twitter: @essexregionca

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Thursday, December 7, 2017 4:42 PM
To: Katie Stammler <KStammler@erca.org>
Cc: John Henderson <JHenderson@erca.org>
Subject: Source water protection in Essex Region

As a follow up to our phone call I have included a map of the study area and the letter from the MOECC discussing source water protection.

I will use the web sites you directed me to show that the site is in IPZ-3

The 3rd paragraph on page 3 of the MOECC letter says
For assistance in determining whether the proposed project will require new technical work and potentially require amendments to the source protection plan for this area please contact the Project Manager for Drinking Water Source

Protection at the local source protection authority which coincidently in this case, is the Essex Region Conservation Authority itself.

Can you please confirm that no new technical work or potential amendments to the source water protection plan are required from this study. I can provide additional project details if required.

Thanks

Jayson Innes, M.A.Sc., P.Eng.
Senior Water Resources Engineer
Direct: (519) 585-7282
Mobile: (519) 569-0518

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4 CA

From: John Henderson <JHenderson@erca.org>
Sent: 2017-12-19 4:09 PM
To: Katie Stammler; Innes, Jayson
Subject: ULR - Source Protection

Thanks Katie.

Jayson – Please include the additional information included in Katie's e-mail below regarding the need to update the IPZ-3 and Event Based Area when drains are altered in the future. If you have any questions, please provide them directly to Katie with a copy to me.

Thank you,

Essex Region Conservation Authority
sustaining the place for life

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Katie Stammler
Sent: Tuesday, December 19, 2017 4:03 PM
To: John Henderson <JHenderson@erca.org>
Subject: RE: ULR - Next Steps

Hi John,
Just got a chance to read this over. Given the statement below, I would like to add some additional information via email for their records. Sorry for the jargon, but the references should make sense to any ministry reviewer focussed on Source Water. Please let me know if you require anything further.

"Discussions with the Project Manager for Drinking Water Source Protection for Essex Region identified policies and vulnerable areas within the study limits (refer to attached email from Katie Stammler). Since the project does not include installing or altering a municipal drinking water intake no new technical work nor amendments to the source protection plan are required."

Upon further discussion with John Henderson, it has come to my attention that the proposal includes changes to the drainage network. This will eventually lead to the need for an update to the IPZ-3 and Event Based Area. Some portions of these vulnerable areas may be removed through a s.51 amendment to the SPP and AR if drains are removed. If new drains are installed or are relocated, the vulnerable areas will need to be extended, which will require either a s.34 amendment to the SPP and AR or would be included in the Essex Region SPA s.36 work plan. We would ask that the proponent provide mapping of the final changes to the drainage network to ERCA so that the changes to vulnerable areas can be made appropriately.

KATIE STAMMLER, PHD
Water Quality Scientist/Source Water Protection Project Manager
Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311 • Essex, Ontario • N8M 1Y6
P. 519-776-5209 x 342 • F. 519-776-8688
kstammler@erca.org www.essexregionconservation.ca

Follow us on Twitter: @essexregionca

From: John Henderson
Sent: Friday, December 15, 2017 11:28 AM
To: Katie Stammler <KStammler@erca.org>
Subject: FW: ULR - Next Steps

Hi Katie,

Please look at Jayson response to the Source Protection section in attached Table B and provide your comments.

Thank you,

John Henderson, P. Eng.
Essex Region Conservation Authority (ERCA)
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209 ext. 246
Fax: 519-776-8688

From: Innes, Jayson [mailto:jayson.innes@stantec.com]
Sent: Thursday, December 14, 2017 9:32 AM
To: John Henderson <JHenderson@erca.org>
Cc: Godo, Anna <agodo@citywindsor.ca>; Phil Bartnik <pbartnik@tecumseh.ca>; Vendrasco, Wira H.D. <wvendrasco@citywindsor.ca>; Winterton, Mark <mwinterton@citywindsor.ca>; Richard Wyma <RWyma@erca.org>; Tim Byrne <TByrne@erca.org>
Subject: RE: ULR - Next Steps

Attached is a draft version of MOECC Table B for internal review.

APPENDIX N

Cultural Heritage Resources

Cultural Heritage Resource Assessment, Upper Little River Watershed Environmental Assessment

FINAL REPORT

June 24, 2021

Prepared for:

Essex Region Conservation Authority
360 Fairview Avenue West, Suite 311
Essex, ON N8M 1Y6

Prepared by:

Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham, ON L3R 0B8

File: 160311265

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Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Essex Region Conservation Authority (ERCA), in conjunction with the City of Windsor and the Town of Tecumseh, to prepare a Cultural Heritage Resources Assessment (CHRA) report as part of the Upper Little Watershed Environmental Assessment (EA) (the Project). The purpose of the Project is to determine a preferred approach to providing stormwater management control measures for the developing lands upstream of the E.C. Row Expressway and contributing to Upper Little River. The Study Area is contained partially within the City of Windsor and partially within the Town of Tecumseh, Ontario. It extends roughly from west to east from Concession Road 6, in the City of Windsor to Lesperance Road in the Town of Tecumseh, and north to south from the E.C. Row Expressway to the South Talbot Road.

As part of the Upper Little Watershed EA a CHRA has been completed to identify heritage resources, including built heritage and cultural heritage landscapes, present within, and adjacent to, the Study Area. Potential heritage resources were identified through consultation and a windshield survey, inventoried, and evaluated according to *Ontario Regulation* (O. Reg.) *9/06*, the criteria for determining cultural heritage value or interest (CHVI) (Government of Ontario 2006a). Where CHVI was identified, the resource was mapped, and recommendations made for further study.

In order to identify protected properties, the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), the Ontario Heritage Trust (OHT), City of Windsor, and Town of Tecumseh were consulted. As a result of the consultation, eight previously recognized properties were identified in relation to the Study Area. Four of these properties were determined to be situated within the CHRA Study Area.

A windshield survey was undertaken to identify potential heritage resources within, and adjacent to, the Study Area and confirm the presence of previously identified potential heritage properties. Where identified, the potential heritage properties were photographed from the public right-of-way. A total of 72 properties were identified as potential heritage properties. In each case evaluation of the CHVI of the property was undertaken according to O. Reg. 9/06. Each potential heritage resource was considered both as an individual structure and as a landscape. Following evaluation, 14 cultural heritage resources (CHRs) were identified within the Study Area.

This CHRA provides general measures to avoid potential impacts to the CHRs. The preferred alternative should be designed to avoid the identified CHRs. Project components should be planned and undertaken in a manner to avoid the built heritage and cultural heritage landscape attributes of the identified CHRs. Site plan controls are recommended to be put in place prior to construction activities. This includes mapping of CHRs on construction maps, communication to the construction team leads on their locations, and physical protective measures such as temporary fencing. If Project work occurs within 50 metres of CHRs, it is recommended that a qualified building conditions specialist or geotechnical engineer with previous experience working with heritage structures be consulted to identify appropriate vibration mitigation measures in advance of construction. Mitigation measures for vibration may include developing

an appropriate vibration setback distance, a vibration attenuation study, and/or a construction monitoring program.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

Project Personnel

Project Manager:	Jayson Innes, M.A.Sc. (Eng.), P.Eng.
Task Manager:	Heidy Schopf, MES, CAHP
Report Writers:	Heidy Schopf, MES, CAHP Laura Walter, MA, CAHP
GIS Specialist:	Christina Coghlan, BA
Administrative Assistant:	Carol Naylor
Quality Reviewer:	Jeffrey Muir, BA, CAHP
Independent Reviewer:	Tracie Carmichael, BA, B.Ed.

Acknowledgments

Proponent Contact: John Henderson, Essex Region Conservation Authority

Abbreviations

BHR	Built Heritage Resource
CHL	Cultural Heritage Landscape
CHR	Cultural Heritage Resource
CHRA	Cultural Heritage Resource Assessment
CHVI	Cultural Heritage Value or Interest
EA	Environmental Assessment
ERCA	Essex Region Conservation Authority
MTCS	Ministry of Tourism, Culture and Sport
OHA	Ontario Heritage Act
OHT	Ontario Heritage Trust
O. Reg.	Ontario Regulation
PPS	Provincial Policy Statement
RoW	Right-of-Way
SWM	Stormwater Management

Glossary

Built Heritage Resource	(BHR) Refers to a single building, structure, monument, installation or remains determined to be of cultural heritage value or interest (CHVI) following evaluation according to *Ontario Regulation* (O. Reg.) *9/06*. In addition, this includes properties protected under the *Ontario Heritage Act* (OHA) or listed by local, provincial, or federal jurisdictions. This may include residences, barns, bridges, and similar features (based on definition provided in the 2020 Provincial Policy Statement (PPS) (Government of Ontario 2020)).
Cultural Heritage Landscape	(CHL) Refers to a defined geographical area modified by human activities and determined to be of CHVI following evaluation according to O. Reg. 9/06. In addition, this includes properties protected under the OHA or listed by local, provincial, or federal jurisdictions. This may include grouping(s) of individual heritage features such as structures, spaces, archaeological sites, and natural elements, which together form an important type of heritage form, distinctive from that of its constituent elements or parts (based on definition provided in the PPS) (Government of Ontario 2020).
Cultural Heritage Resource	(CHR) Refers to built or cultural resources where CHVI has been determined according to O. Reg. 9/06. Prior to evaluation, resources identified to be 40 years of age or older are considered to be *potential* heritage resources. There are two categories of heritage resources: Built Heritage Resources (BHR) and Cultural Heritage Landscapes (CHL). For the purposes of this report, the term heritage resource is used exclusively unless assessing the CHVI of a potential heritage resource.
Heritage attributes	Refers to the components of a heritage resource that define its CHVI. These may include, but are not limited to, principal features, characteristics, context, and appearance of a heritage resource (based on definition provided in the PPS) (Government of Ontario 2020).
Potential Heritage Property	Refers to any property previously identified by municipal staff or provincial agencies as containing, or having the potential to contain, CHVI. This includes properties identified on municipal registers, lists, or inventories of potential heritage resources. It may also include properties identified during the site assessment that are over 40 years of age.

Project Location	Refers to the stormwater management (SWM) corridor boundary.
Protected Heritage Property	Refers to properties which are designated under, or subject to an easement made under, the OHA, as well as properties identified by provincial authorities and prescribed public bodies as a provincial heritage property. In addition, protected heritage property includes those identified by federal or international authorities as such including, but not limited to, Parks Canada or UNESCO (based on definition provided in the PPS) (Government of Ontario 2020).
Study Area	Refers to all properties through which the Project Location is proposed to pass through plus a 50-metre area surrounding the SWM corridor boundary. This area was used to define the limit of site investigations and is based on an understanding of property parcel boundaries.

1.0 INTRODUCTION

1.1 STUDY PURPOSE AND OBJECTIVES

As part of the Upper Little Watershed Environmental Assessment (EA) (the Project), a Cultural Heritage Resource Assessment (CHRA) has been completed to identify heritage resources, including built heritage and cultural heritage landscapes, present within, and adjacent to, the Study Area. The purpose of the project is to determine a preferred approach to providing stormwater management (SWM) control measures for the developing lands upstream of the E.C. Row Expressway and contributing to Upper Little River. The objective of the Project is to ensure that urbanization of the watershed can occur in a fashion that will not lead to negative impacts on the receiving systems including increased flood risk and the impairment of natural watercourse features. The Project would allow for future enhancement of the watercourse, stream margins, and wetlands. The SWM system should minimize the impact of urban development on the natural environment and be integrated as an amenity within the existing drain system and the open space system. It should also be capable of meeting applicable water quality and quantity requirements while minimizing any potential impacts on waterfowl within the vicinity of the Windsor International Airport related to waterfowl.

The Study Area is contained partially within the City of Windsor and partially within the Town of Tecumseh, Ontario (Figure 1 and Figure 2). It extends roughly from west to east from Concession Road 6, in the City of Windsor to Lesperance Road in the Town of Tecumseh, and north to south from the E.C. Row Expressway to the South Talbot Road. The main branch of Little River originates south of Highway 401 and generally flows north through a well-defined system of municipal drains and channels towards the Detroit River and Lake St. Clair. The drainage area contributing to Upper Little River upstream of the E.C. Row Expressway is approximately 45 square kilometres.

As part of the CHRA report, potential heritage resources were identified through consultation and a windshield survey, inventoried, and evaluated according to *Ontario Regulation* (O. Reg.) *9/06*, the criteria for determining cultural heritage value or interest (CHVI) (Government of Ontario 2006a). A land use history was completed to provide a cultural context for the Study Area and to provide a background upon which to base evaluations. Where CHVI was identified, the resource was mapped and recommendations made for further study. The objectives of the CHRA are summarized below:

- Prepare a land use history of the Study Area for use in the identification and evaluation of heritage resources;
- Identify potential heritage resources within the Study Area through a preliminary property inspection from the public right-of-way (RoW);
- Evaluate the CHVI of the potential heritage resources to determine the number of heritage resources present; and
- Prepare recommendations for future work where heritage resources were identified.

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Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Railway - Discontinued
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 1 2 Kilometers

1:45,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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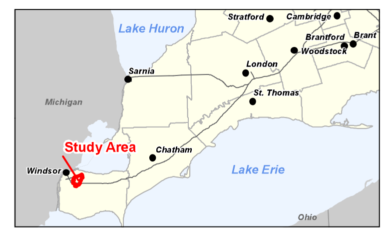

Project Location
Windsor, Ontario

160311265 REVA
Prepared by CMC on 2021-06-22
Technical Review by ABC on xxxx-xx-xx

Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
1

Title
Project Location

Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Road
Watercourse
Waterbody
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

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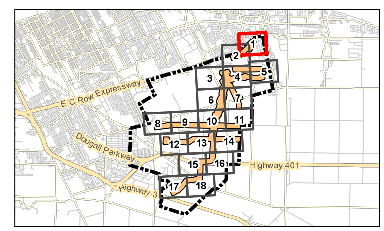

Project Location
Windsor, Ontario

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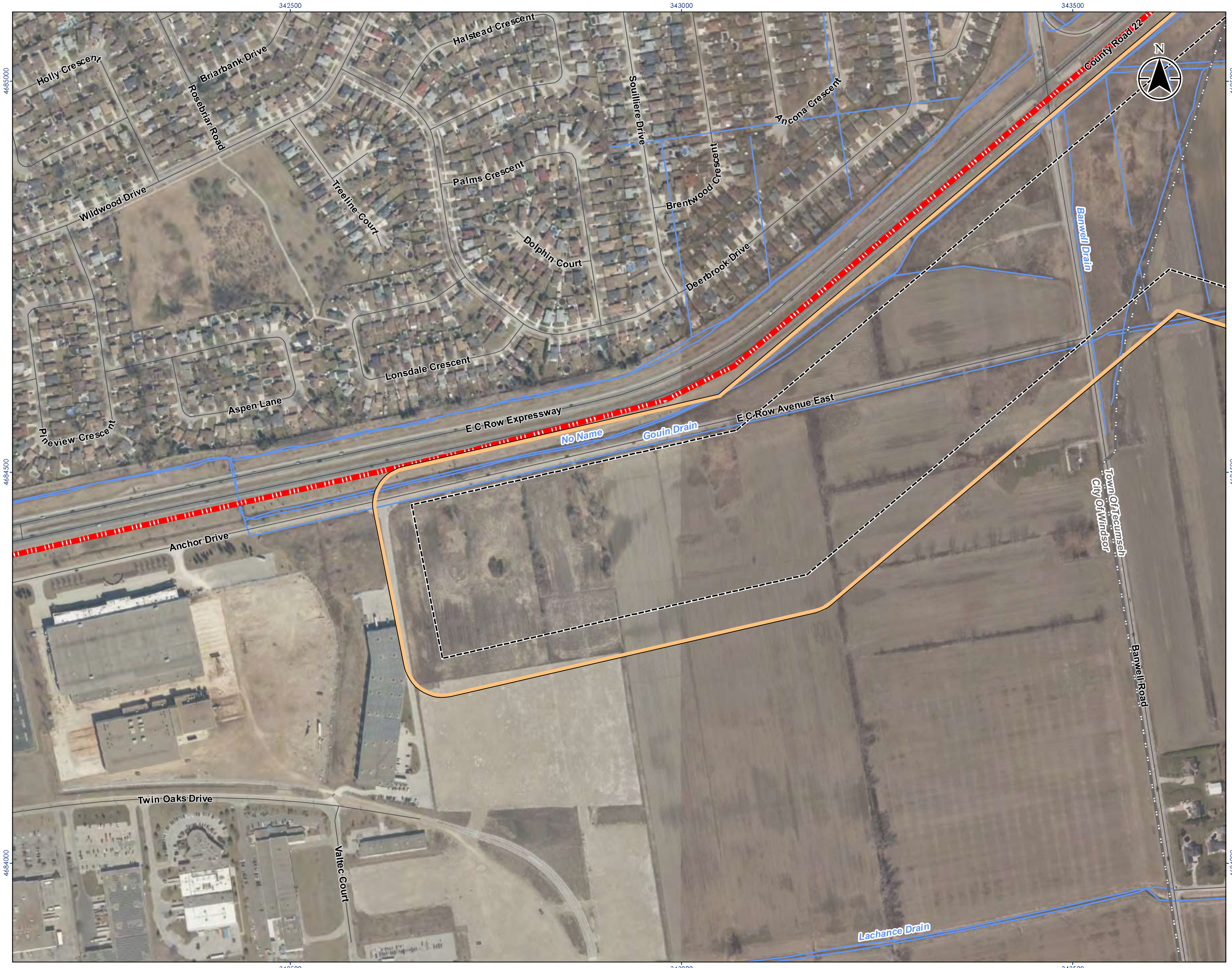
Prepared by CMC on 2021-06-22
Technical Review by ABC on xxxx-xx-xx

Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2a

Title
Study Area - Tile 1



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Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

Notes
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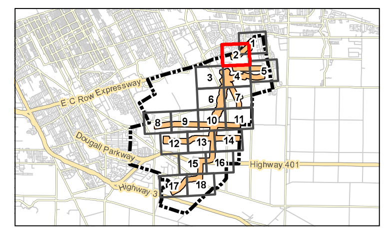

Project Location
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2b

Title
Study Area - Tile 2

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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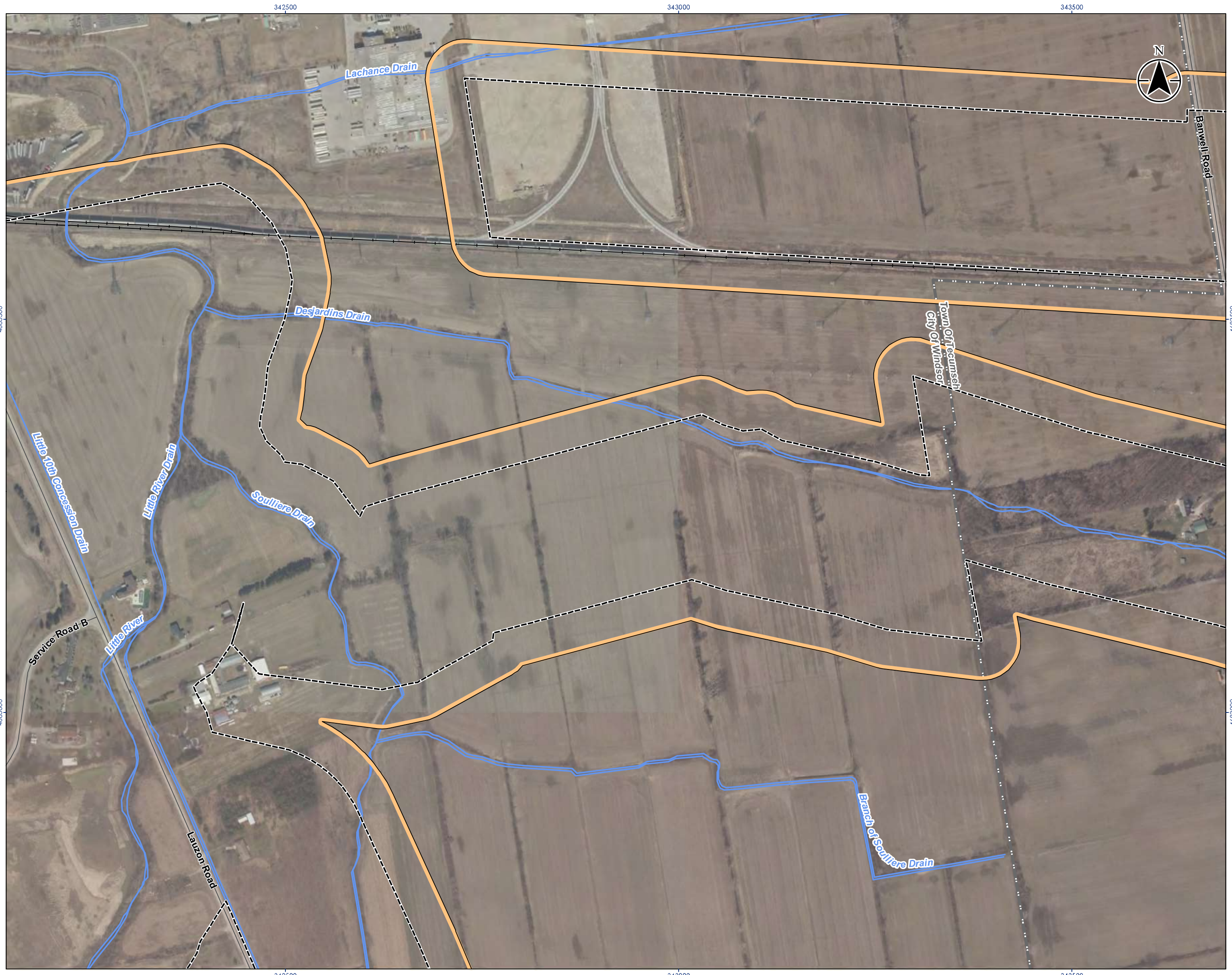
Project Location
Windsor, Ontario

160311265 REVA
Prepared by CMC on 2021-06-22
Technical Review by ABC on xxxx-xx-xx

Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2c

Title
Study Area - Tile 3



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

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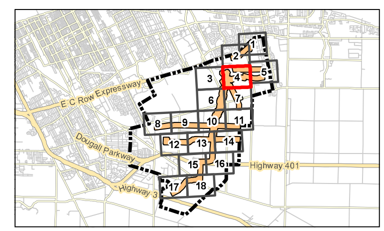

Project Location
Windsor, Ontario

160311265 REVA
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2d

Title
Study Area - Tile 4

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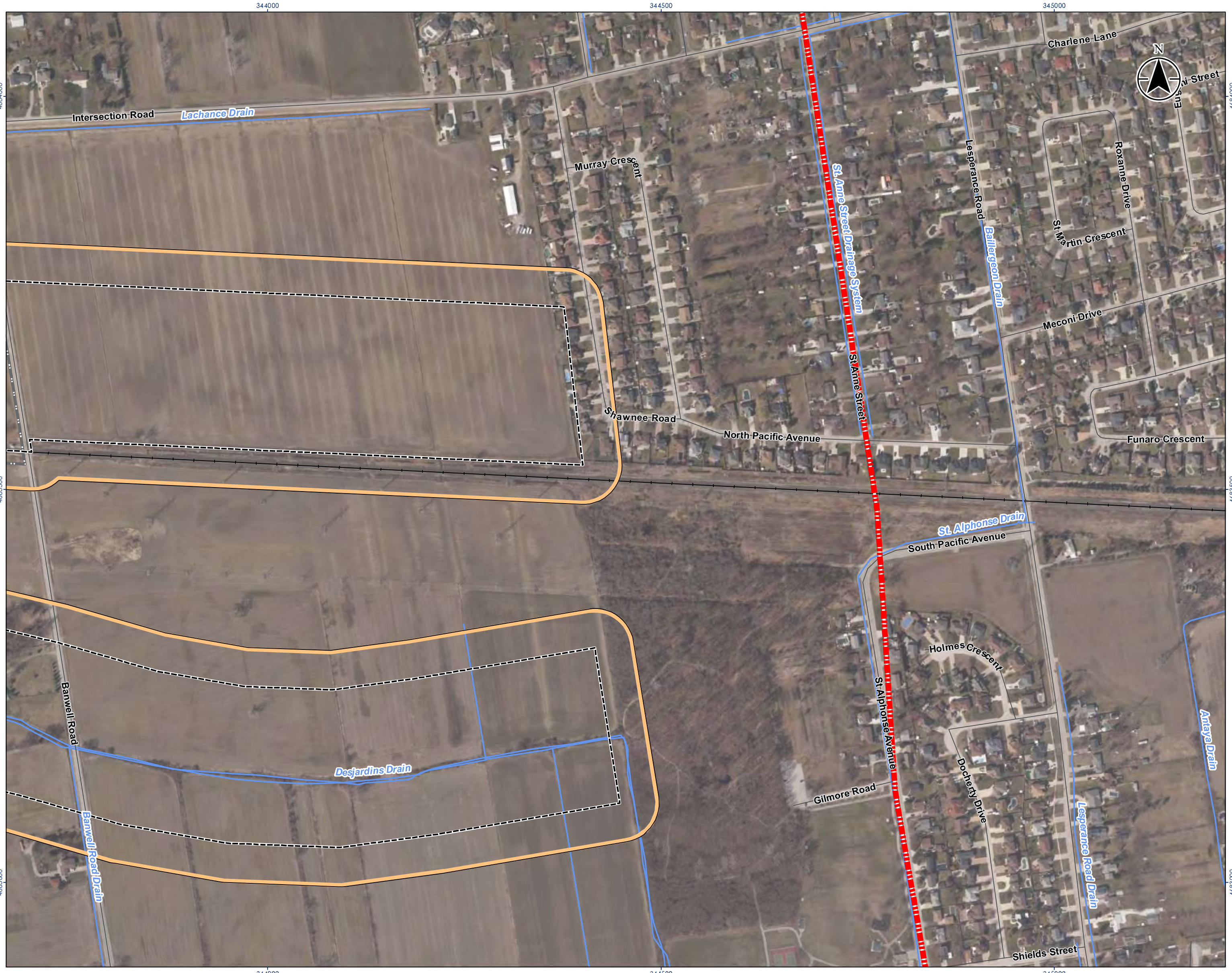

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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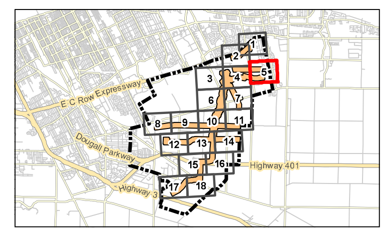

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UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2e

Title
Study Area - Tile 5

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
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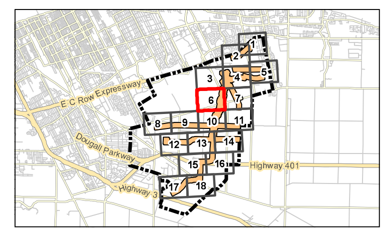

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Figure No.
2f

Title
Study Area - Tile 6

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- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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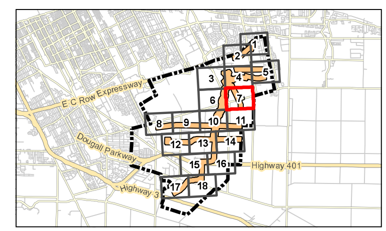

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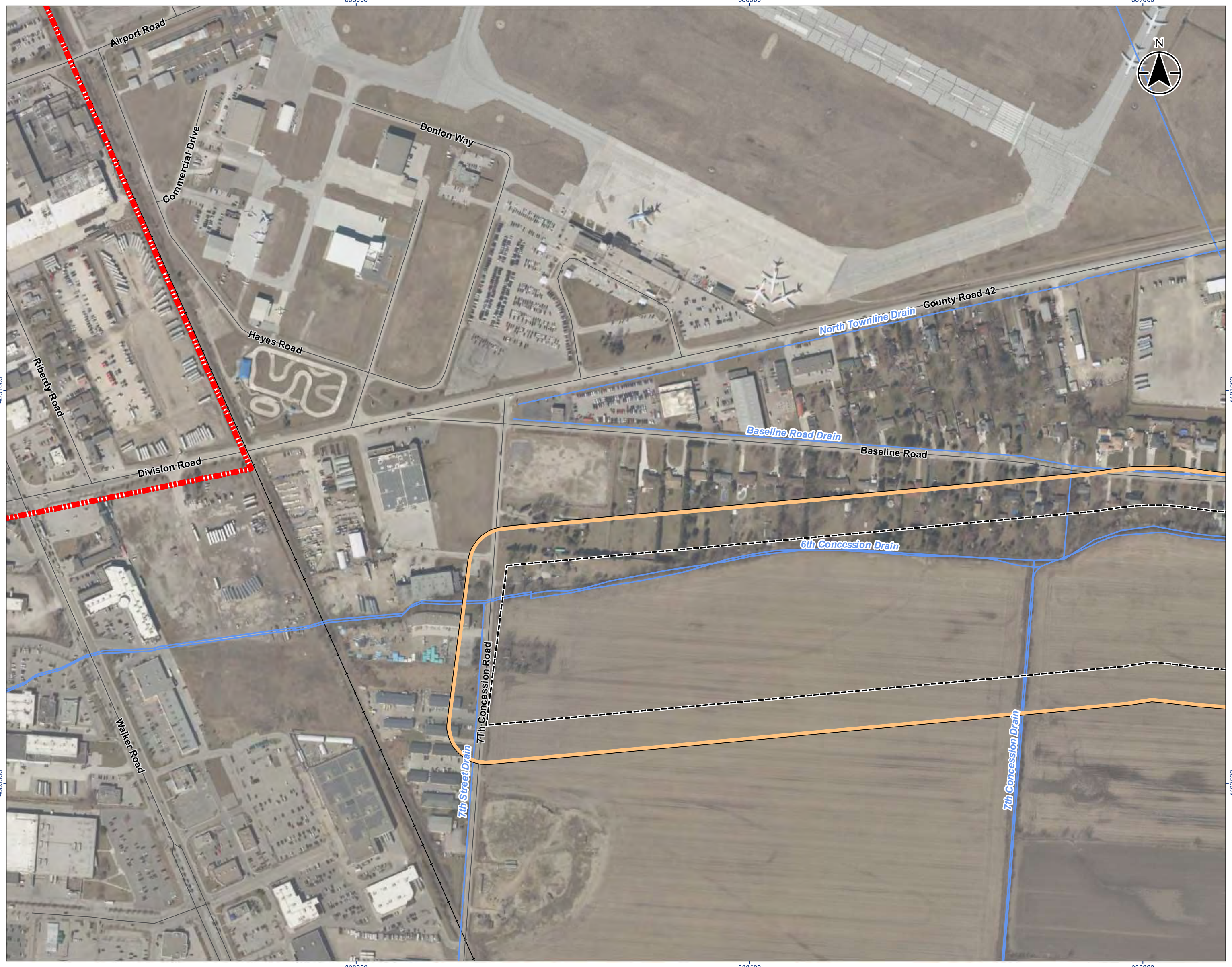
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2g

Title
Study Area - Tile 7



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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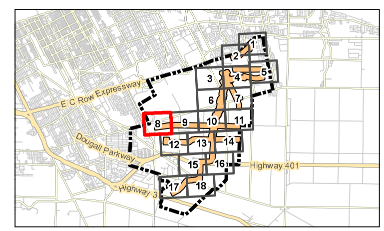

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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2h

Title
Study Area - Tile 8

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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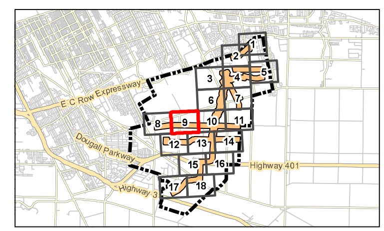

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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2i

Title
Study Area - Tile 9

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

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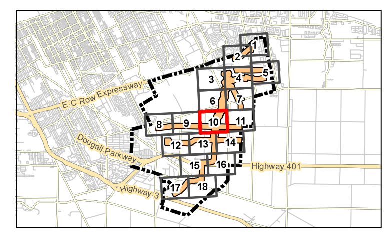

Project Location
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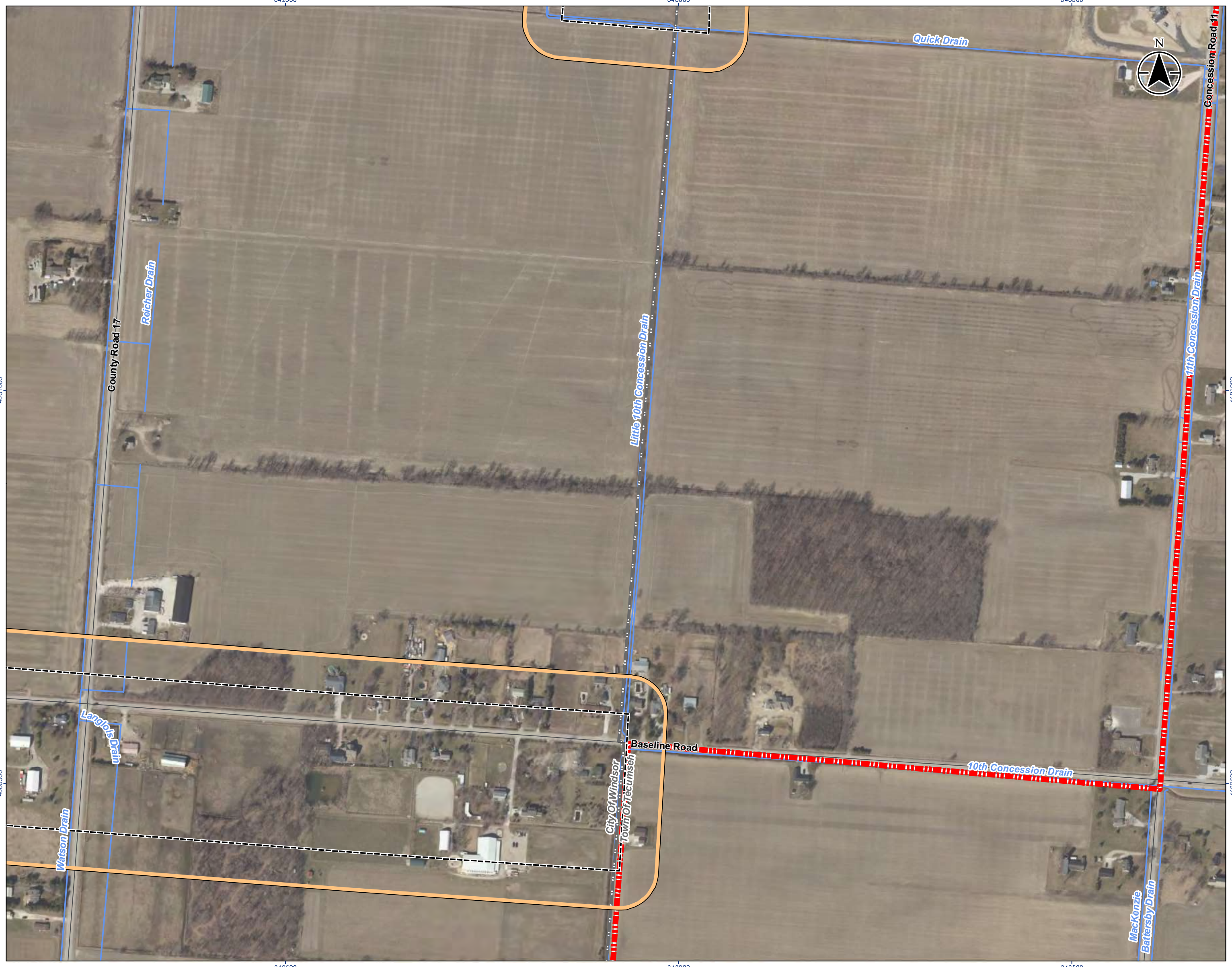
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2j

Title
Study Area - Tile 10



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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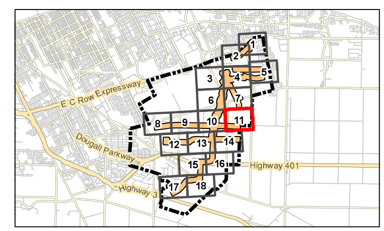

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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2k

Title
Study Area - Tile 11

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

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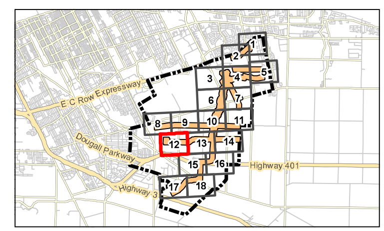

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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
21

Title
Study Area - Tile 12

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- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

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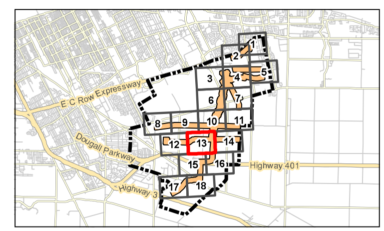

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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2m

Title
Study Area - Tile 13

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Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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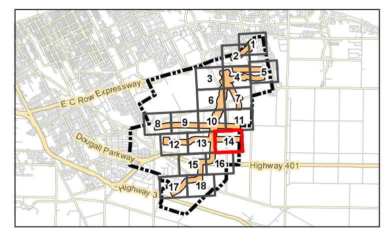

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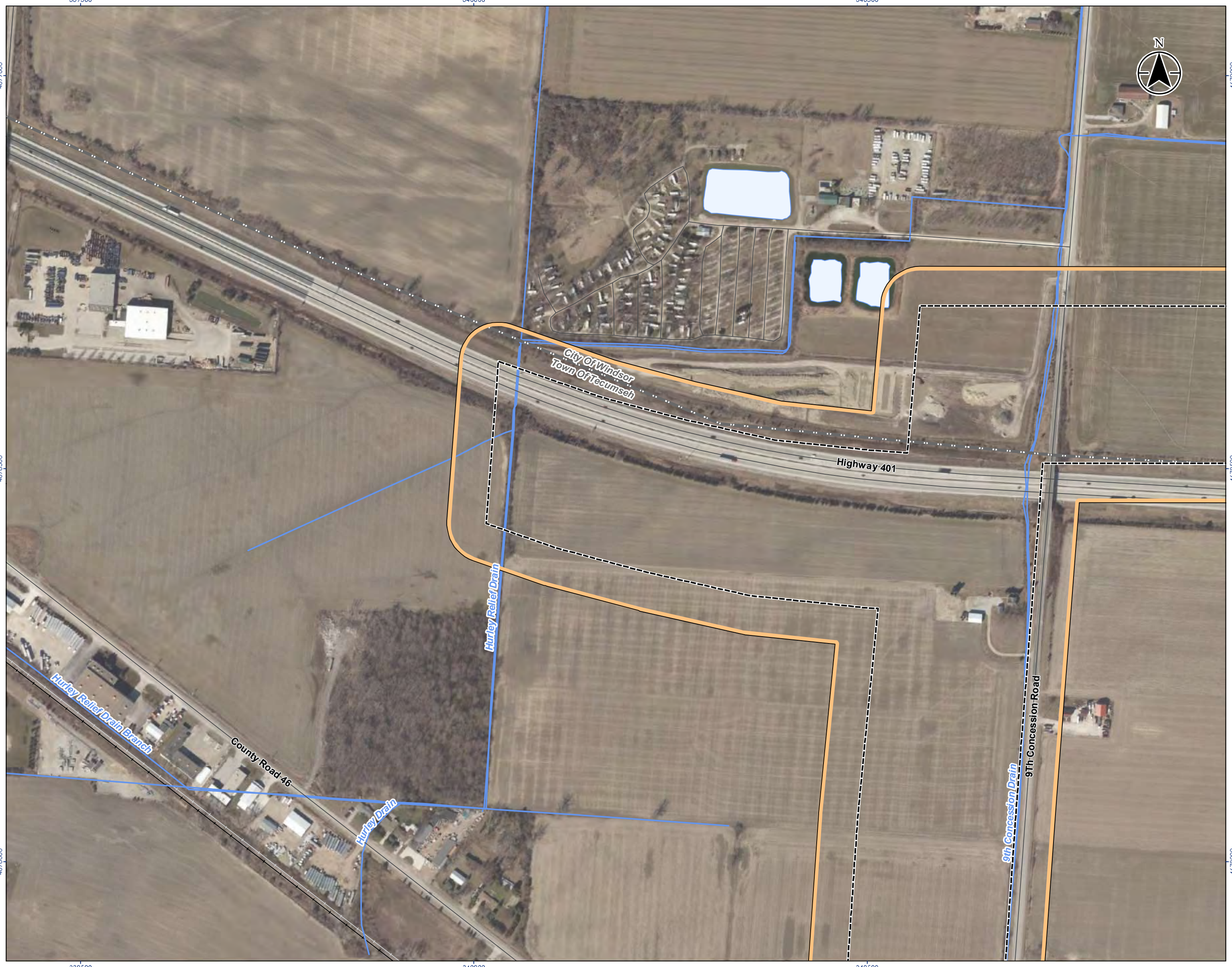
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2n

Title
Study Area - Tile 14



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

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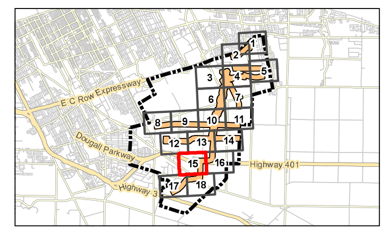

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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2o

Title
Study Area - Tile 15

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters
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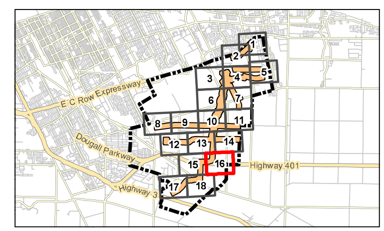

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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2p

Title
Study Area - Tile 16

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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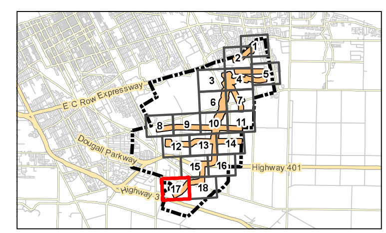

Project Location
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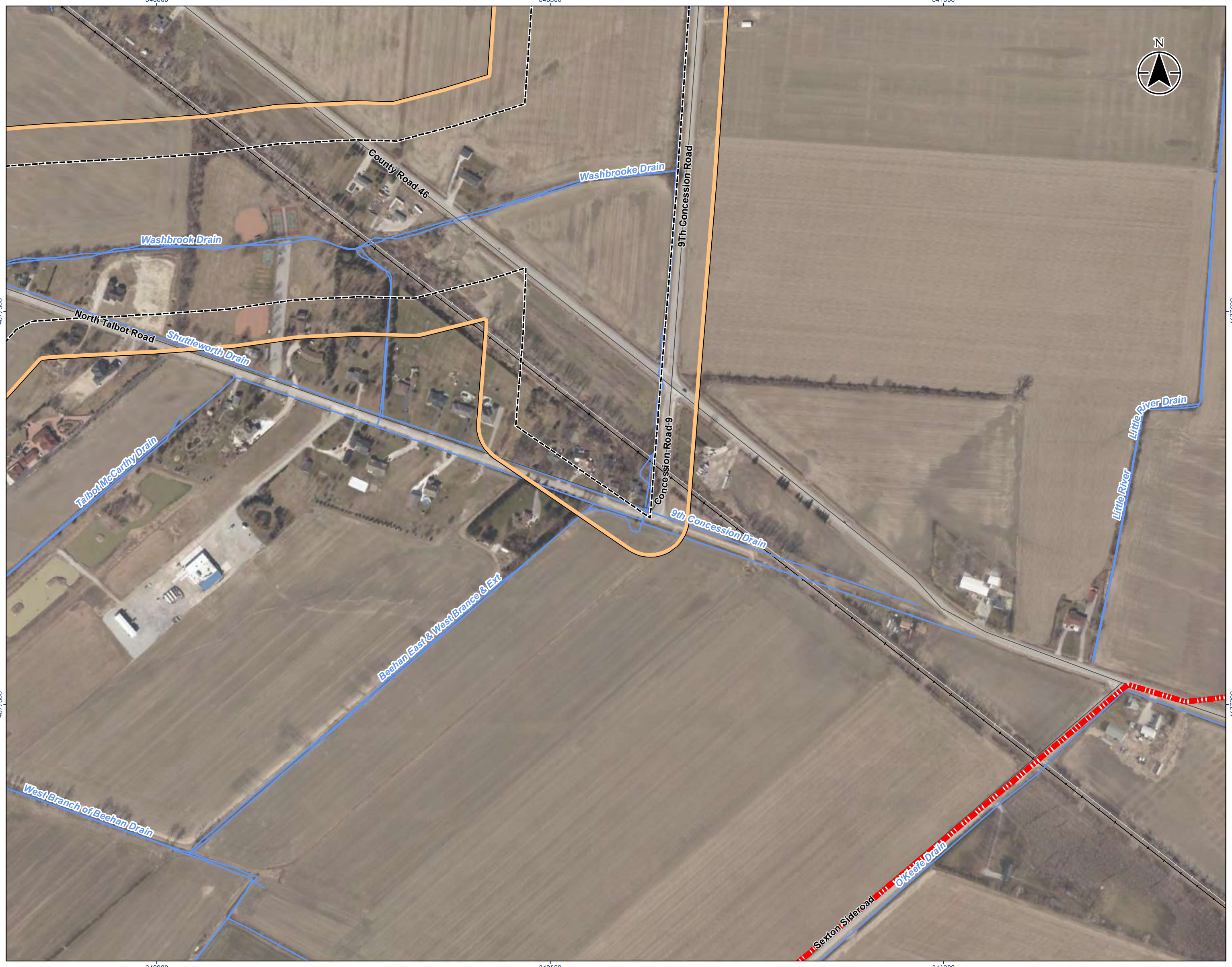
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2q

Title
Study Area - Tile 17



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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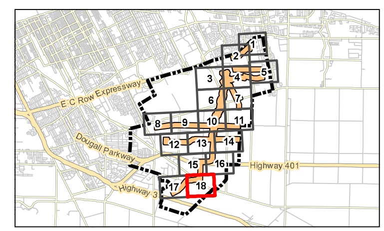

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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
2r

Title
Study Area - Tile 18

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2.0 METHODOLOGY

The requirement to consider cultural heritage in Municipal Class EAs is discussed in the Municipal Class Environmental Assessment Manual (MCEA Manual) (Municipal Engineers Association 2015) and the revised 2020 Provincial Policy Statement (PPS) (Government of Ontario 2020). The MCEA Manual considers cultural environment heritage, including built heritage resources and cultural heritage landscapes as well as archaeological resources, as one in a series of environmental factors to be considered when undertaking an MCEA, particularly when describing existing and future conditions, development alternatives, and determination of the preferred alternative.

The MCEA Manual further suggests that cultural heritage resources that retain heritage attributes should be identified early in the EA process and avoided where possible. Where avoidance is not possible, potential effects to these attributes should be identified and minimized. Adverse impacts should be mitigated according to provincial and municipal guidelines. It is suggested that this happen early in the process so that potential impacts to significant features can be included in an understanding of project impacts and plans established to mitigate these impacts.

In addition to requirements outlined in the MCEA Manual, provisions made under the PPS were also considered in the preparation of the study. Section 2.6 of the PPS addresses cultural heritage in the land use planning process and as such was considered. The applicable provisions include:

> *2.6.1 - Significant built heritage resources and significant cultural heritage landscapes shall be conserved.*
>
> *2.6.3 - Planning authorities shall not permit development and site alteration on adjacent lands to protected heritage property except where the proposed development and site alteration has been evaluated and it has been demonstrated that the heritage attributes of the protected heritage property will be conserved.*

(Government of Ontario 2020: 31)

2.1 BACKGROUND HISTORY

The CHRA was composed of a program of archival research focused on the Study Area. To familiarise the study team with the Study Area, local historical resources were consulted, archival documents were reviewed, and a summary of the historical background of the local area was prepared. Specifically, historical mapping from 1877, 1881, 1912, 1913, 1920, 1931, 1936, 1940, 1961, 1962, and 1975 was consulted to identify the presence of structures, settlements, and other potential heritage resources in advance of the field program.

2.2 MUNICIPAL AND AGENCY CONSULTATION

Listings of provincially and locally designated properties, districts, and easements for each municipality were collected from the Ontario Heritage Trust (OHT), the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), the City of Windsor, and the Town of Tecumseh. Consultation with these interested agencies and municipalities within which the project is proposed was undertaken to determine the presence of designated, listed, or registered heritage properties within the Study Area.

Recognition of protected properties varies greatly and is dependent on the level of CHVI identified or, in some cases, the level of investigation undertaken. For the purpose of this study, any property previously identified by municipal staff or provincial agencies as containing, or having the potential to contain, CHVI was determined to be a protected property.

2.3 FIELD PROGRAM

A vehicular windshield survey was conducted on April 19, 2018 and May 11, 2018 from the RoW. At this time, the Study Area was surveyed for potential heritage resources, including both potential built heritage resources and cultural heritage landscapes. Where identified, these were photographed, and their locations recorded. Characteristics of each potential heritage resource were noted while in the field and recorded.

In general, heritage resources of more than 40 years of age were evaluated during the survey for their potential to satisfy O. Reg. 9/06 criteria. The use of the 40-year threshold is generally accepted by both the federal and provincial authorities as a preliminary screening measure for CHVI. This practice does not imply that all properties more than 40 years of age are inherently of significant heritage value, nor does it exclude exceptional examples constructed within the past 40 years of being of significant cultural heritage value.

2.4 EVALUATION OF CULTURAL HERITAGE VALUE OR INTEREST

The criteria for determining CHVI is defined by O. Reg. 9/06. Each potential heritage resource was considered both as an individual structure and as cultural landscape. Where CHVI was identified, a structure or landscape was assigned a cultural heritage resource (CHR) number and the property was determined to contain a heritage resource. Evaluations for each property are contained in Appendix A.

2.4.1 Ontario Regulation 9/06

In order to identify CHVI at least one of the following criteria must be met:

1. *The property has design value or physical value because it,*
   i. *is a rare, unique, representative or early example of a style, type, expression, material or construction method,*
   ii. *displays a high degree of craftsmanship or artistic merit, or*

iii. *demonstrates a high degree of technical or scientific achievement.*

2. *The property has historical value or associative value because it,*

   i. *has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,*

   ii. *yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or*

   iii. *demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.*

3. *The property has contextual value because it,*

   i. *is important in defining, maintaining or supporting the character of an area,*

   ii. *is physically, functionally, visually or historically linked to its surroundings, or*

   iii. *is a landmark.*

(Government of Ontario 2006a).

3.0 HISTORICAL DEVELOPMENT

3.1 INTRODUCTION

The Study Area is located within the City of Windsor and the Town of Tecumseh, Ontario. It extends roughly from west to east from Concession Road 6, in the City of Windsor to Lesperance Road in the Town of Tecumseh, and north to south from the E.C. Row Expressway to the South Talbot Road.

Specifically, the Study Area spans across the following historical lots and concessions of the former Township of Sandwich, within the County of Essex, Ontario.

- Lots 141 to 150, Concession 1, Petit Cote
- Lots 98 to 150, Concession 3, Petit Cote
- Lots 12 to 16, Concession 6
- Lots 11 to 17, Concession 7
- Lots 10 to 18, Concession 8
- Lots 10 to 18, Concession 9
- Lots 13 to 19, Concession 10
- Lots 300 to 304, Talbot Road North Side
- Lots 300 to 302, Talbot Road South Side

The following sections outline the historical development of the Study Area from the period of settlement to the 20th century.

3.2 PHYSIOGRAPHY

The Study Area is situated within the St. Clair Clay Plains physiographic region of southwestern Ontario (Chapman and Putnam 1984: 113). The physiography of the region highly influenced the late settlement and farming in the County of Essex, until more advanced artificial drainage was implemented in the late 19th and early 20th centuries.

The St. Clair Clay Plains is an extensive area of clay plains covering 5,880 square kilometres in Counties of Essex, Kent, and Lambton. The region is fairly flat with little relief, lying between approximately 175 to 215 metres above sea level. The area during the glacial period was covered by Glacial Lake Whittlesey and Lake Warren, which failed to leave deep stratified beds of sediment on the underlying clay. The majority of Essex County is till plains smoothed by shallow deposits of lacustrine clay which settled in the depressions while the knolls were being lowered by wave action. Within Essex County, the underlying rock is limestone (Chapman and Putnam 1984: 147).

The majority of the region has a history of poor drainage, which required the installation of dredged ditches and tile underdrains to have satisfactory conditions for crop growth and tillage (Chapman and Putnam 1984: 149). The issue of drainage was addressed beginning in 1869 with the first *Ontario Drainage Act*. The act provided municipal and provincial funding to land owners for the construction of drains in southwestern Ontario (Burr 2014: 22). Throughout the late 19th to the early 20th century new innovations established effective drainage throughout the county to facilitate improved agriculture. Still seen on the landscape today within the Study Area are deep ditches, with large culverts as part of driveways (Plate 1). There are also several different drains within the Study Area, including for example the Little River Drain which crosses Baseline Road (Plate 2).

Plate 1: Deep ditch and culvert driveway example on EC Row Avenue East

Plate 2: Little River Drain

3.3 SURVEY AND SETTLEMENT

On January 1, 1800, in the *Act for the Better Division of the Province*, the Townships of Rochester, Mersea, Gosfield, Maidstone, Sandwich, and Malden were created as part of the County of Essex. The townships of Essex County were surveyed by Patrick McNiff, Abraham Iredell, and Thomas Smith (Clarke 2001: 60, 70).

Among the counties in Ontario, Essex County was the first to be settled (Corporation of the County of Essex 1992: 1). Euro-Canadian settlement in the area of Essex County began as early as 1747 as French settlers began living along the banks of the Detroit River (County of Essex 2019). Following the American War of Independence (1775-1783), settlers began to settle further east of the Detroit River along the north shore of Lake Erie (Corporation of the County of Essex 1992: 2).

The Township of Sandwich was surveyed between 1792 and 1793 by Patrick McNiff. McNiff did not complete the full survey of the township, with additional surveys undertaken by Abraham Iredell in 1796-1797, and Mahlon Burwell in 1824 (Clarke 2001: 67). Due to the township's location bordered on the north by Lake St. Clair and the west by the Detroit River, its French settlers prior to survey, and swamp areas, the township lots are irregularly laid out. Adjacent to the watercourses, in Concessions 1 to 3

Petite Cote, the township has long narrow lots, while the remaining south and east portions of the township utilize the double-front survey system. This survey system created a rectangular pattern of 100-acre lot allowances surrounded by road allowances (Plate 3).

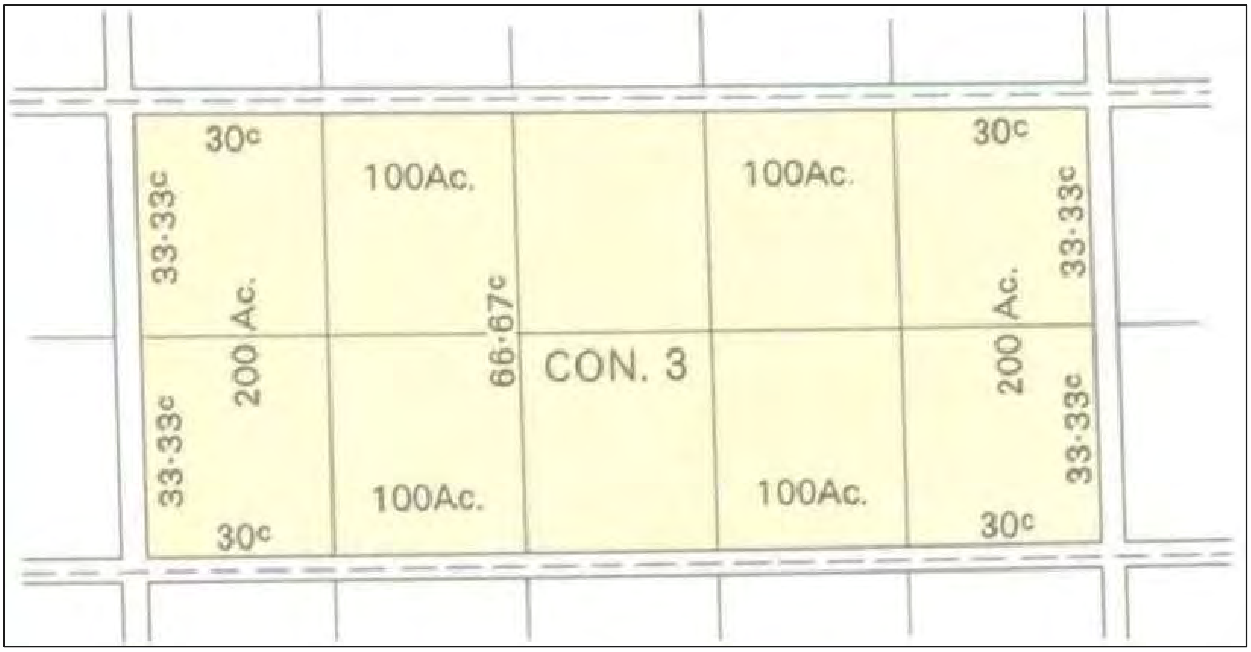


Plate 3: Double-Front Survey System (Dean 1969)

The village of Sandwich began to develop in 1788 to the northwest of the Study Area when a one square mile block of land was acquired by the British from the Chiefs of the Wyandottes/Huron, the Chippewa, and Ottawa for the price of three hundred pounds worth of supplies. It was laid out into one-acre sections and 24-acre residential lots. It was named for the English borough of Sandwich in Kent. Sandwich was established as the new county town by the Honourable Peter Russell in 1796 and its administrative function stimulated rapid growth. Industries included fur, salt, brick manufacturing, and fish hatcheries (Neal 1909: 133-134).

3.4 19TH CENTURY DEVELOPMENT

In the early 19th century, road development helped to increase accessibility in the Study Area and the spread of settlers throughout the township. In 1811, Colonel Talbot commissioned Mahlon Burwell to survey the Talbot Road along the north shore of Lake Erie. The construction of the roadway was interrupted by the War of 1812, before reaching Essex County in 1818 (County of Essex 2019). The Talbot Road was completed through the Study Area between the hamlet of Maidstone and the Village of Sandwich.

Northwest of the Study Area, in July 1812, the village of Sandwich was the first community in Upper Canada to be attacked by American forces. That month, under General Hull, 2,000 men crossed the Detroit River, forcing residents and British army in Sandwich to abandon the community. The following month, under the command of General Isaac Brock, the British army, and First Nations warriors, retaliated and the American forces were overtaken. Sandwich was attacked again in September 1813, by the American Forces under General William Henry Harrison. When peace came in 1814, the Crown compensated Sandwich for their losses during the conflict (City of Windsor 2021a).

In 1817, Sandwich was formally incorporated as a police village (County of Essex 2019). In the 1830s, the town became an important terminal on the Underground Railroad following the *Emancipation Act* in 1833. Refugees numbering between 30,000 and 100,000 made their journey into Upper Canada by way of Sandwich, with many settling in the town (City of Windsor 2021a). North of the Study Area, the Tecumseh Road was constructed in 1838, running parallel to Lake St. Clair and Detroit River between the community of Ryegate (now Tecumseh) and Sandwich (Tecumseh 2019).

Sandwich was incorporated as a town in 1858, with Charles Baby as the first mayor (Neal 1909: 133-134). By the mid-19th century Sandwich was a well-established town, with a grist and carding mill, two tanneries, a door and blind factory, a saw mill, a foundry, a brick yard, a shingle factory, two wagon shops, a bakery, a gunsmith, seven general stores, four groceries, five hotels, five saloons, a boot and shoe factory, two potash factories, and a brewery (Sutherland & Co. 1866: 93).

Although the village of Sandwich was chosen as the location of Essex County offices, the Town of Windsor eventually outstripped the former in size and industry. Windsor, situated on the banks of the Detroit River, northwest of the Study Area, was originally founded as South Detroit by James Dougall of Paisley, Scotland, who bought the land, laid it out as a village plot, and opened a store in 1830. Early settlers in Windsor included a number of families: Baby, Dumouchelle, Goyeau, Jannesse, Langlois, Marentette, Meloche, and Oullette (Belden 1881: 7). In 1846, Windsor had a population of only 300 (Smith 1846: 221).

In 1844, the township population was 3,624, outside of the towns on the Detroit River. Agriculture remained the main industry in the township in the mid-19th century, with residents supplying products such as poultry to Windsor and the City of Detroit. By 1846, the township had 10,797 acres under cultivation out of a total of 51,476 acres (Smith 1846: 104).

After the *Municipal Corporations Act* of 1850, which provided a means of government for towns and counties, Essex was united with the Counties of Kent and Lambton. In June 1853, Essex became an independent county (County of Essex 2019). In 1853, the Great Western Railway was constructed through the township, with the line running through Ryegate and terminating at Windsor. Windsor was incorporated as a town in 1854, with S.S. Macdonnell as the first reeve (Belden 1881: 7). By 1866, its population had increased to 4,500 (Neal 1909:136). The arrival of the railway and the development of a port marked the beginning of significant industrial development in Windsor. Several areas that are now within the city limits, such as Walkerville and Ford City, were developed in the late 19th century (Archaeological Services Inc. 2008). In 1892, Windsor was incorporated as a City (County of Essex 2019).

By the late 19th century, the Town of Sandwich had become a suburb of Windsor, with a population in 1881 of 1,054 (Belden 1881: 9). Outside the town, in 1861, the township had been divided into two distinct east and west municipalities. The Study Area fell within the Township of Sandwich East (County of Essex 2019). By 1881, the Township of Sandwich East was well settled with a population of 3,837 (Belden 1881: 9). The 1881 township map within the *Illustrated Historical Atlas of the Counties Essex and Kent*, shows the rural Study Area (Figure 3). The majority of development in the Study Area is along the Talbot Road, with a few farmsteads north of the main roadway. In 1893, the Township of Sandwich East was further subdivided, with the creation of the Township of Sandwich South, with the Study Area within both boundaries (Town of Tecumseh 2019).

The Windsor Subdivision of the Canadian Pacific Railway runs east - west across the northern portion of the Study Area. This railway is present on McPhillips' 1898 *Plan of the Township of Sandwich* (McPhillips 1898). Part of the Trans-Canada railway commissioned by the government in 1880, it reached Windsor in 1890, and the line is still in operation today (Andreae 1997).

3.5 20TH CENTURY DEVELOPMENT

In the early 20th century, the Study Area remained within a rural part of the Townships of Sandwich East and Sandwich South, until the development of better roadways and an airport in the 1920s. In 1920, the Department of Public Highways (DPHO) assumed ownership of roadways between Windsor and Niagara Falls for the creation of Highway 3. Within the County of Essex, the highway remained under municipal authority. The Highway was designated as Provincial Highway 3 in 1925, and re-designated as King's Highway in 1930 (Bevers 2020).

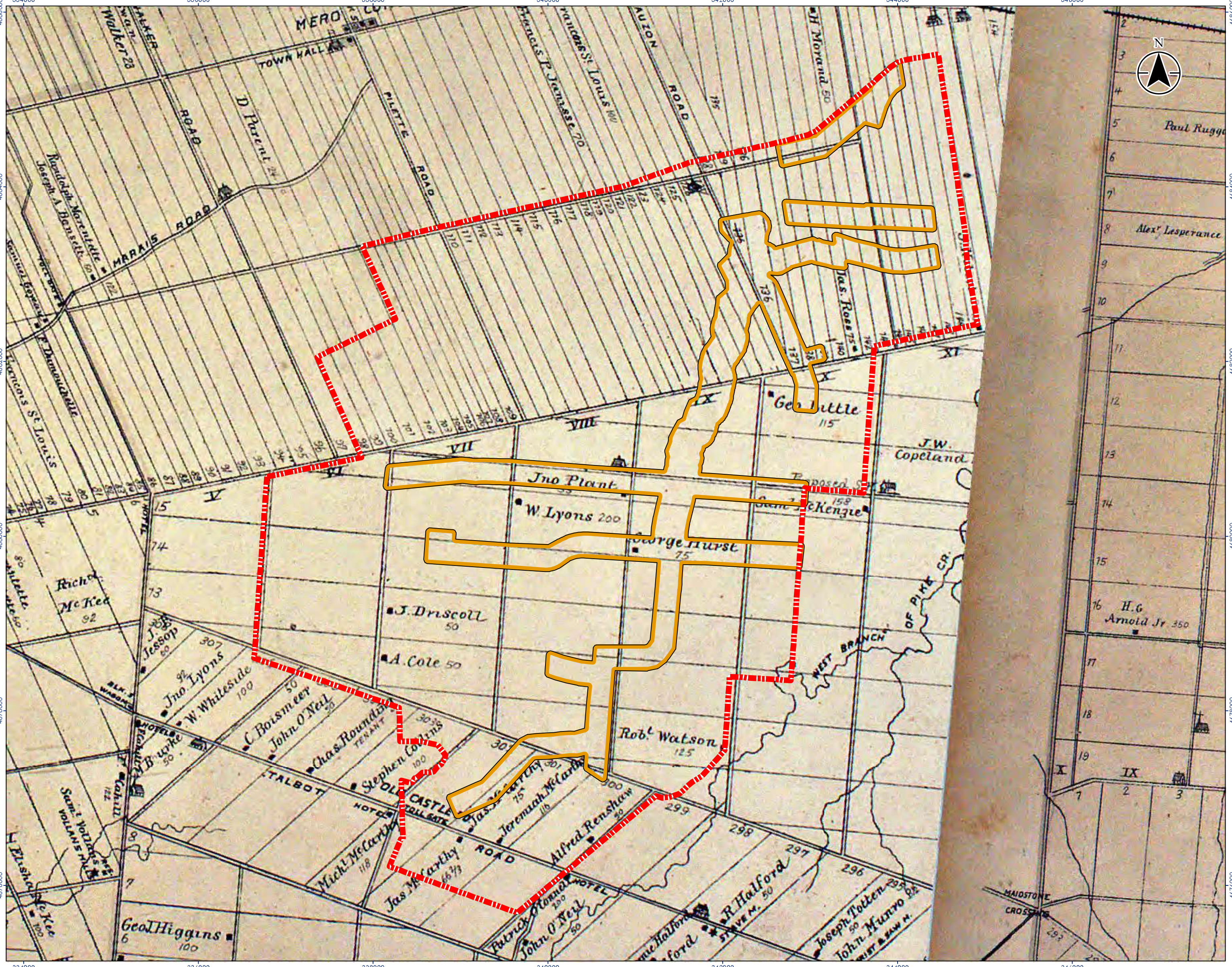
Major development occurred adjacent to the Study Area with the opening of the Walker Airport on September 8, 1928. Following the Great Depression in the 1930s, the airport was purchased in 1940 by the City of Windsor. The City also purchased surrounding lands for the construction of three permanent runways, administration buildings, and a control tower (Weeks 2015).

North of the Study Area, the former community of Ryegate had been incorporated in 1921 as the Town of Tecumseh, a municipality separate from the Township of Sandwich East. That year, the town had a population of 978. The town grew in the 1930s with the establishment of the Green Giant Factory (Town of Tecumseh 2019). Northwest of the Study Area, the Ambassador Bridge was opened in 1929 between Canada and the United States and became a vital trade link between the two nations. The high trade aspirations were short lived with the onset of the Great Depression. Windsor and Sandwich were hit hard by the depression and it resulted in the loss of thousands of heavy industry and manufacturing jobs. The provincial government, in an effort to save tax dollars, passed a bill to streamline municipal governments. As a result, Sandwich, East Windsor, and Walkerville, were annexed by the City of Windsor in 1935 (City of Windsor 2021a).

In the late 1950s, properties within and adjacent to the Study Area were purchased for the construction of a new highway into the City of Windsor. Construction of the E.C. Row Expressway, named for the President of Chrysler Canada, began in 1970. Construction and expansion contracts to the highway continued into the late 20th century (Oiamo *et al* 2016:189).

In the 1960s, the City of Windsor continued to expand through annexations of surrounding towns and townships. In 1966, the City of Windsor annexed the Townships of Sandwich East and Sandwich South (Town of Tecumseh 2019). The City of Windsor had a stable population between 1966 and 1996, with an average population of about 195,000 (City of Windsor 2021b).

In 1999, the east portion of the Study Area was annexed by the Town of Tecumseh as part of the reorganization of Essex County (Town of Tecumseh 2019). In 2003, the City of Windsor annexed 23 square kilometres from the Town of Tecumseh (City of Windsor 2021c). With its location adjacent to the City of Windsor, and the City's airport, Tecumseh is a suburban community. In 2006, the town had a population 24, 224 (Statistics Canada 2017).



Stantec

Cultural Heritage Study Area

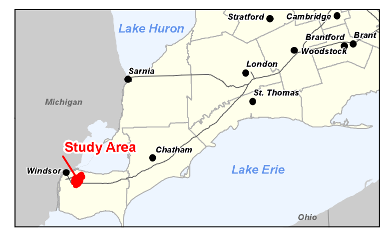
Upper Little River Study Area

0 1 2 Kilometers

1:45,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 Ontario MNR Lambert
2. Essex County (Ontario Map Ref #1) Essex supplement in illustrated atlas of the Dominion of Canada. Toronto: H. Belden & Co., 1881.



Project Location
Windsor, Ontario

160311265 REVA
Prepared by CMC on 2021-06-22
Technical Review by ABC on xxxx-xx-xx

Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
3

Title
Township of Sandwich 1881

4.0 RESULTS

4.1 AGENCY AND MUNICIPAL CONSULTATION

In order to identify heritage resources within the Study Area, the MHSTCI, OHT, City of Windsor, and Town of Tecumseh were consulted.

At the provincial level, Karla Barboza, Team Lead, Heritage, with the MHSTCI, confirmed that there are no provincial heritage properties within or adjacent to the Study Area. Thomas Wicks, Heritage Planner with the OHT, reported that there are no OHT conservation easement sites or OHT-owned properties within or adjacent to the Study Area.

At the municipal level, staff were consulted to determine the presence of municipally protected heritage properties. Table 4-1 provides an overview of the identified heritage resources in relation to the Study Area. Kristina Tang, Planner II - Revitalization & Policy Initiatives, Planning & Building Services, City of Windsor, identified five properties as heritage resources in relation to the Study Area. Three of the properties were determined to be situated within the Study Area. Chad Jeffery, Manager Planning, Town of Tecumseh, provided a map of heritage resources in the Town of Tecumseh which identified three properties as heritage resources in relation to the Study Area. One of the properties was determined to be situated within the Study Area.

Table 4-1: Identified and Protected Heritage Resources within the Study Area

Municipality	Location/Municipal Address	Level of Recognition	Relationship to the Study Area
City of Windsor	2600 Airport Rd (3200 County Rd 42)	Listed on municipal register	Outside the Study Area
City of Windsor	5680 Baseline Rd	Listed on municipal register	Inside the Study Area
City of Windsor	4639 9th Concession Rd	Listed on municipal register	Inside the Study Area
City of Windsor	4799 9th Concession Rd	Listed on municipal register	Outside the Study Area
City of Windsor	4601 County Rd 17 (10th Concession)	Listed on municipal register	Inside the Study Area
Town of Tecumseh	2300 Banwell Road	Designated Heritage Property	Inside the Study Area
Town of Tecumseh	11945 Intersection Road	Listed on municipal register	Inside the Study Area
Town of Tecumseh	2725 Highway 3 (Talbot Road)	Heritage Property Candidate	Outside the Study Area

4.2 FIELD PROGRAM

4.2.1 Potential Heritage Resources

As described in Section 2.3, a windshield survey was undertaken to identify potential heritage resources situated within, and adjacent to, the Study Area and confirm the presence of previously identified protected properties. Where identified, the potential heritage resource was photographically documented from the public RoW.

During the course of the survey, 72 individual sites were identified as containing potential heritage resources (Figure 4). Of those identified, five had been previously recognized by municipal heritage staff through listing on their municipal heritage register. A summary of these potential heritage resources is contained in Table 4-2 and Appendix A.

The Study Area contains a mixture of residential and commercial structures. The majority of the potential heritage resources date to the mid-20th century, between approximately 1940 to 1975, based on topographic mapping. Eight properties date to the late 19th to early 20th century, specifically between 1882 and 1912, determined through historic and topographic mapping. Six of these eight properties display a similar one and a half storey structure with a T-shaped plan, while the remaining two are red brick two storey structures. Two of the eight properties are farmsteads.

4.3 EVALUATION OF CULTURAL HERITAGE VALUE OF INTEREST

Where a potential heritage resource was identified within the Study Area, an evaluation of the CHVI of the property was undertaken. As described in Section 2.5, each potential heritage resource was evaluated according to O. Reg. 9/06, the criteria for determining CHVI. Detailed evaluations for each property are contained within Appendix A. In addition, each potential heritage resource was considered both as an individual structure and as part of a landscape. Where CHVI was identified, a structure or landscape was assigned a CHR number and the property was determined to contain a heritage resource. There were 72 potential heritage resources identified (Figure 4), 14 of which were determined to be cultural heritage resources (Figure 5). Table 4-2 summarizes the findings.

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
1667 Shawnee Road	4a	No	Residence		None identified	No	N/A
3780 Lauzon Road	4d	No	Farmstead		None identified	No	N/A
3805 Lauzon Road	4d	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
Banwell Road (railway line)	4e	No	Railway Line		Railway line: Layout of the railway line.	Yes	CHR-1
2300 Banwell Road	4e	Yes	Cemetery		Cemetery: Grave markers, provincial plaque, and mature deciduous trees.	Yes	CHR-2
11945 Intersection Road	4e	Yes	Farmstead		Residence: Two storey structure, high-pitched hip roof, brick chimney, hip dormer, symmetrical exterior, red brick exterior, covered full width porch, 3/1 wood windows, and stone foundation. Barn: Timber frame structure and side gable roof. Landscape: Tree-lined laneway, mature maple and white pines.	Yes	CHR-3

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3945 Lauzon Road	4g	No	Residence		None identified	No	N/A
7816 County Road 42	4g	No	Residence		None identified	No	N/A
7955 County Road 42	4g	No	Residence		Associative: Connection to the Sikh community in Windsor and the local area, potential to yield information about the Sikh community and their influence on Windsor. Contextual: Guardwara Khalsa Parkash Windsor temple which acts as a landmark along County Road 42.	Yes	CHR-4

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
8421 County Road 42	4g	No	Residence/Commercial		None identified	No	N/A
8667 County Road 42	4g	No	Residence		None identified	No	N/A
9244 County Road 42	4g	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4120 7th Concession Road	4h	No	Residence		None identified	No	N/A
4178 7th Concession Road	4h	No	Residence		None identified	No	N/A
4140 7th Concession Road	4h	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3255 Baseline Road	4h	No	Residence		None identified	No	N/A
3225 Baseline Road	4h	No	Residence		None identified	No	N/A
3325 Baseline Road	4h	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

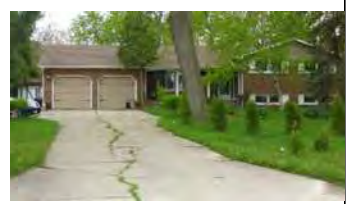
Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3277 Baseline Road	4h	No	Residence		None identified	No	N/A
3355 Baseline Road	4h	No	Residence		None identified	No	N/A
3415 Baseline Road	4h	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3465 Baseline Road	4h	No	Residence		None identified	No	N/A
3483 Baseline Road	4h	No	Residence		None identified	No	N/A
3567 Baseline Road	4h	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3605 Baseline Road	4h	No	Residence		None identified	No	N/A
3635 Baseline Road	4h	No	Residence		None identified	No	N/A
3665 Baseline Road	4h	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3685 Baseline Road	4h	No	Residence		None identified	No	N/A
3745 Baseline Road	4h	No	Residence		None identified	No	N/A
3765 Baseline Road	4h	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3825 Baseline Road	4h	No	Residence		None identified	No	N/A
3915 Baseline Road	4h	No	Residence		None identified	No	N/A
3965 Baseline Road	4h	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3985 Baseline Road	4i	No	Residence		None identified	No	N/A
4085 Baseline Road	4i	No	Residence		None identified	No	N/A
4095 Baseline Road	4i	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4145 Baseline Road	4i	No	Residence		None identified	No	N/A
4175 Baseline Road	4i	No	Residence		None identified	No	N/A
4245 Baseline Road	4i	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4367 Baseline Road	4i	No	Cemetery		Cemetery: Grave markers and brick piers with metal gates.	Yes	CHR-5
4489 Baseline Road	4i	No	Residence		None identified	No	N/A
4441 Baseline Road	4i	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4475 Baseline Road	4i	No	Residence		None identified	No	N/A
4435 8th Concession Road	4i	No	Residence		None identified	No	N/A
4440 8th Concession Road	4i	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5680 Baseline Road	4i	Yes	Farmstead		Residence: One and a half storey structure, medium-pitched cross gable roof, brick chimney, and T-shaped plan. Barn: Timber frame structure, side gable roof, salt box side, wood paneled door, and wood multi-paned windows. Driveshed: one storey structure, side gable roof, and wood 2/2 fixed windows. Smaller barn: side gable roof and rusticated concrete foundation. Outbuilding: horizontal wood siding, side gable roof, and wood 2/2 fixed windows.	Yes	CHR-6
7295 Baseline Road	4k	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, gabled dormers, and T-shaped plan.	Yes	CHR-7

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4310 County Road 17	4k	No	Outbuilding		None identified	No	N/A
8360 Baseline Road	4k	No	Residence		None identified	No	N/A
8780 Baseline Road	4k	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
3850 County Road 17	4k	No	Residence		Residence: One and a half storey structure, medium-pitched side gable roof, three-bay front façade, and stone foundation. Landscape: mature spruce trees.	Yes	CHR-8
4721 8th Concession Road	4l	No	Residence		None identified	No	N/A
4727 8th Concession Road	4l	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4774 8th Concession Road	4l	No	Residence		None identified	No	N/A
4824 8th Concession Road	4l	No	Outbuildings		None identified	No	N/A
4639 9th Concession Road	4m	Yes	Residence		Residence: Two storey structure, medium-pitched hip roof, gabled dormers, red brick exterior, covered wraparound brick, concrete and wood porch, 3/1 and 4/1 windows, and wood paneled door.	Yes	CHR-9

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4665 9th Concession Road	4m	No	Residence		None identified	No	N/A
4445 9th Concession Road	4m	No	Residence		None identified	No	N/A
4979 9th Concession Road	4o	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5012 9th Concession Road	4o	No	Residence		None identified	No	N/A
4610 County Road 17	4n	No	Residence		None identified	No	N/A
4601 County Road 17	4n	Yes	Residence		Residence: One and a half storey structure, medium-pitched side gable roof, stone clad exterior, three-bay front façade, and stone clad front porch.	Yes	CHR-10

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
4500 County Road 17	4n	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, T-shaped plan, and gabled dormer.	Yes	CHR-11
4521 County Road 17	4n	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, and gabled dormers. Outbuilding: vertical wood boards and side gable roof.	Yes	CHR-12
5284 North Talbot Road	4r	No	Park		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

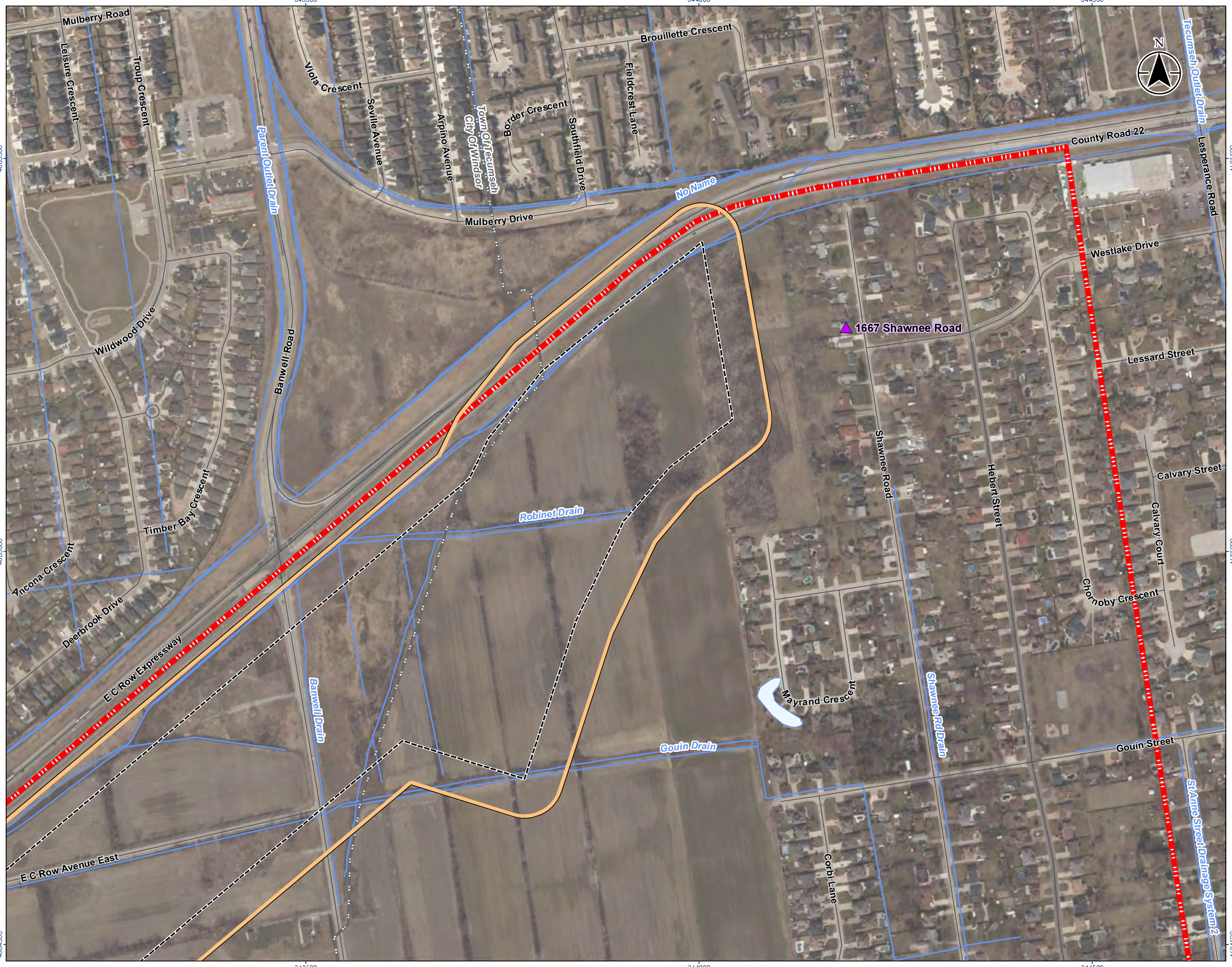
Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5648 North Talbot Road	4r	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, and T-shaped plan.	Yes	CHR-13
5700 North Talbot Road	4r	No	Residence		None identified	No	N/A
5760 North Talbot Road	4r	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5790 North Talbot Road	4r	No	Residence		None identified	No	N/A
9th Concession Road (former railway line)	4r	No	Former railway line		Recreational Trail: Layout of the former Canada Southern Railway Line including linear corridor lined with naturalized vegetation.	Yes	CHR-14
3940 Highway 3	4q	No	Residence		None identified	No	N/A

Table 4-2: Summary of Determination of CHVI

Municipal Address	Figure Number	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number
5075 North Talbot Road	4r	No	Residence		None identified	No	N/A



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Stantec

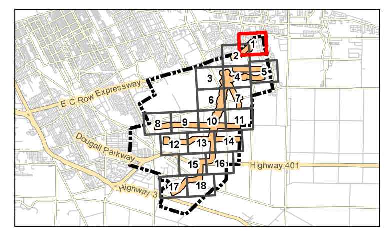
- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2016.
3. Orthoimagery © First Base Solutions, 2018. Imagery flown in 2017.



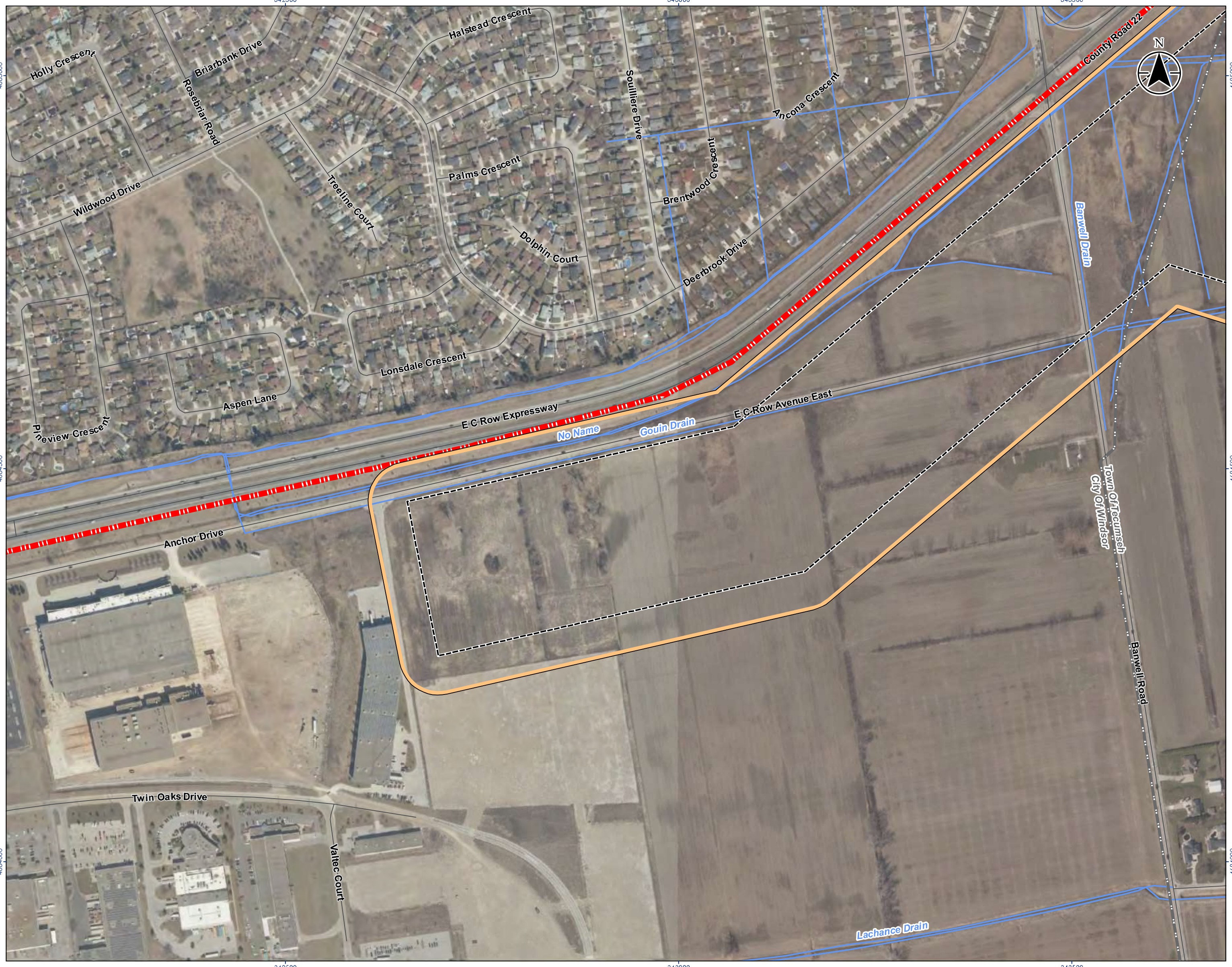
Project Location
Windsor, Ontario

160311265 REVA
Prepared by CMC on 2021-06-22
Technical Review by ABC on xxxx-xx-xx

Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4a

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 1



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes

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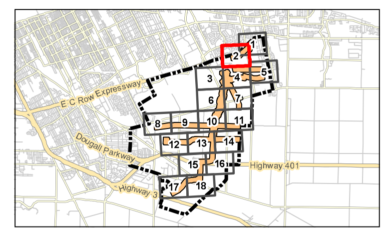


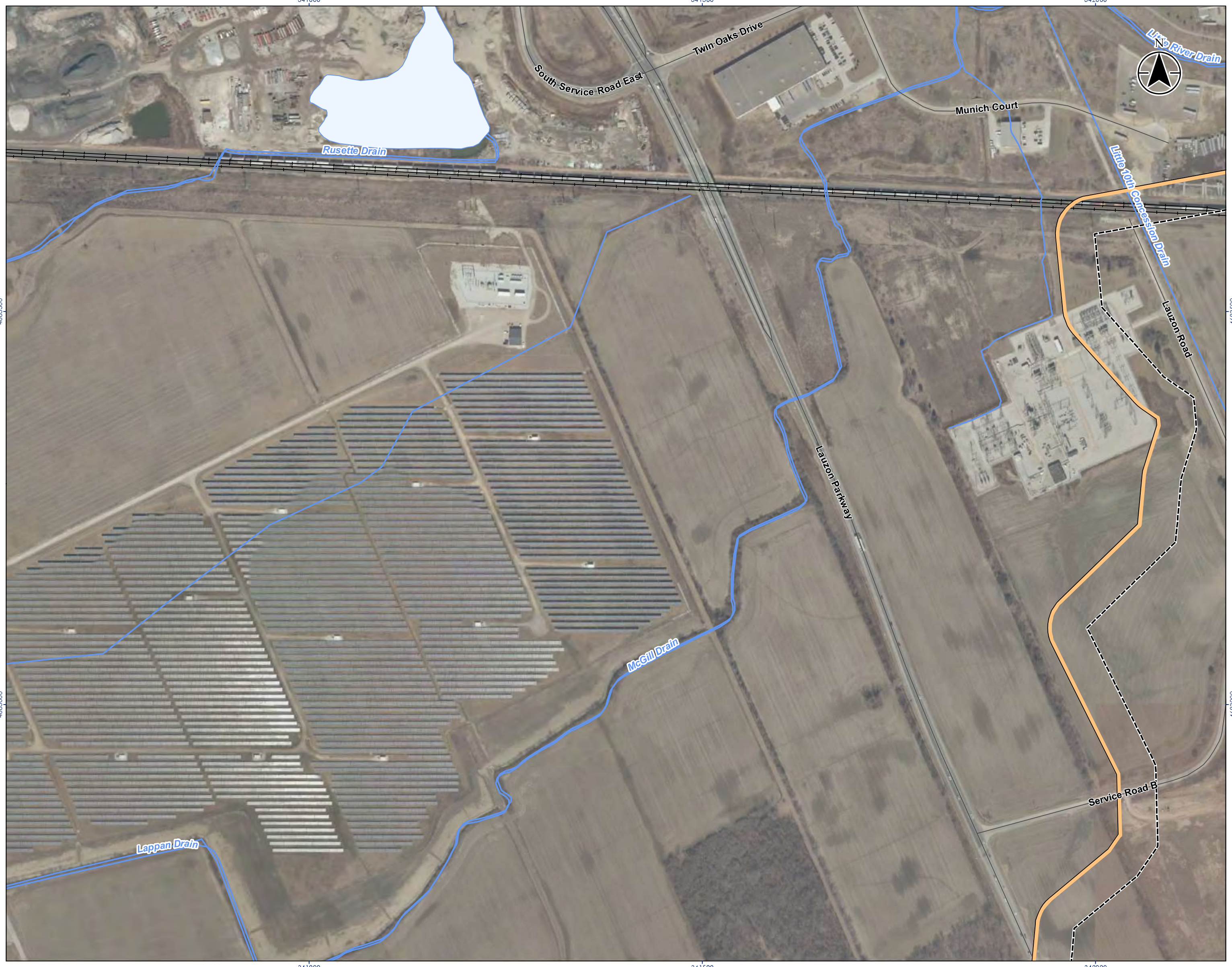
Project Location
Windor, Ontario

160311265 REVA
Prepared by CMC on 2021-06-22
Technical Review by ABC on xxxx-xx-xx

Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4b

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 2



Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Railway - Operational
Road
Watercourse
Waterbody
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

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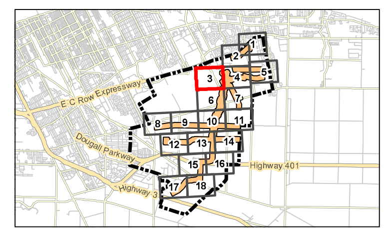

Project Location
Windsor, Ontario

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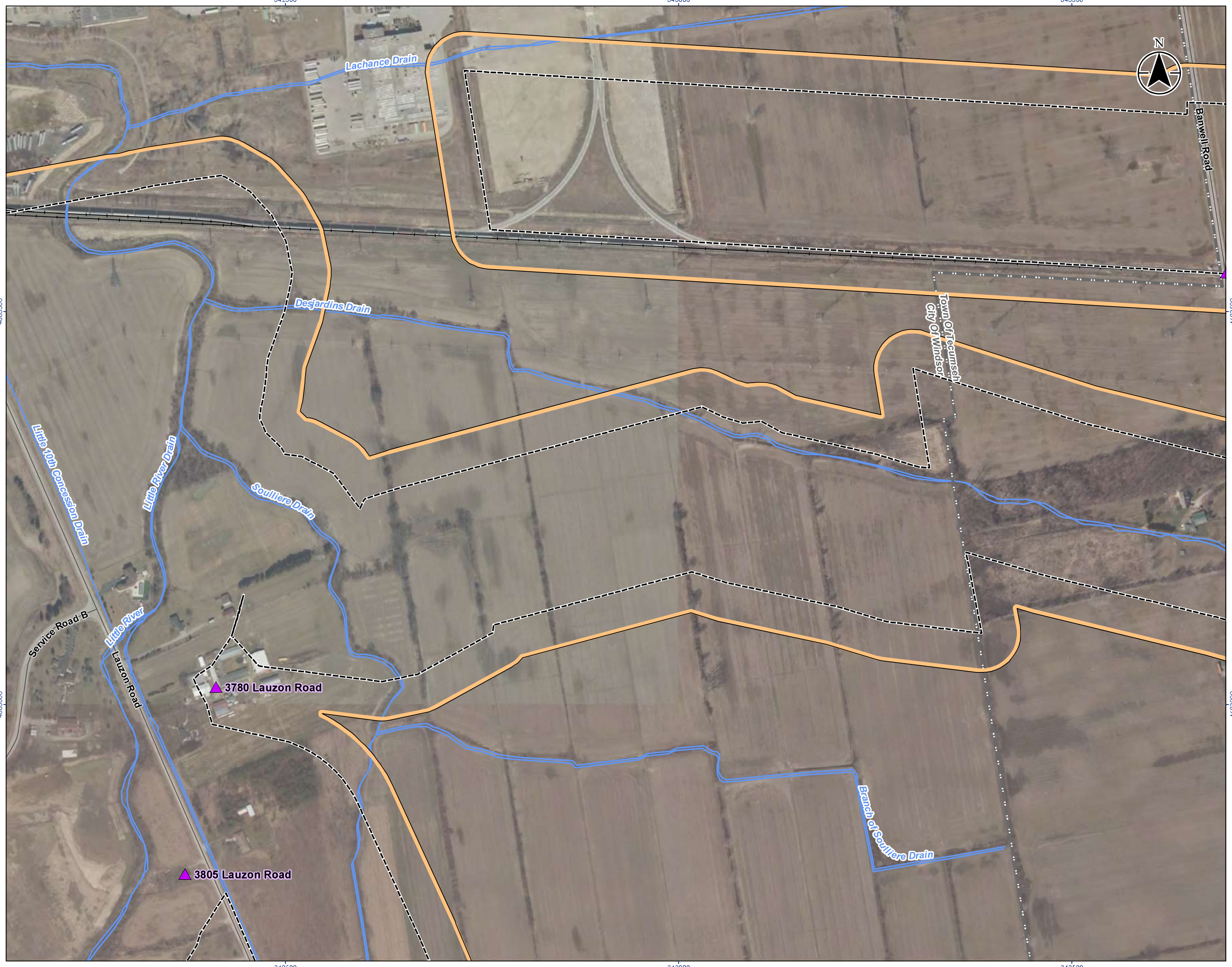
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4c

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 3



Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Potential Heritage Resource
Railway - Operational
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

Notes
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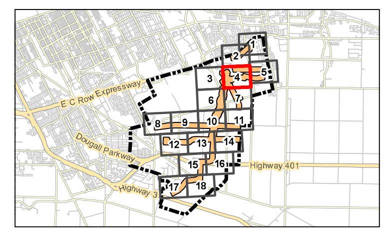

Project Location
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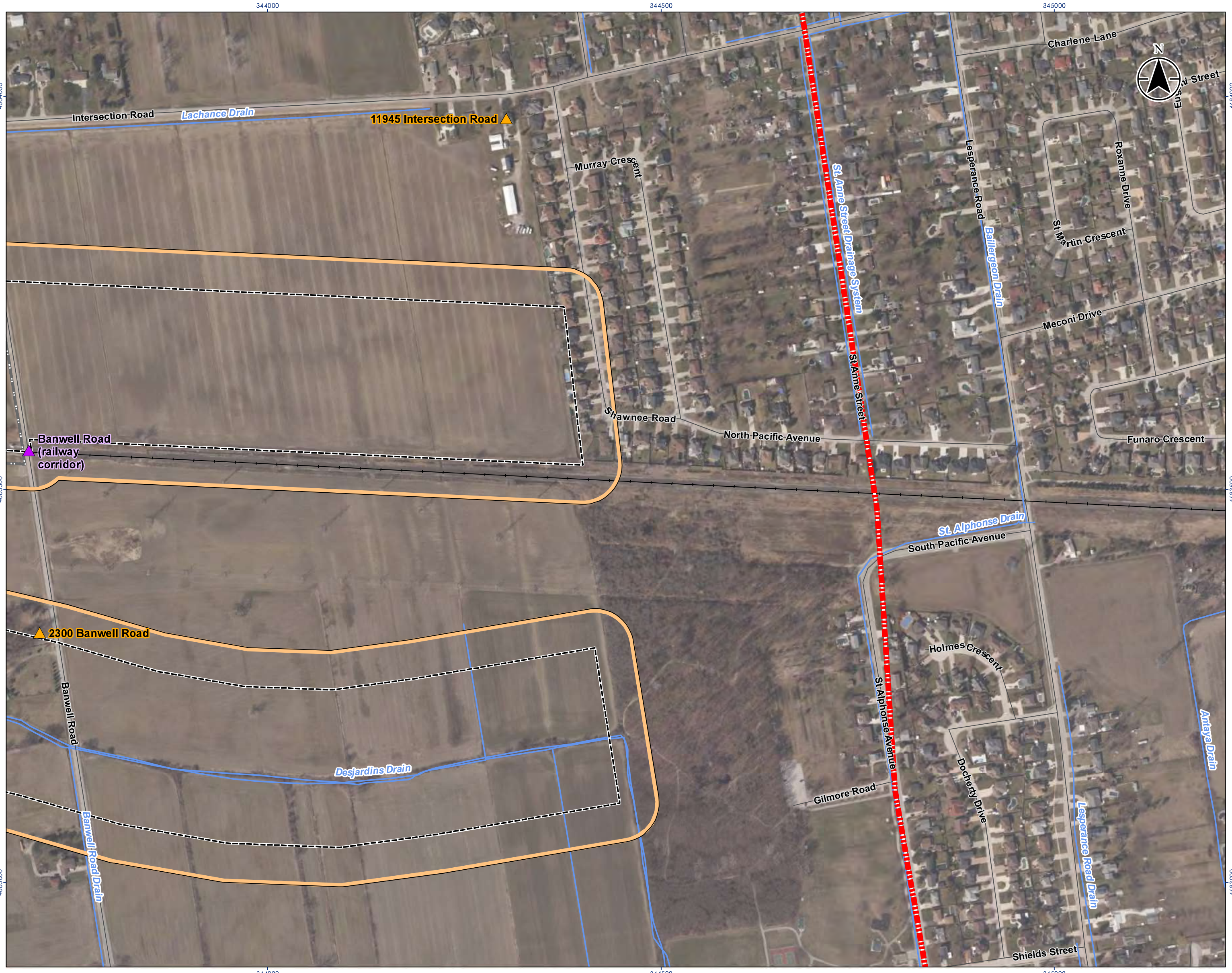
Technical Review by ABC on xxxx-xx-xx

Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4d

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 4



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Protected and Previously Identified Heritage Resources
- Potential Heritage Resource
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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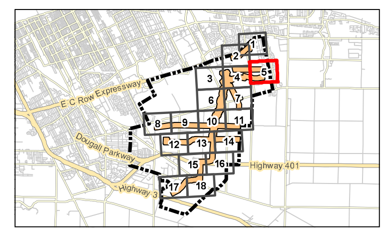

Project Location
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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4e

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 5

\\cd1004-f01\work_group\01603\active\160311265\design\drawing\gis\mxd\CulturalHeritage\CHRA\160311265_CHRA_Fig04_PotHeritageResources.mxd Revised: 2021-06-22 By: CCoghlan

Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
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Notes
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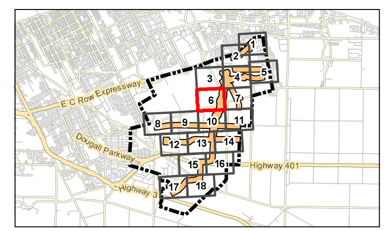

Project Location
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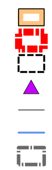
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4f

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 6



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

1:5,000 (At original document size of 11x17)

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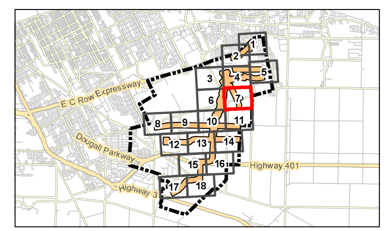

Project Location
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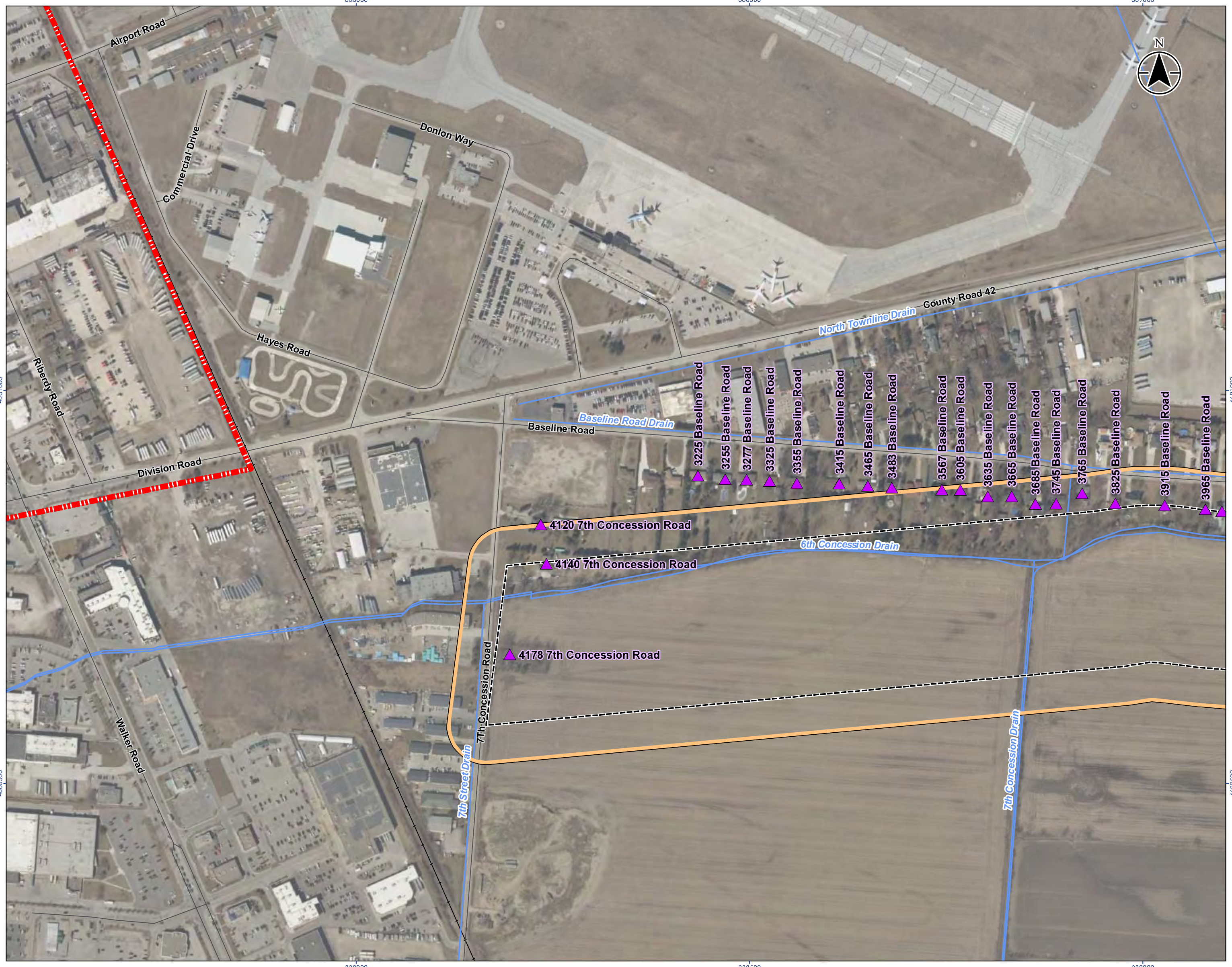
Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4g

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 7



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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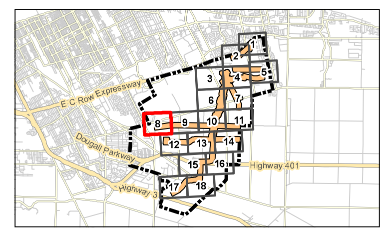

Project Location
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Technical Review by ABC on xxxx-xx-xx

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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4h

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 8

Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Protected and Previously Identified Heritage Resources
Potential Heritage Resource
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
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Notes
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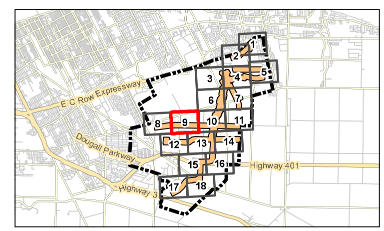

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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4i

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 9

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Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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Notes

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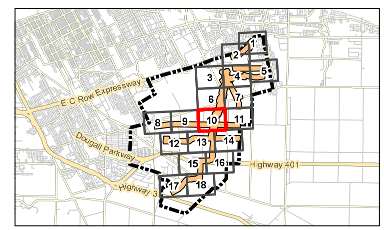

Project Location
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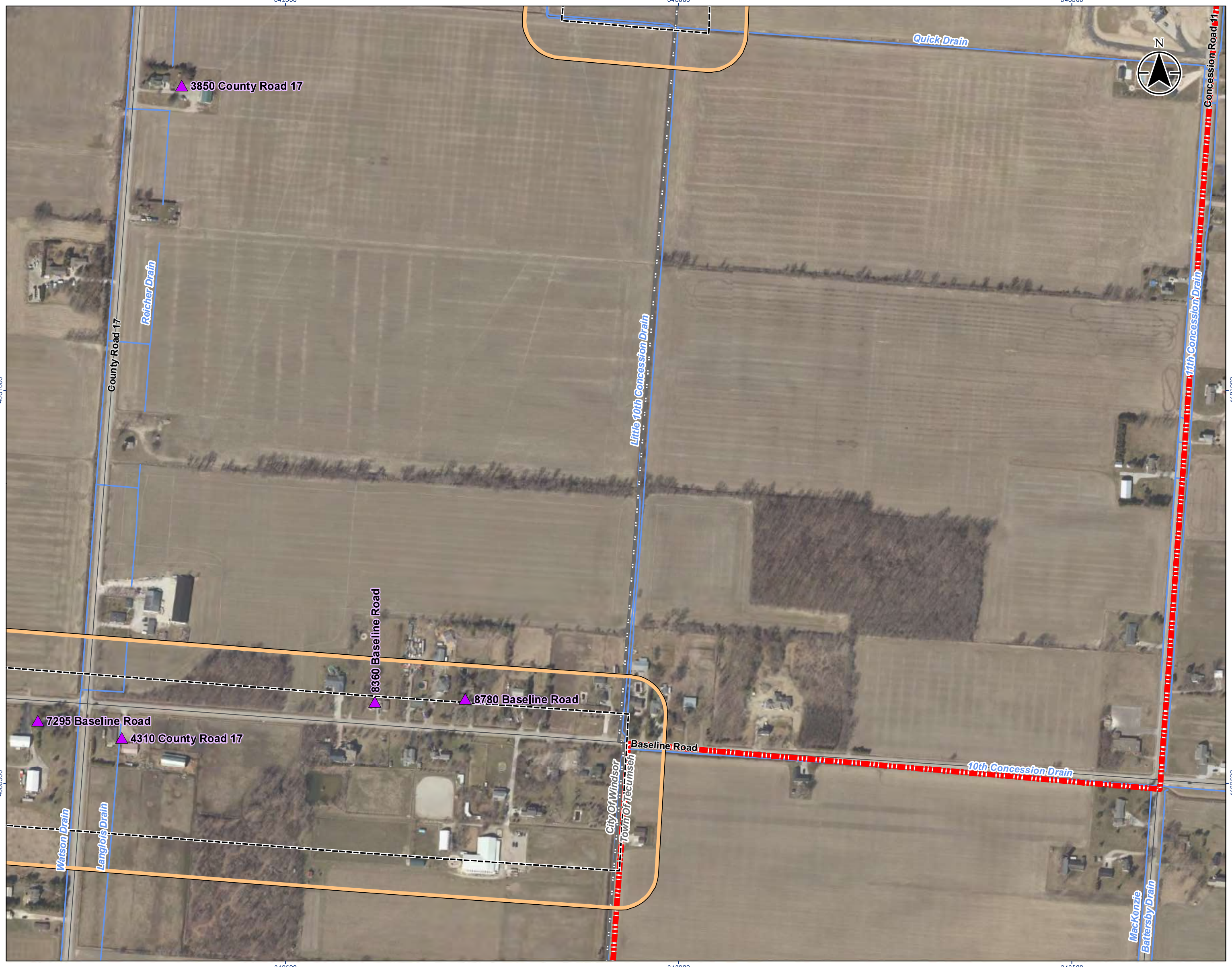
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4j

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 10



Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Potential Heritage Resource
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

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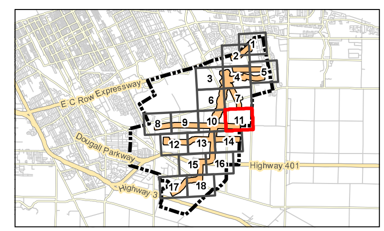

Project Location
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4k

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 11

Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Potential Heritage Resource
Road
Watercourse
Waterbody
Municipal Boundary - Lower Tier

0 100 200 Meters
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Notes
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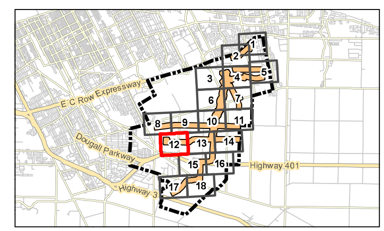

Project Location
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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4l

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 12

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Protected and Previously Identified Heritage Resources
- Potential Heritage Resource
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes

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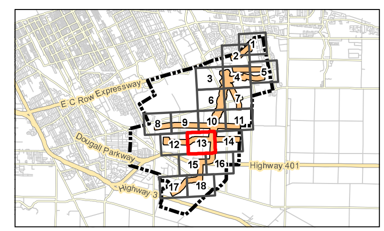

Project Location
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4m

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 13

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Protected and Previously Identified Heritage Resources
- Potential Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes

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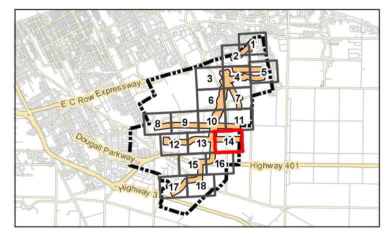

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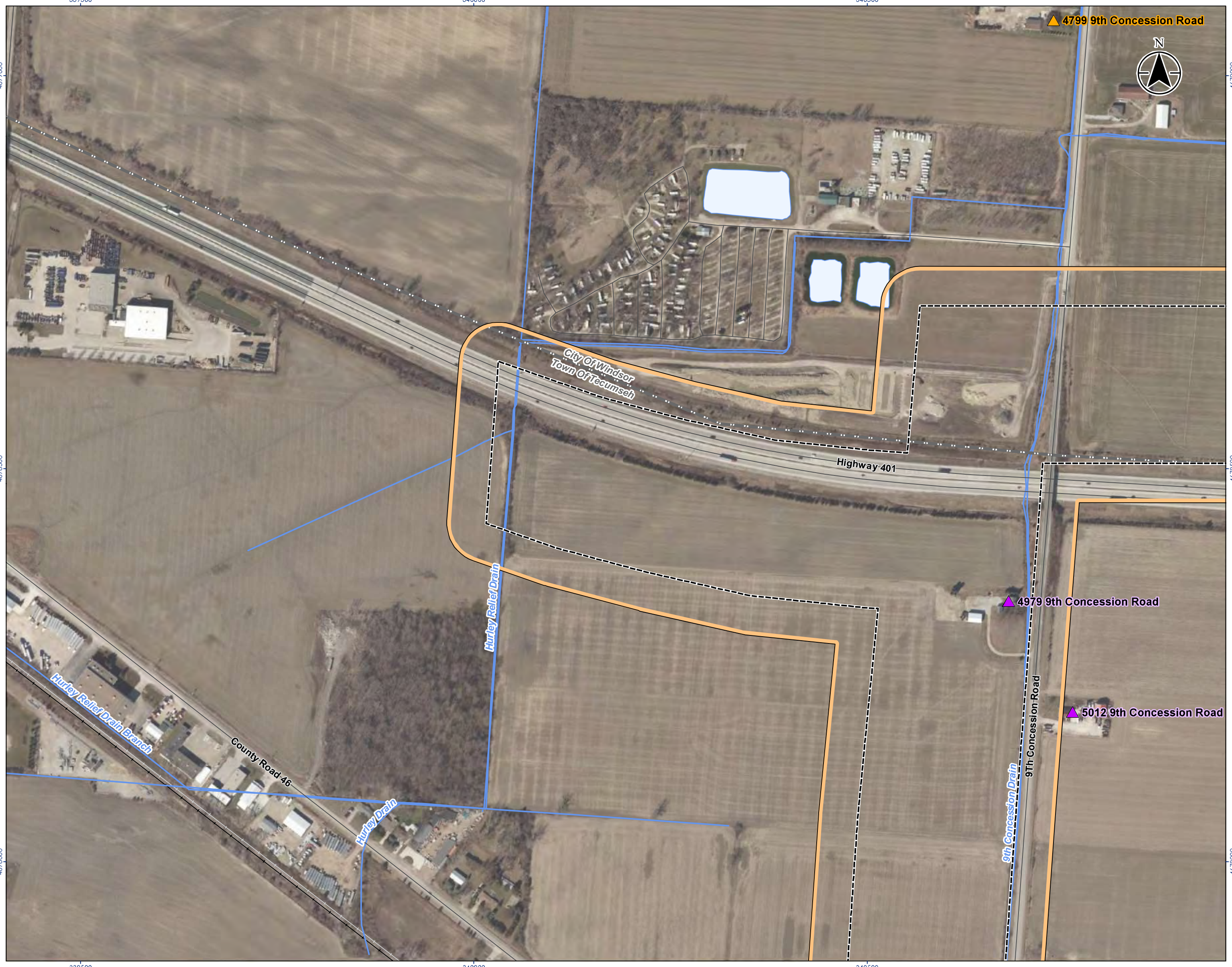
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4n

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 14



Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Protected and Previously Identified Heritage Resources
Potential Heritage Resource
Railway - Operational
Railway - Discontinued
Road
Watercourse
Waterbody
Municipal Boundary - Lower Tier

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes

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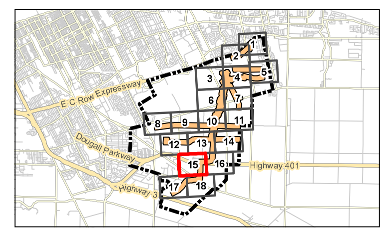

Project Location
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4o

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 15

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

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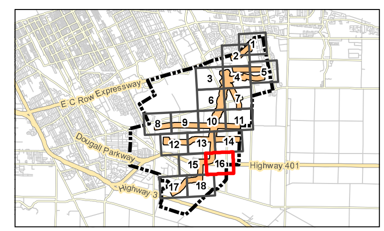

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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4p

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 16

Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Potential Heritage Resource
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

Notes
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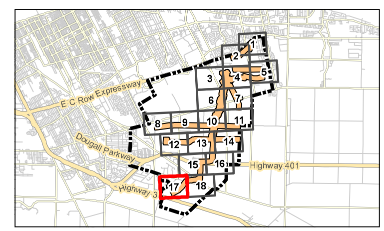

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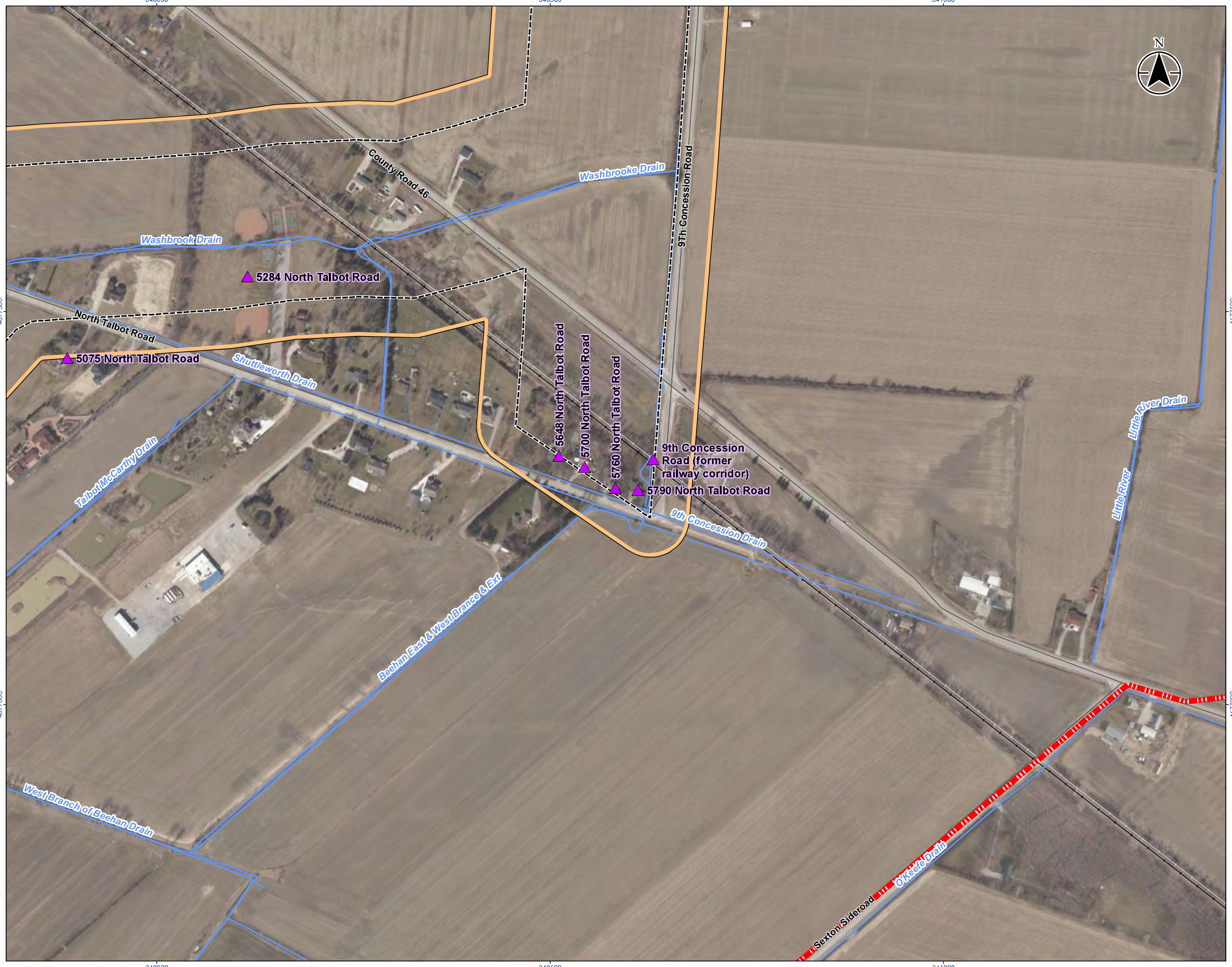
Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4q

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 17



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Potential Heritage Resource
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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Notes

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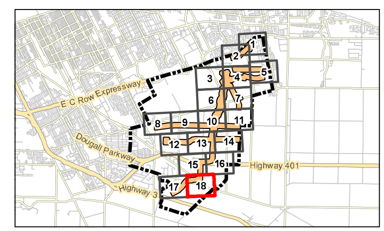

Project Location
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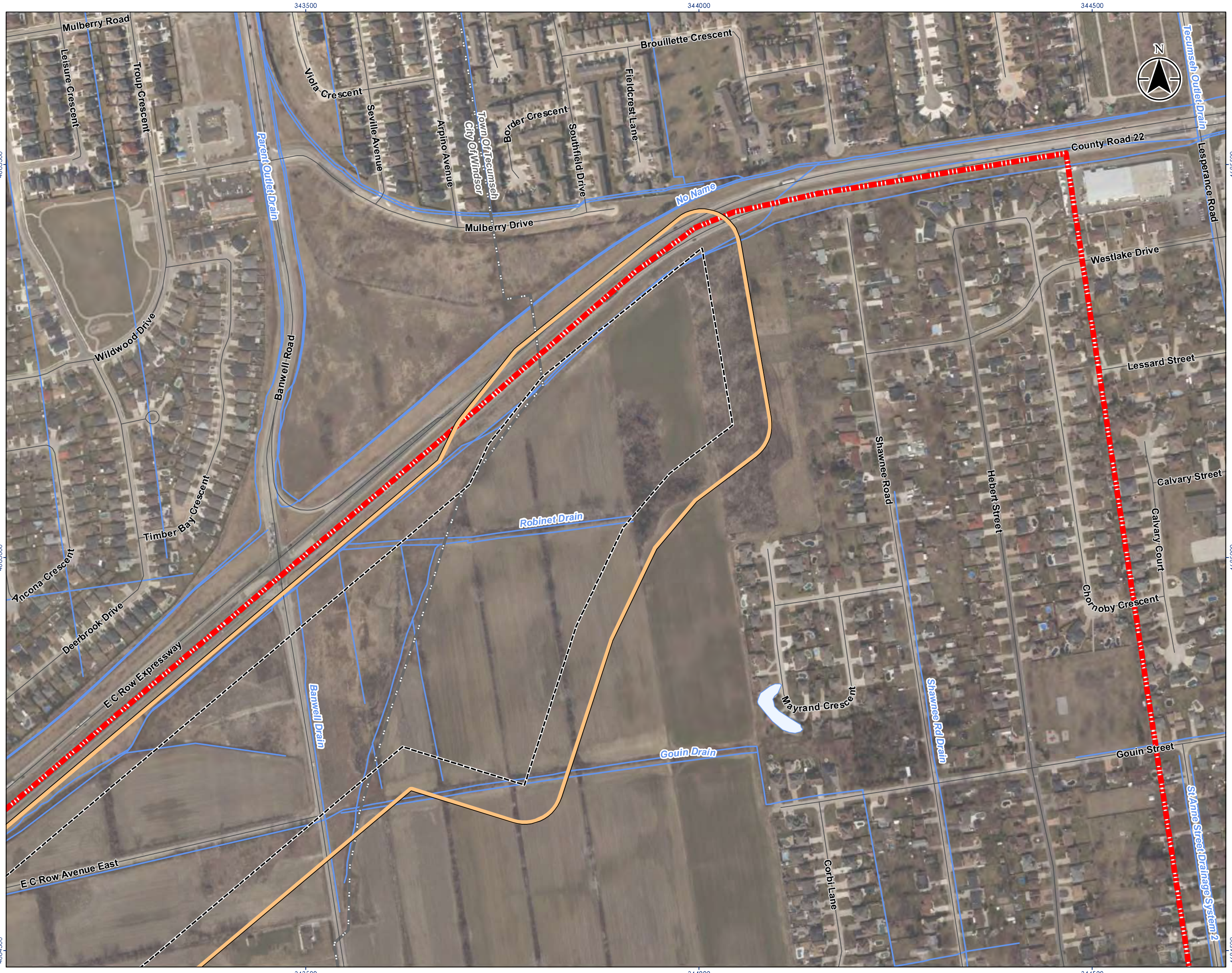
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
4r

Title
Potential and Previously Identified Cultural Heritage Resources - Tile 18



- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

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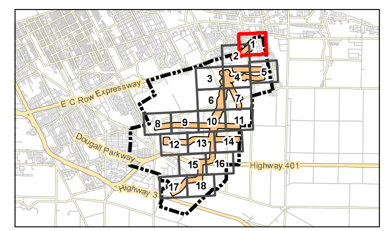

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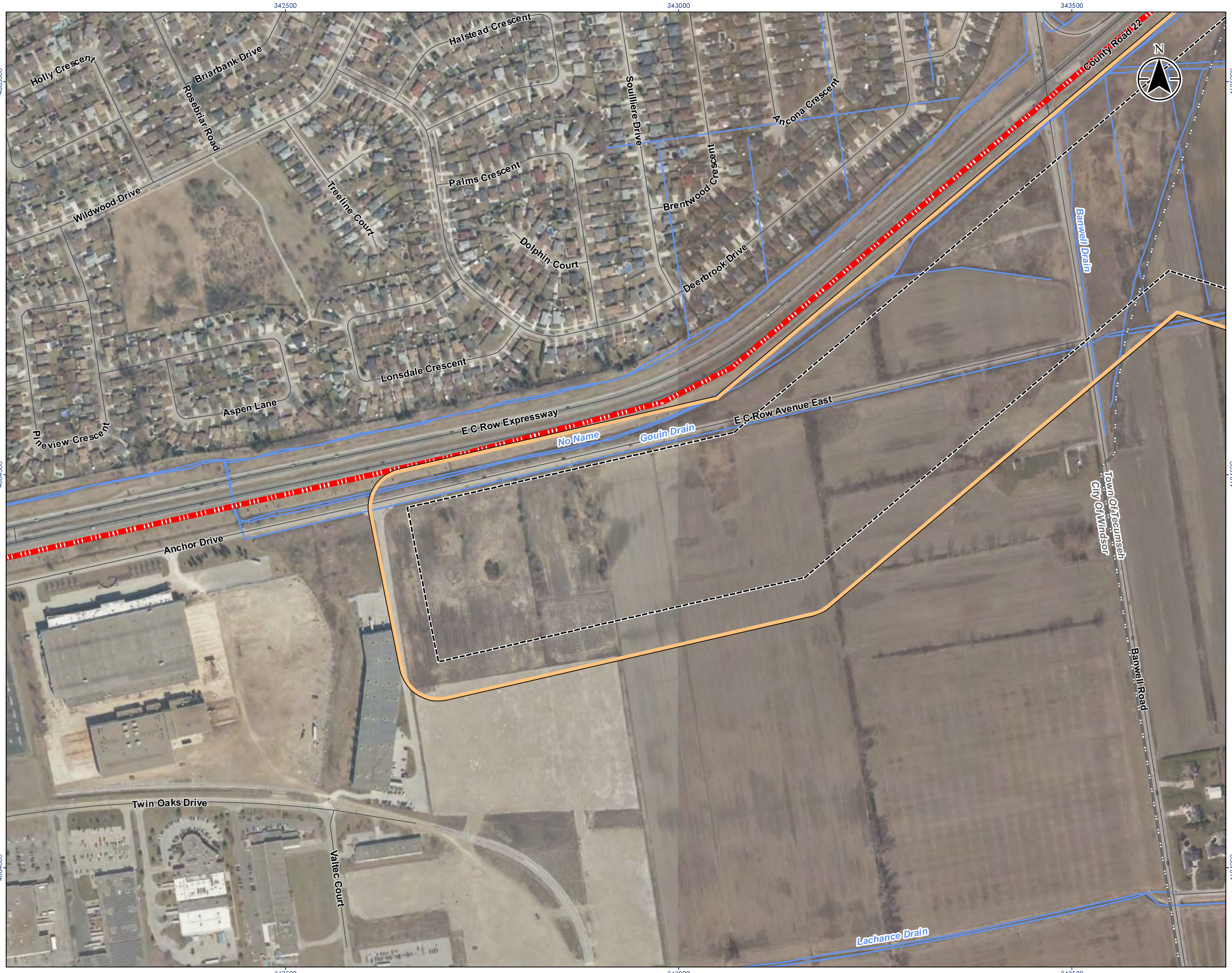
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5a

Title
Identified Cultural Heritage Resources - Tile 1



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters
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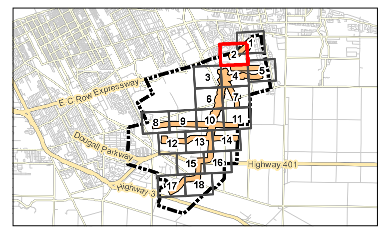

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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5b

Title
Identified Cultural Heritage Resources - Tile 2

![Stantec]

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Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Railway - Operational
Road
Watercourse
Waterbody
Municipal Boundary - Lower Tier

0 100 200 Meters

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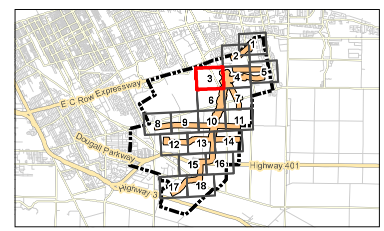

Project Location
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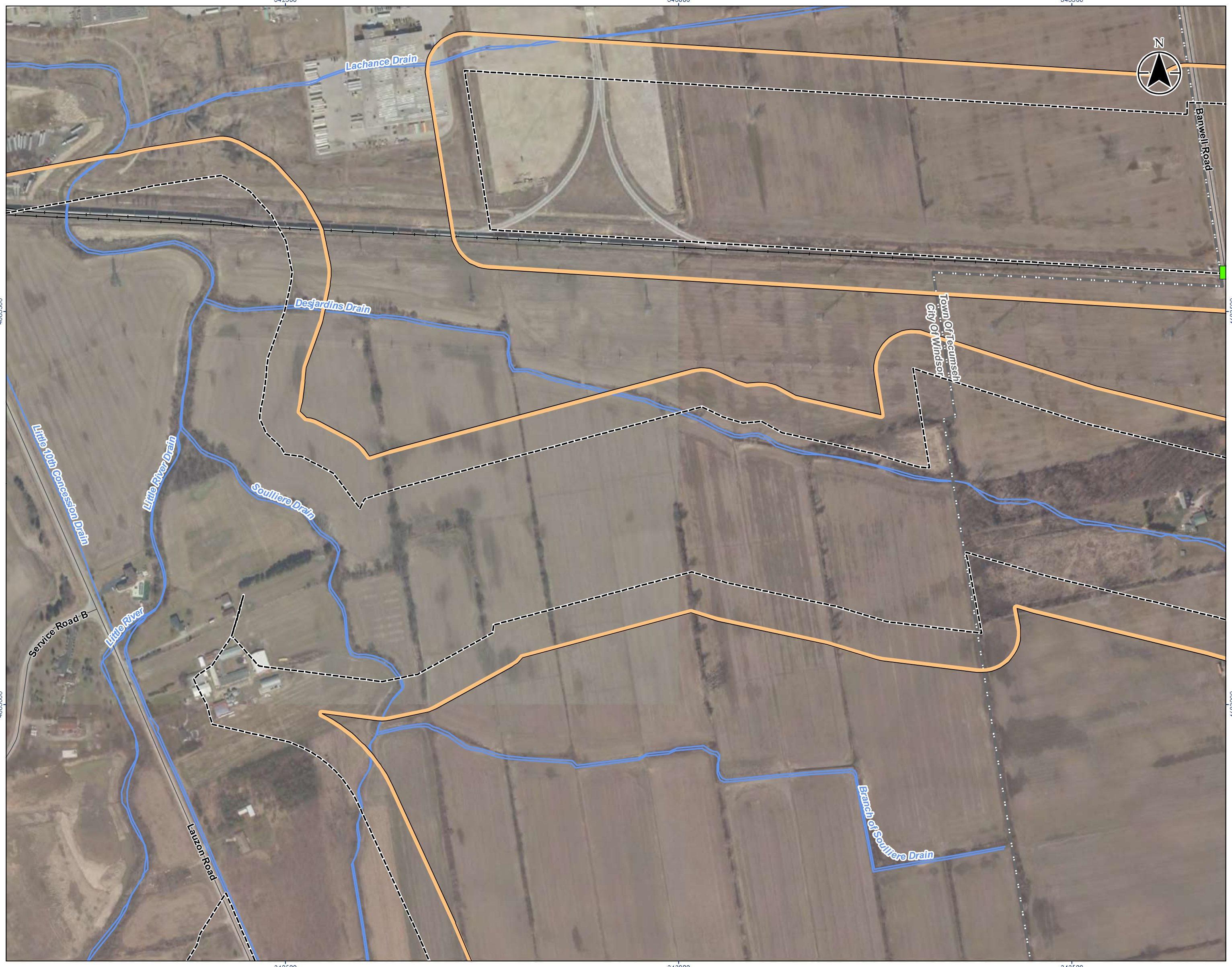
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5c

Title
Identified Cultural Heritage Resources - Tile 3



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes

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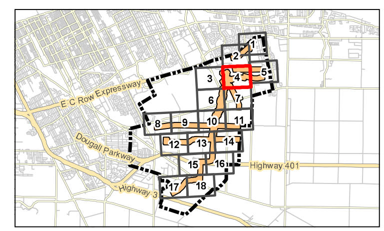

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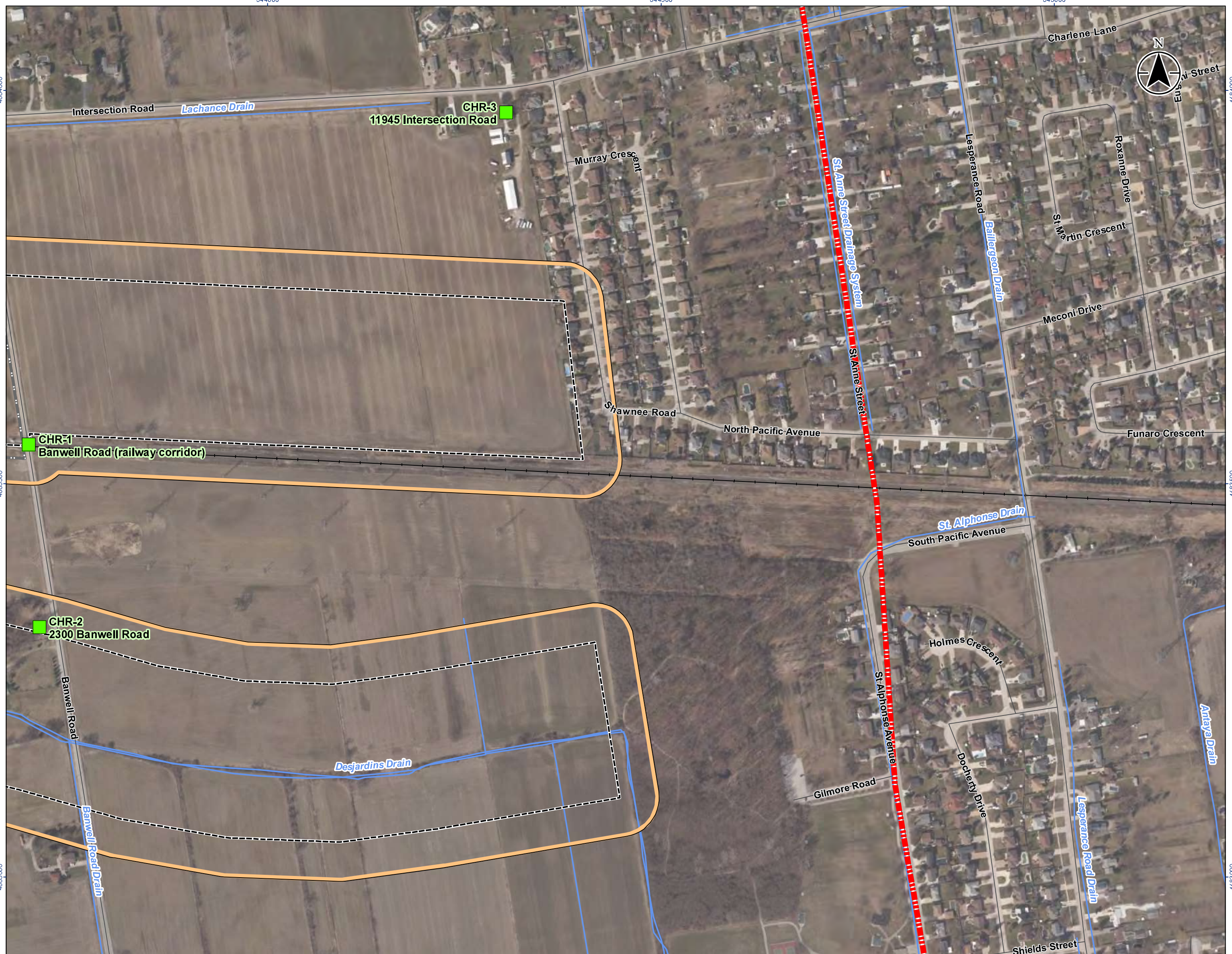
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5d

Title
Identified Cultural Heritage Resources - Tile 4



Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Identified Cultural Heritage Resource
Railway - Operational
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
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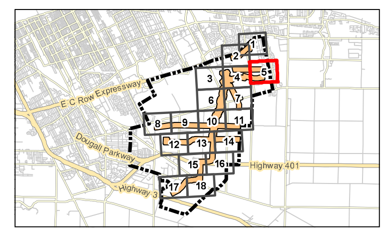

Project Location
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CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5e

Title
Identified Cultural Heritage Resources - Tile 5

Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
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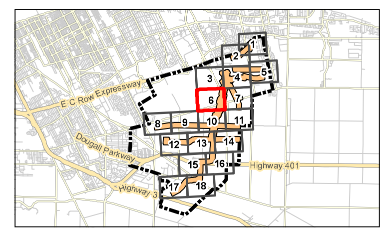

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UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5f

Title
Identified Cultural Heritage Resources - Tile 6

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Identified Cultural Heritage Resource
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
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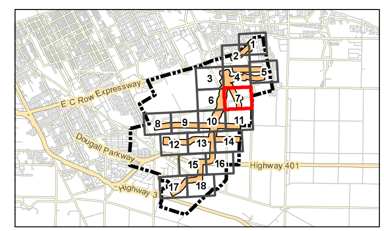

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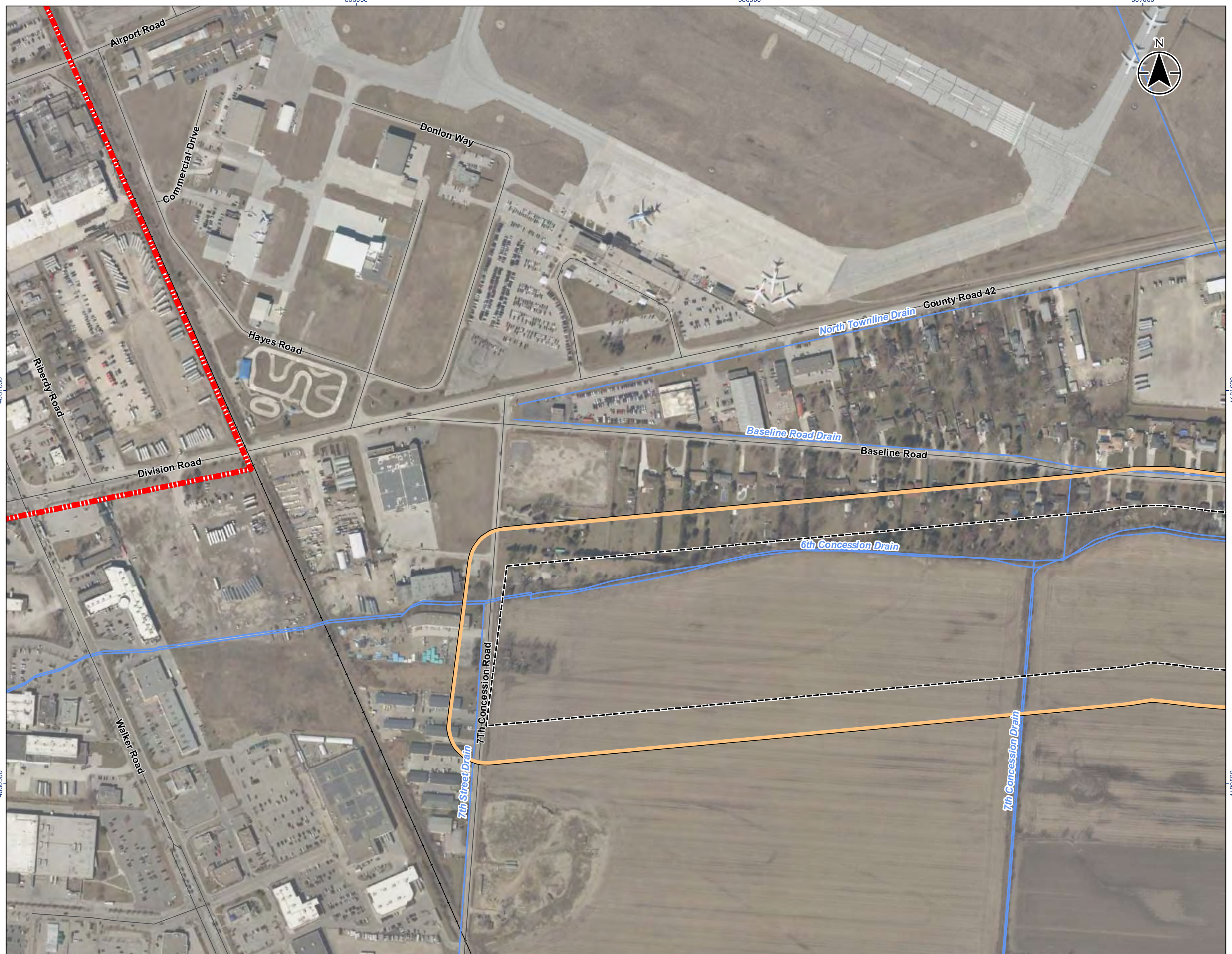
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5g

Title
Identified Cultural Heritage Resources - Tile 7



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Railway - Operational
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters
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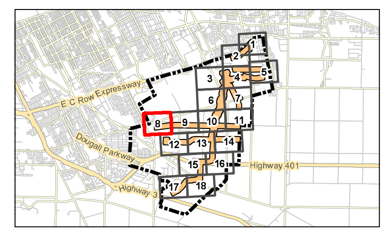

Project Location
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5h

Title
Identified Cultural Heritage Resources - Tile 8

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Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

1:5,000 (At original document size of 11x17)

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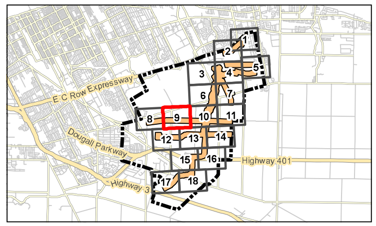

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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5i

Title
Identified Cultural Heritage Resources - Tile 9

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

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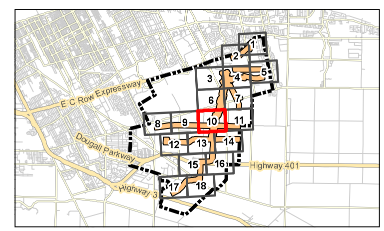

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Technical Review by ABC on xxxx-xx-xx

Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5j

Title
Identified Cultural Heritage Resources - Tile 10

Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Identified Cultural Heritage Resource
Road
Watercourse
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

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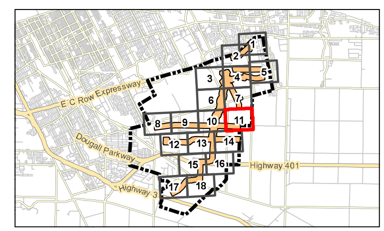

Project Location
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5k

Title
Identified Cultural Heritage Resources - Tile 11

Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Road
Watercourse
Waterbody
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

Notes
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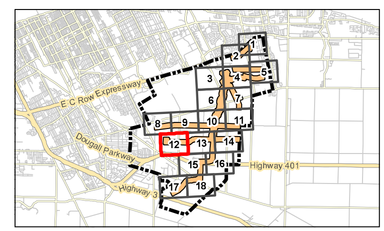

Project Location
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5l

Title
Identified Cultural Heritage Resources - Tile 12

Stantec

Cultural Heritage Study Area
Upper Little River Study Area
SWM Corridor Boundary
Identified Cultural Heritage Resource
Road
Watercourse
Waterbody
Municipal Boundary - Lower Tier

0 100 200 Meters
1:5,000 (At original document size of 11x17)

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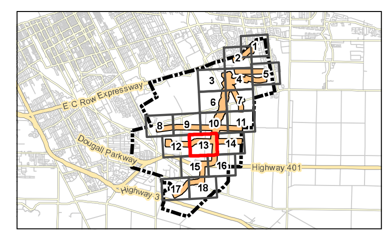

Project Location
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5m

Title
Identified Cultural Heritage Resources - Tile 13

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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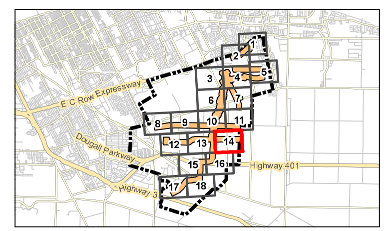

Project Location
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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5n

Title
Identified Cultural Heritage Resources - Tile 14

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

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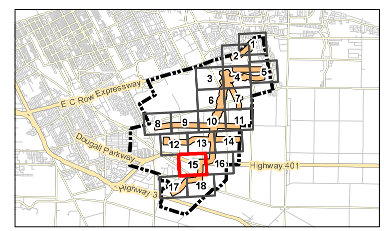

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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5o

Title
Identified Cultural Heritage Resources - Tile 15

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Waterbody
- Municipal Boundary - Lower Tier

0 100 200 Meters

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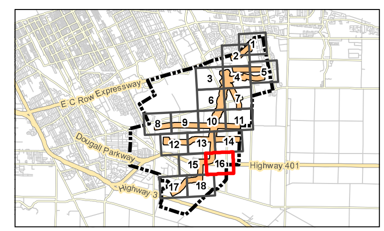

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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5p

Title
Identified Cultural Heritage Resources - Tile 16

Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters

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Notes

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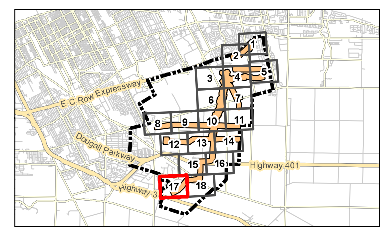

Project Location
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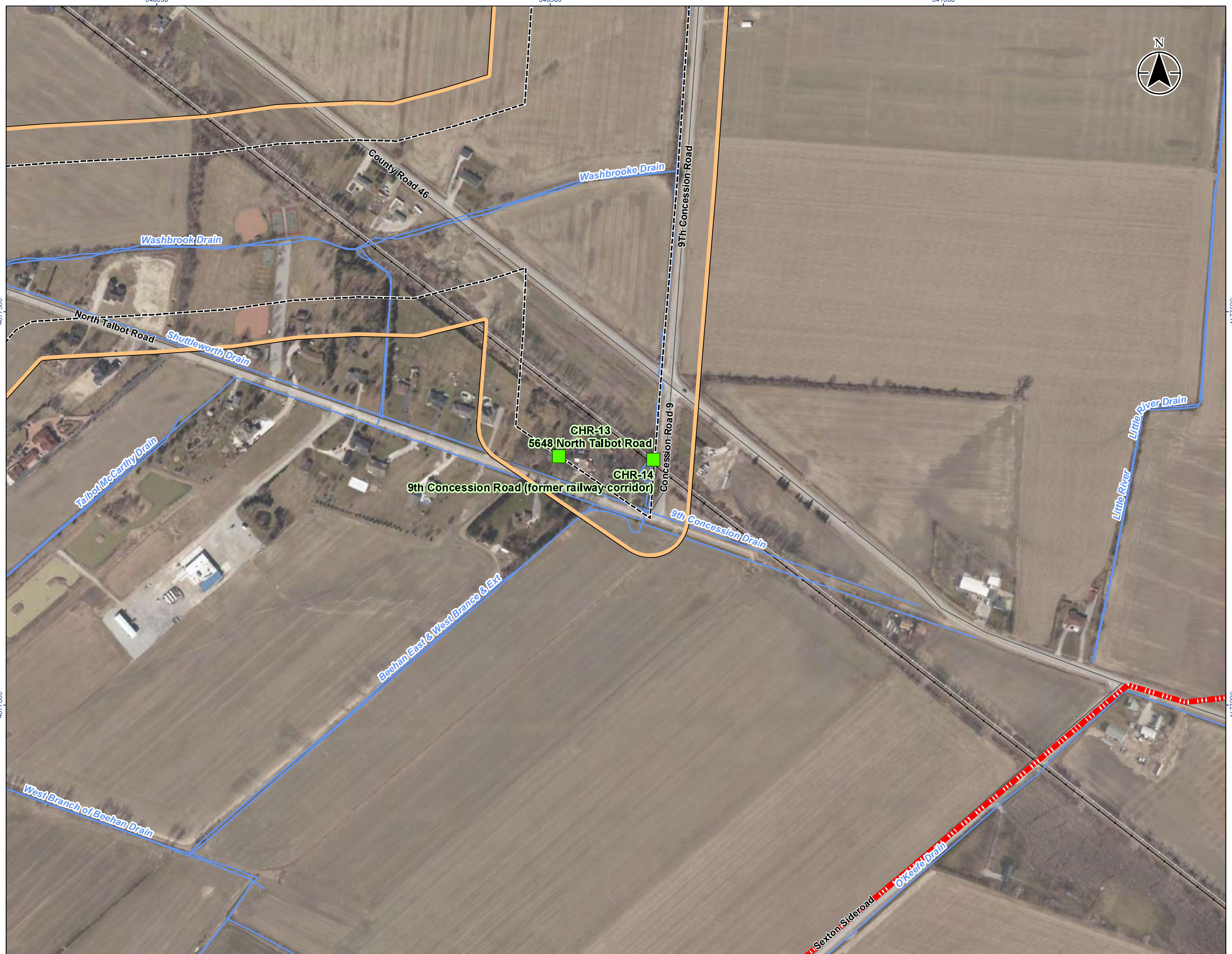
Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5q

Title
Identified Cultural Heritage Resources - Tile 17



Stantec

- Cultural Heritage Study Area
- Upper Little River Study Area
- SWM Corridor Boundary
- Identified Cultural Heritage Resource
- Railway - Operational
- Railway - Discontinued
- Road
- Watercourse
- Municipal Boundary - Lower Tier

0 100 200 Meters
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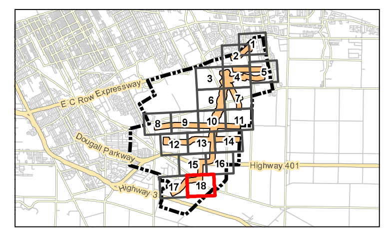

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Client/Project
CITY OF WINDSOR
UPPER LITTLE RIVER
CULTURAL HERITAGE RESOURCES ASSESSMENT

Figure No.
5r

Title
Identified Cultural Heritage Resources - Tile 18

5.0 PROPOSED UNDERTAKING

5.1 DESCRIPTION OF UNDERTAKING

The Upper Little River Watershed EA has been prepared to determine a preferred approach to providing SWM control measures for the developing lands upstream of the E.C. Row Expressway and contributing to Upper Little River. A Master Plan Approach 2 approach was completed for this EA study. This approach identified the problem (Phase 1), developed six alternative solutions (Phase 2), developed a design concept for a portion of the Study Area (Phase 3), and documented the process in the Environmental Study Report (Phase 4) (Stantec 2021). No Phase 5, Implementation, was completed as part of this Master Plan Approach 2.

The Environmental Study Report selected Alternative 6 as the preliminary preferred alternative as it provides all stormwater management controls before out-letting to the downstream watercourses. Each facility would be required to provide water quality, water quantity, and erosion controls on a standalone basis. In this alternative the SWM facilities are grouped into stormwater management corridors to promote natural linkages, recreational trails, and greenways. The SWM facilities can provide controls for more than one property and will be located adjacent to other facilities and a watercourse. It is anticipated that facilities would be designed and constructed as development proceeds. The Study Area for the SWM will be developed by multiple landowners and the preferred alternative supports the ability of individual landowners to proceed independently while minimizing the total number of SWM facilities.

The stormwater areas are proposed to be congregated into stormwater management corridors which can be combined with trail systems and amenity areas for the surrounding developments. The stormwater management corridor will be located beside watercourses which will accept drainage from the end-of-pipe facilities. Heavy vegetation adjacent to all water bodies and minimal open water will also be implemented in order to make water features less attractive to bird species, a specific request from the Windsor Airport. As part of this work, several of the existing municipal drains are proposed to be abandoned and several new channels will be created that align with the proposed development plan for the area. In addition, the work will include re-grading the stream channel banks to create benches or terraces, which will help dissipate energy and re-connect the bankfull channel to a floodplain area (Stantec 2021).

6.0 EVALUATION OF ANTICIPATED IMPACTS AND MITIGATION OPTIONS

The Upper Little River EA includes conceptual designs of the preferred alternative only for a section of the Study Area (Appendix B). Accordingly, an impact assessment cannot be completed since the relationship of Project Activities to identified CHRs is not known. Thus, general mitigation options have been prepared for future cultural heritage guidance in the Study Area including more detailed EAs and planning processes. The mitigation options were developed in accordance with the MHSTCI *InfoSheet #5: Heritage Impact Assessments and Conservation Plans from the Heritage Resources in the Land Use Planning Process Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (Government of Ontario 2006b). It is recommended that buffer zones, site plan controls, and other planning mechanisms be used as mitigation measures.

In general, for the Project, the following will need to be taken into account for each CHR to eliminate any potential impacts:

- The full design of Alternative 6 should be suitably planned in a manner that avoids any identified CHRs.
- All staging and construction activities should be planned and undertaken to avoid impacts to an identified CHR.
- Site plan controls should be put in place prior to construction to prevent potential Project impacts. Site plan controls include mapping CHRs on construction mapping and physically demarcating these properties to communicate the presence of these properties to construction crews. Physical protective measures should include at minimum the installation of temporary fencing around CHRs.
- If Project work is to occur within 50 metres of identified CHRs, it is recommended that a qualified building condition specialist or geotechnical engineer with previous experience working with heritage structures be consulted to identify appropriate vibration mitigation measures in advance of construction. Mitigation measures for vibration may include developing an appropriate vibration setback distance, a vibration attenuation study, and/or a construction monitoring program.
- Post-construction landscaping and rehabilitation plans should be undertaken in a manner that is sympathetic to the overall setting.

7.0 RECOMMENDATIONS

7.1 AVOIDANCE OF CULTURAL HERITAGE RESOURCES

The full design of Alternative 6 should be suitably planned in a manner that avoids any identified CHRs. Project components should be planned and undertaken in a manner to avoid the built heritage and cultural heritage landscape attributes of the identified CHRs.

7.2 SITE PLAN CONTROLS

It is recommended that site plan controls be put in place prior to construction activities to prevent potential impacts as a result of the Project. These controls should be indicated on all construction mapping and communicated to the construction team leads.

Site plan controls should include mapping CHRs within 50 metres of Project activities on construction maps and physically demarcating these properties to communicate the presence of these properties to construction crews. Physical protective measures should include at a minimum the installation of temporary fencing around CHRs. Depending on the proximity or Project activities, additional measures may be required such as stabilization of built heritage attributes in close proximity to construction work.

7.3 CONDITION SURVEYS AND VIBRATION MONITORING

If Project work is to occur within 50 metres of CHRs, it is recommended that a qualified building conditions specialist or geotechnical engineer with previous experience working with heritage structures be consulted to identify appropriate vibration mitigation measures in advance of construction. Mitigation measures for vibration may include developing an appropriate vibration setback distance, a vibration attenuation study, and/or a construction monitoring program.

7.4 DEPOSIT COPIES

To assist in the retention of historic information, copies of this report should be deposited with local repositories of historic material as well as with municipal and regional planning staff. Therefore, it is recommended that this report be deposited at the following locations:

City of Windsor Library
850 Ouellette Avenue
Windsor, ON
N9A 4M9

Essex County Library, Tecumseh Branch
13675 St. Gregory's Road
Windsor, ON
N8N 3E4

City of Windsor Heritage Committee
Suite 404, 400 City Hall Square East
Windsor, ON
N9A 7K6

Town of Tecumseh Municipal Heritage Committee
917 Lesperance Road
Tecumseh, ON
N8N 1W9

8.0 CLOSURE

This report has been prepared for the sole benefit of Essex Region Conservation Authority, City of Windsor and Town of Tecumseh and may not be used by any third party without the express written consent of Stantec Consulting Ltd. Any use which a third party makes of this report is the responsibility of such third party.

We trust this report meets your current requirements. Please do not hesitate to contact us should you require further information or have additional questions about any facet of this report.

Yours truly,

STANTEC CONSULTING LTD.

Laura Walter
Digitally signed by Walter, Laura
Date: 2021.06.25 09:36:15 -04'00'

Laura Walter, MA, CAHP
Cultural Heritage Specialist
Tel: (705) 427-6044
Fax: (226) 268-5392
laura.walter@stantec.com

Tracie Carmichael

Tracie Carmichael, BA, B.Ed.
Managing Principal
Tel: (226) 927-3586
Fax: (519) 645-6575
tracie.carmichael@stantec.com

9.0 SOURCES

Andreae, Christopher. 1997. *Lines of Country: An Atlas of Railway and Waterway History in Canada*. Erin: The Boston Mill Press.

Archaeological Services Inc. 2008. *Detroit River International Crossing Study: Draft Cultural Heritage Resource Assessment*. Electronic document: http://www.partnershipborderstudy.com/pdf/CulturalHeritage/WEB_PracticalAltsWP_CulturalHeritage_April2008-appsonly.pdf. Last accessed: April 16, 2018.

Belden, H. & Co. 1881. *Illustrated Historical Atlas of the Counites of Essex and Kent, 1880-1881*. Toronto: H. Belden & Co.

Bevers, Cameron. 2020. *The King's Highway 3.* Electronic Document: http://www.thekingshighway.ca/Highway3.htm. Last accessed: April 16, 2018.

Burr, Christina. 2014. *Canada's Victorian Oil Town: The Transformation of Petrolia from a Resource Town into a Victorian Community.* Montreal: McGill-Queen's University Press.

Chapman, Lyman John and Donald F. Putnam. 1984. *The Physiography of Southern Ontario*. Third edition. Ontario Geological Survey Special Volume 2. Toronto: Ontario Ministry of Natural Resources.

City of Windsor. 2021a. *History of Sandwich.* Electronic Document: https://www.citywindsor.ca/residents/historyofwindsor/history-of-sandwich/Pages/default.aspx. Last accessed: April 16, 2018.

City of Windsor. 2021b. *Land Use History.* Electronic Document: https://www.citywindsor.ca/residents/planning/Plans-and-Community-Information/About-Windsor/Pages/Land-Use-History.aspx Last accessed: April 16, 2018.

City of Windsor. 2021c. *History of Windsor*. Electronic Document: https://www.citywindsor.ca/residents/historyofwindsor/pages/default.aspx. Last accessed: June 23, 2021.

Clarke, John. 2001. *Land, Power, and Economics on the Frontier of Upper Canada.* Montreal: McGill-Queen's University Press.

Corporation of the County of Essex. 1992. *Essex County, Then and Now.* Essex: Corporation of the County of Essex.

County of Essex. 2019. *Early Municipal History.* Electronic Document: https://www.countyofessex.ca/en/discover-the-county/early-settlement-history.aspx. Last accessed: April 16, 2018.

Dean, W.G. 1969. *Economic Atlas of Ontario.* Toronto: University of Toronto Press.

Government of Ontario. 2006a. *Ontario Regulation 9/06, Criteria for Determining Cultural Heritage Value or Interest, Under the Ontario Heritage Act*. Electronic Document: https://www.ontario.ca/laws/regulation/060009. Last accessed: April 16, 2018.

Government of Ontario. 2006b. *InfoSheet #5 in Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005*. Ministry of Heritage, Sport, Tourism and Culture Industries. Toronto: Queen's Printer for Ontario.

Government of Ontario. 2020. *Provincial Policy Statement*. Electronic Document: https://files.ontario.ca/mmah-provincial-policy-statement-2020-accessible-final-en-2020-02-14.pdf. Last accessed: June 21, 2021.

McPhillips, G. 1898. *Plan of the Township of Sandwich – West, East and South of the Towns of Walkerville and Sandwich and the City of Windsor.* Electronic Document. http://data2.archives.ca/nmc/n0011345_a2.pdf. Last accessed: April 16, 2018.

Municipal Engineers Association. 2015. *Municipal Class Environmental Assessment*. Electronic Document: http://www.municipalclassea.ca/manual/page1.html. Last accessed: April 16, 2018.

Neal, F. 1909. *The Township of Sandwich (Past and Present): An Interesting History of the Canadian Frontier Along the Detroit River, Including the Territory Which Now Embrace the Present City of Windsor, the Towns of Sandwich and Walkerville and the Sandwich Townships, and Also a Brief Account of the Present County of Essex.* Sandwich: Frederick Neal.

Oiamo, Tor H., Don Lafreniere, and Joy Parr. 2016. "The Windsor-Detroit Borderland: The Making of a Key North American Environment of Mobility." In *Moving Natures: Mobility and the Environment in Canadian History*, edited by Ben Bradley, Jay Young, and Colin M. Coates, pp. 175-198. Calgary: University of Calgary Press.

Smith, William Henry. 1846. *Smith's Canadian Gazetteer*. Toronto: H. & W. Rowsell.

Stantec Consulting Ltd. 2021. *Upper Little River Watershed Master Drainage and Stormwater Management Plan Environmental Assessment, Environmental Study Report, Windsor and Tecumseh, Ontario.* Report on file with Stantec Consulting Ltd.

Statistics Canada. 2017. *Tecumseh, T, Ontario and Ontario. Census Profile. 2016 Census.* Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. Electronic Document: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=3537048&Geo2=PR&Code2=35&SearchText=Tecumseh&SearchType=Begins&SearchPR=01&B1=All&GeoLevel=PR&GeoCode=3537048&TABID=1&type=0. Last accessed: April 16, 2018.

Sutherland & Co. 1866. *County of Essex Gazetteer and General Business Directory*. Woodstock: Sutherland & Co.

Town of Tecumseh. 2019. *History*. Electronic Document: https://www.tecumseh.ca/en/things-to-do/history-of-tecumseh.aspx. Last accessed: April 16, 2018.

Weeks, Elaine. 2015. *Walkerville Times*. Electronic Document: http://www.walkervilletimes.com/37/windsor-airport.html. Last accessed: April 16, 2018.

APPENDIX A
Inventory of Heritage Resources

Municipal Address: 1667 Shawnee Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage. The one storey structure has a low-pitched hip roof with asphalt shingles and a brick chimney. The residence is clad in vinyl siding and has 1/1 windows and a flat fixed wood window. The front entrance has a partial wood porch. The structure has a concrete foundation.

The residence sits on a large lot and has a mature maple tree on its front yard.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3780 Lauzon Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Farmstead

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and several outbuildings. The residence is a one storey structure with a high-pitched side gable roof with asphalt shingles. The structure has a brick exterior with modern windows. The entrance has a partial brick and concrete porch. The residence has a concrete foundation.

Situated to the rear of the residence is farm associated outbuildings and four silos. The majority of the outbuildings are gable roof structures.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 5, 2018.

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Municipal Address: 3805 Lauzon Road

Former Township or County: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1932-1940

Relationship to Project: Within the Study Area

Description: The property contains a laneway and a residence. The one storey structure has a high-pitched hip roof with asphalt shingles, and a central chimney. The exterior is clad in vinyl siding and has modern windows. The structure has a salt box side, and an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

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Municipal Address: Banwell Road

Former Township: Township of Sandwich

Municipality: City of Windsor/Town of Tecumseh

Resource Type: Railway Line

Associated Dates: 1853

Relationship to Project: Within the Study Area

Description: The property contains the former Great Western Railway Line, now part of the Canadian National (CN) Railway.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. **The property has design value or physical value because it,**	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. **The property has historical value or associative value because it,**		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. **The property has contextual value because it,**		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: This railway corridor is associated with the Great Western Railway Line that was constructed through the Township of Sandwich in 1853. The railway line operated between Windsor and Niagara Falls. The line was taken over by the Grand Trunk Railway in 1882, and the CN Railway in 1923. The railway line had a large influence on industrial development in Windsor and Tecumseh, and thus is physically and historically linked to its surroundings.

Identified Heritage Attributes: Railway line: Layout of the railway line.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-1
Completed by (name): Laura Walter	**Date Completed:** September 14, 2017.

Municipal Address: 2300 Banwell Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Cemetery

Associated Dates: *circa* 1850

Relationship to Project: Within the Study Area

Description: The property contains the Banwell Road Black Cemetery. The cemetery has six grave markers that date to the early 20th century. The cemetery contains the graves of early black settlers to the Township of Sandwich, including those associated with the Underground Railroad. The property has a provincial plaque that marks the significance of The Banwell Road Area Black Settlement.

The property is designated under Part IV of the *Ontario Heritage Act* by the Town of Tecumseh.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: This cemetery dates to the mid-19th century and is associated with the early black settlers in the Township of Sandwich. Beginning in the 1830s, at least 30 families fleeing enslavement and racial oppression in the United States settled in the Banwell Road area in the Township of Sandwich.

Identified Heritage Attributes: Cemetery: Grave markers, provincial plaque, and mature deciduous tree.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-2
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 11945 Intersection Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Farmstead

Associated Dates: 1882-1912

Relationship to Project: Within the Study Area

Description: The property contains a residence, a barn, and three outbuildings.

The residence is a two storey structure with a high-pitched hip roof with asphalt shingles and a brick chimney. The front (north) elevation has a central hip dormer. The structure has a symmetrical red brick exterior. The front elevation has a covered full width porch that is clad in stone and has brick piers. The upper exterior has 3/1 wood windows. The residence has a stone foundation.

At the rear of the residence is a timber frame barn with a side gable roof that is clad in metal. The property has a tree-lined laneway, and mature maple and white pine trees.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this two storey residence dates to between approximately 1882 and 1912, determined through historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse with Edwardian design influences. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: Two storey structure, high-pitched hip roof, brick chimney, hip dormer, symmetrical exterior, red brick exterior, covered full width porch, 3/1 wood windows, and stone foundation. Barn: Timber frame structure and side gable roof. Landscape: Tree-lined laneway, mature maple and white pines.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-3

Completed by (name): Laura Walter	Date Completed: May 7, 2018.

Municipal Address: 3945 Lauzon Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached modern garage.

The residence is a one storey structure with a low-pitched hip roof with asphalt shingles. The structure has an asymmetrical exterior with vinyl cladding. The residence has modern windows and doors, and a concrete foundation. The property has a mature maple tree.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 7816 County Road 42

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles. The asymmetrical exterior is clad in vinyl siding and brick. The residence has modern windows and doors, and an attached single-car garage. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

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Municipal Address: 7955 County Road 42

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961 (residence), 1975-2004 (temple)

Relationship to Project: Within the Study Area

Description: The property contains the Gurdwara Khalsa Parkash Windsor a modern temple, as well as a separate residence, and detached garage. The property is bordered with a large concrete and metal fence.

The temple is a large three-storey massing with a flat roof. The structure has six corner towers, and one central larger tower. Each tower is top with a dome that is painted white and top with a finial. The central dome has gold paint embellishments. The concrete structure has rectangular window openings. The north and west elevations have covered carports.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The exterior is clad in vinyl siding. The front entrance has a partial porch and a wood paneled door. The residence appears abandoned as it is boarded up.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.	✓	

Draft Statement of Cultural Heritage Value or Interest: This late 20th to early 21st century structure is associated with the Sikh community in Windsor and has the potential to yield information that contributes to an understanding of the community's development in the City. This property acts as a landmark along County Road 42, and in the local area.

Identified Heritage Attributes: Associative: Connection to the Sikh community in Windsor and the local area, potential to yield information about the Sikh community and their influence on Windsor. Contextual: Guardwara Khalsa Parkash Windsor temple which acts as a landmark along County Road 42.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-4
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 8421 County Road 42

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence/Commercial

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence that is situated on a commercial property, "Frank Dupuis Landscaping & Trucking Ltd." The residence is possibly used as commercial offices. The property contains modern outbuildings associated with the commercial business.

The residence is a one and a half storey structure with a medium-pitched side gable roof that has asphalt shingles and a concrete block chimney. The front (north) elevation has a shed dormer. The structure is clad in brick and has modern windows. The front elevation has a partial brick and concrete porch with metal railing. The structure has a concrete block foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

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Municipal Address: 8667 County Road 42

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence, and mature spruce and maple trees.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles. The exterior is clad in brick and has modern windows and doors. The front (north) entrance has a partial concrete porch clad in brick. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 9244 County Road 42

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1932-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence. The property is bordered by a wood fence.

The residence is a one and a half storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The front (south) elevation has a hip dormer. The structure is clad in vinyl siding and has modern windows and doors. The structure has a concrete block foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.
Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4120 7th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and outbuilding. The property has mature deciduous and coniferous trees.

The residence is a one and a half storey structure and has a medium-pitched gambrel roof with a brick chimney. The north and south roof elevations have large shed dormers. The exterior is clad in vinyl siding and has modern windows. The entrance has a covered partial porch with concrete steps and brick piers. The structure has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

4. The property has design value or physical value because it,	**Yes**	**No**
iv. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
v. Displays a high degree of craftsmanship or artistic merit, or		✓
vi. Demonstrates a high degree of technical or scientific achievement.		✓
5. The property has historical value or associative value because it,		
iv. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
v. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
vi. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
6. The property has contextual value because it,		
iv. Is important in defining, maintaining or supporting the character of an area,		✓
v. Is physically, functionally, visually or historically linked to its surroundings, or		✓
vi. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4178 7th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a laneway and residence.

The residence is a one storey structure with a high-pitched side gable roof with asphalt shingles and a brick chimney. The exterior is clad in stone and has modern windows. The structure has a projecting entrance with a partial concrete porch that is clad in stone and has a metal railing. The foundation is undetermined.

The residence is situated behind a cedar hedge and the property has mature deciduous trees.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4140 7th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and three outbuildings.

The residence is one storey structure with a low-pitched hip roof with asphalt shingles. The exterior is clad in vinyl siding and has modern windows and doors. The structure appears to have a north addition. The residence has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

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Municipal Address: 3255 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one and a half storey structure with a low-pitched side gable roof. The structure is clad in brick and has modern windows and doors. The residence has a single-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3225 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one and a half storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The split-level residence has a single-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. **The property has design value or physical value because it,**	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. **The property has historical value or associative value because it,**		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. **The property has contextual value because it,**		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3325 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one and a half storey structure with a low-pitched hip roof with asphalt shingles. The structure is clad in brick and vinyl siding and has modern windows and doors. The split-level residence has a single-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3277 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one and a half storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The split-level residence has a double-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3355 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one and a half storey structure with a low-pitched cross gable roof with asphalt shingles. The structure is clad in brick and has modern windows and doors. The split-level residence has a double-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3415 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in stone and has modern windows and doors. The residence has an attached double-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
iv. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
i. Displays a high degree of craftsmanship or artistic merit, or		✓
ii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3465 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a covered partial porch and a single-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3483 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage. The view of the residence is obstructed by vegetation.

The residence is a two storey structure with a low-pitched side gable roof. The front (north) elevation has a shed dormer. The structure is clad in vinyl siding and brick and has modern windows and doors. The front elevation has a partial porch clad in brick with a metal railing. The structure has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3567 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1961-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage.

The residence is s a one storey structure with a medium-pitched hip roof with asphalt shingles and a chimney. The structure is clad in vinyl siding and has modern windows and doors. The residence has a covered partial concrete porch and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3605 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is s a one storey structure with a low-pitched hip roof with asphalt shingles. The structure is clad in brick and has modern windows and doors. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3635 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1961-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage.

The residence is a one and a half storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in vinyl siding and has modern windows and doors. The front (north) elevation has a central projecting bay, and a covered partial porch. The side (west) elevation has a projecting entrance.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3665 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a low-pitched side gable roof with asphalt shingles. The structure is clad in brick and has modern windows and doors. The residence has an attached double-car garage. The structure has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. **The property has design value or physical value because it,**	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. **The property has historical value or associative value because it,**		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. **The property has contextual value because it,**		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3685 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a low-pitched front facing gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has a double-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3745 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is s a one storey structure with a low-pitched side gable roof with asphalt shingles and a concrete chimney. The structure is clad in vinyl siding and has modern windows and doors. The residence has a partial concrete porch and an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3765 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a low-pitched side gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The front (north) elevation has a covered partial wood porch. The structure has an attached single-car garage and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3825 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a medium-pitched cross gable roof with asphalt shingles. The structure is clad in brick and stone and has modern windows and doors. The front (north) elevation has a modern addition that has a covered partial concrete entry porch. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3915 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.

The residence is s a one storey structure with a medium-pitched cross gable roof with asphalt shingles. The structure is clad in brick and aluminum siding and has modern windows and doors. The residence has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. **The property has design value or physical value because it,**	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. **The property has historical value or associative value because it,**		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. **The property has contextual value because it,**		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3965 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial concrete porch and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3985 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is s a one and a half storey structure with a medium-pitched side gable roof with asphalt shingles and two concrete chimneys. The front (north) elevation has a central gabled dormer. The structure is clad in brick and has modern windows and doors. The front elevation has a covered full width concrete porch clad in brick. The residence has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4085 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in vinyl siding and has modern windows and doors. The front (north) elevation has a partial wood porch and a front facing gable. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. **The property has design value or physical value because it,**	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. **The property has historical value or associative value because it,**		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. **The property has contextual value because it,**		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4095 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a medium-pitched side gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

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Municipal Address: 4145 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.

The residence is s a one storey structure with a medium-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial porch and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4175 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one and a half storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The front (north) elevation has two gabled dormers. The structure is clad in brick and has modern windows and doors. The front entrance has projecting entrance with an asymmetrical gable. The residence has an attached single-car garage, and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

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Municipal Address: 4245 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is s a one storey structure with a low-pitched cross gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has a partial wood porch and a concrete foundation

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4367 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Cemetery

Associated Dates: 1900

Relationship to Project: Within the Study Area

Description: The property contains Fairbairn Union Cemetery.

The cemetery was established in 1900. Thomas Fairbairn donated one acre of land from his farm for a cemetery, prior to his death on May 24, 1900. Thomas Fairbairn was the first burial in the cemetery.

The cemetery contains a mixture of grave markers from the early 20th century to the 21st century. The entrance to the cemetery is marked with brick piers with metal gates.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The Fairbairn Cemetery established in 1900, has a direct association with a person in the community, Thomas Fairbairn, who donated the property for a public burying ground in 1900. Fairbairn was the first person laid to rest within the cemetery. The Fairbairn Cemetery supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Cemetery: Grave markers and brick piers with metal gates.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-5
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

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Municipal Address: 4489 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is s a one storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial concrete and porch and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4441 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.

The residence is s a one storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial wood porch and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
1. The property has design value or physical value because it,		
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4475 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is s a one storey structure with a low-pitched hip roof with asphalt shingles and a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has a partial concrete porch and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. **The property has design value or physical value because it,**	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. **The property has historical value or associative value because it,**		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. **The property has contextual value because it,**		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4435 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in vinyl siding and has modern windows and doors. The residence has a partial concrete porch and a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4440 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1920-1940

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuilding.

The residence is a one storey structure with a low-pitched side gable roof with asphalt shingles and a concrete chimney. The structure is clad in vinyl siding and has modern windows and doors. The residence has a partial concrete porch and an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 5680 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Farmstead

Associated Dates: *circa* 1875 (date from Municipal Heritage Register)

Relationship to Project: Within the Study Area

Description: The property contains two residences, several farm associated outbuildings, and four silos. The property contains mature maple trees.

The *circa* 1875 residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles and a brick chimney. The structure has a T-shaped plan, with a covered wraparound verandah. The exterior is clad in vinyl siding and has modern windows and doors. The foundation was not visible from the roadway.

The second residence, that dates between 1962 and 1975, is a one storey structure with a medium-pitched side gable roof with asphalt shingles. The exterior is clad in vinyl siding and has modern windows and doors. The residence has partial wood entrance porch, an entrance gable, and a concrete foundation.

The property contains a timber frame barn that has a side gable roof that is clad with metal. The barn has a salt box side and is clad in metal. The south addition has a wood paneled door. The exterior has wood multi-pane windows. Adjacent to the barn is a mixture of late 19th to modern outbuildings including:

A one storey driveshed, with a side gable roof that is clad in metal. Its exterior is clad in metal and has 2/2 wood fixed windows.

A one storey outbuilding with a side gable roof, that is clad in metal and has a concrete chimney. It has a horizontal wood siding exterior, with 2/2 wood fixed windows.

An early 20th century barn, with a side gable roof that is clad in metal. The exterior of the barn is clad in metal and has a rusticated concrete block foundation.

The property is listed on the City of Windsor Municipal Heritage Register and is associated with the Ure family.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓

3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to about 1875. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich through its connection to the Ure family. This property supports the late 19th century agricultural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, brick chimney, and T-shaped plan. Barn: Timber frame structure, side gable roof, salt box side, wood paneled door, and wood multi-paned windows. Driveshed: one storey structure, side gable roof, and wood 2/2 fixed windows. Smaller barn: side gable roof and rusticated concrete foundation. Outbuilding: horizontal wood siding, side gable roof, and wood 2/2 fixed windows.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-6
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 7295 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1882-1912

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuildings. The property is bordered in wood fencing.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The roofline has two gabled dormers. The residence has a T-shaped plan. The exterior is clad in vinyl siding and has modern windows and doors. The north elevation has a covered partial wood porch. The structure has a rusticated concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1882 and 1912, based on historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to early 20th century agricultural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, gabled dormers, and T-shaped plan.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-7
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4310 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Outbuilding

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a modern house, barn, and outbuilding. The property is bordered by wood fencing.

The barn is a timber frame structure with a gambrel roof that is clad in metal and has hay hoods and two ventilators. The outbuilding is a timber frame structure with a side gable roof that is clad in metal.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 8360 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached single-car garage.

The residence is s a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in vinyl siding and has 1/1 metal windows. The front (south) elevation has projecting entry porch with an asymmetrical gable. The residence has a partial concrete porch and a concrete foundation. The structure has a rear addition with an attached single-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 8780 Baseline Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage. The view of the residence is obstructed from the roadway by vegetation.

The residence is s a one storey structure with a low-pitched side gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 3850 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1882-1912

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuildings. The property has mature spruce trees.

The residence is s a one and a half storey structure with a medium-pitch side gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The front (west) three-bay façade has a covered partial wood porch. The residence has a south entry porch addition and a stone foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1882 and 1912, based on historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched side gable roof, three-bay front façade, and stone foundation. Landscape: mature spruce trees.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-8
Completed by (name): Laura Walter	**Date Completed:** May 7, 2018.

Municipal Address: 4721 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a medium-pitched side gable roof and concrete chimney. The front (east) elevation has a shed dormer. The structure is clad in vinyl siding and has modern windows and doors. The front elevation has a full width concrete porch with metal railings. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		✓
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 4727 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached double-car garage.

The residence is a one storey structure with a medium-pitched hip rook with brick chimney. The structure is clad in brick and has modern windows and doors. The front (east) elevation has a partial concrete porch. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 4774 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The structure is clad in brick and stone and has modern windows and doors. The front (west) elevation has a partial concrete porch with metal railings. The structure has a concrete foundation and an attached single-car garage.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 4824 8th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Outbuildings

Associated Dates: 1920-1961

Relationship to Project: Within the Study Area

Description: The property contains three outbuildings and a cast-in-place concrete silo.

The largest outbuilding has a side gable roof and is clad in metal. Attached to the outbuilding is the concrete silo. Adjacent to the outbuilding and silo, are two smaller outbuildings with side gable roofs. One has vertical wood boards, the other is clad in metal.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 4639 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1912

Relationship to Project: Within the Study Area

Description: The property contains a laneway that leads to a residence and modern outbuildings.

The residence is a two and a half storey structure with a medium-pitched hip roof with asphalt shingles. The roofline has three gabled dormers. The structure has a red brick exterior. The majority of windows are modern except for some 4/1 and 3/1 windows on the lower storey. The residence has a covered wraparound brick, concrete, and wood verandah. The front (east) entrance has a wood paneled door. The structure has an undetermined foundation.

The residence is listed on the City of Windsor's Municipal Heritage Register. It is recognized as the John Hayes House.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this two storey residence dates to 1912. It is a representative example of a vernacular Ontario farmhouse with Edwardian design influences. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: Two storey structure, medium-pitched hip roof, gabled dormers, red brick exterior, covered wraparound brick, concrete and wood porch, 3/1 and 4/1 windows, and wood paneled door.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-9

Completed by (name): Laura Walter	**Date Completed:** May 14, 2018

Municipal Address: 4465 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1962

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuildings.

The residence is a one and a half storey structure with a medium-pitched front facing gable roof and a brick chimney. The north and south elevations have shed dormers. The exterior is clad in vinyl siding and stone and has modern windows and doors. The front (east) elevation has a covered full width concrete porch with metal railings. The foundation was undetermined.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 4445 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1962

Relationship to Project: Within the Study Area

Description: The property contains a residence and a modern garage.

The residence is a one storey structure with a cross gable roof that has asphalt shingles. The structure is clad in stone and vinyl siding and has modern windows and doors. The residence has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. **The property has design value or physical value because it,**	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. **The property has historical value or associative value because it,**		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. **The property has contextual value because it,**		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018

Municipal Address: 4979 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1942-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence, two outbuildings and a concrete silo.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The east elevation has a gabled dormer. The structure is clad in vinyl siding and has modern windows and doors. The residence has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 5012 9th Concession Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence, a modern garage, and modern outbuilding.

The residence is a one and a half storey structure with a medium-pitched side gable roof with asphalt shingles and a stucco clad chimney. The exterior is clad in stucco and has modern windows and doors. The front (south) elevation has a partial concrete porch. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 4610 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a modern garage.

The residence is a one storey structure with a medium-pitched side gable roof. The structure is clad in vinyl siding and has modern windows and doors. The residence has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

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Municipal Address: 4601 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1932 (from the Municipal Heritage Register)

Relationship to Project: Within the Study Area

Description: The property contains a residence.

The residence is a one and a half storey structure with a medium-pitched side gable roof with metal shingles and a brick chimney. The front (east) elevation has a gabled dormer. The structure is clad in stone and has modern windows and doors. The three-bay front façade has a covered full width concrete porch that is clad in stone. The structure has a concrete foundation.

The property is listed on the City of Windsor's Municipal Heritage Register. The residence is recognized as the Dolphice St. Louis house.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to 1932. It is a representative example of a vernacular Ontario farmhouse with Bungalow design influences. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched side gable roof, stone clad exterior, three-bay front façade, and stone clad front porch.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-10
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 4500 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961 (according to topographic mapping), appears to be early 20th century

Relationship to Project: Within the Study Area

Description: The property contains a residence and two outbuildings.

The residence is a one and a half storey structure with a cross gable roof with asphalt shingles. The structure has a T-shaped plan. The exterior is clad in vinyl siding and has modern windows and doors. The front (west) elevation has an enclosed partial porch and a gabled dormer. The residence has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1940 and 1961 according to topographic maps of the study area, but the design of the structure points to an early 20th century date. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, T-shaped plan, and gabled dormer.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-11
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 4521 County Road 17

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1882-1912

Relationship to Project: Within the Study Area

Description: The property contains a residence, modern outbuilding, and wood outbuilding. Between the residence and the roadway are two mature spruce trees.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The roofline has three gabled dormers. The structure is clad in vinyl siding and has modern windows and doors. The front (east) elevation has a partial wood porch. The residence has a rusticated concrete foundation.

At the rear of the property is a vertical wood outbuilding with a side gable roof that is clad with metal.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1882 and 1912, based on historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, and gabled dormers. Outbuilding: vertical wood boards and side gable roof.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-12
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 5284 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Park

Associated Dates: 1962-1975

Relationship to Project: Within the Study Area

Description: The property contains a community park, the Weston Park. The park is approximately nine acres.

The park contains a playground, two baseball diamonds, basketball courts, two tennis courts, a parking area, soccer field, and an outbuilding.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 5648 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage. The property has mature maple trees.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The structure has a T-shaped plan, with a front (south) one storey addition. The residence is clad in vinyl siding and brick and has modern windows and doors. The structure has a concrete foundation.

The single-car garage to the rear of the residence is a one storey structure with a gable roof. Its exterior is clad in brick and vinyl siding.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method	✓	
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or	✓	
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: The construction of this one and a half storey residence dates to between approximately 1882 and 1913, based on historic and topographic mapping. It is a representative example of a vernacular Ontario farmhouse. This residence has the potential to yield information that contributes to an understanding of Township of Sandwich. This property supports the late 19th to early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: One and a half storey structure, medium-pitched cross gable roof, and T-shaped plan.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-13
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

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Municipal Address: 5700 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a detached garage.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles. The exterior is clad in vinyl siding and has modern windows and doors. The structure has a concrete foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 5760 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and outbuilding.

The residence is a one and a half storey structure with a high-pitched side gable roof with asphalt shingles. The front (south) elevation has two gabled dormers. The residence is clad in brick and vinyl siding and has modern windows and doors. The structure has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 5790 North Talbot Road

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence and a garage.

The residence is a one storey structure with a low-pitched hip roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has a concrete foundation.

The double-car garage to the rear of the residence is a one storey structure with a gable roof. Its exterior is clad in vinyl siding.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 9th Concession Road (former railway line)

Former Township: Township of Sandwich

Municipality: Town of Tecumseh

Resource Type: Trail

Associated Dates: 1890

Relationship to Project: Within the Study Area

Description: The property contains the former railway corridor of the Michigan Central (M.C.) Railway. The rail line has been removed and is now a gravel path that is bordered by wood lots.

The railway line was between London and Windsor in 1890. The railway line was owned by M.C. until 1985, when it was taken over by the Canadian National Railway/Canadian Pacific Railway.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,	✓	
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,	✓	
ii. Is physically, functionally, visually or historically linked to its surroundings, or	✓	
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: This former railway corridor is associated with the M.C. line that operated across southwestern Ontario and connected to the United States. The line was completed through the Township of Sandwich in 1890. The line was removed in the late 20th century. This former railway corridor supports the 19th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Recreational Trail: Layout of the former Canada Southern Railway Line including linear corridor lined with naturalized vegetation.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-14
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 3940 Highway 3

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence, outbuildings, and a horse track. The front (south) yard has wood fencing.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles and a brick chimney. The front (south) elevation has a projecting one storey section with a gable roof. The structure is clad in vinyl siding and has modern windows and doors.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. The property has design value or physical value because it,	Yes	No
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. The property has historical value or associative value because it,		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. The property has contextual value because it,		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

Municipal Address: 5075 North Talbot Road

Former Township: Township of Sandwich

Municipality: City of Windsor

Resource Type: Residence

Associated Dates: 1940-1961

Relationship to Project: Within the Study Area

Description: The property contains a residence, and two outbuildings. The view of the residence is obstructed by vegetation.

The residence is a one storey structure with a medium-pitched cross gable roof with asphalt shingles and a concrete chimney. The exterior is clad in vinyl and a mixture of 3/1 wood windows and modern windows. The structure has an undetermined foundation.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

1. **The property has design value or physical value because it,**	**Yes**	**No**
i. Is a rare, unique, representative or early example of a style, type, expression, material or construction method		✓
ii. Displays a high degree of craftsmanship or artistic merit, or		✓
iii. Demonstrates a high degree of technical or scientific achievement.		✓
2. **The property has historical value or associative value because it,**		
i. Has direct associations with a theme, event, belief, person, activity organization or institution that is significant to a community,		✓
ii. Yields, or has the potential to yield, information that contributes to an understanding of a community of culture, or		✓
iii. Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.		✓
3. **The property has contextual value because it,**		
i. Is important in defining, maintaining or supporting the character of an area,		✓
ii. Is physically, functionally, visually or historically linked to its surroundings, or		✓
iii. Is a landmark.		✓

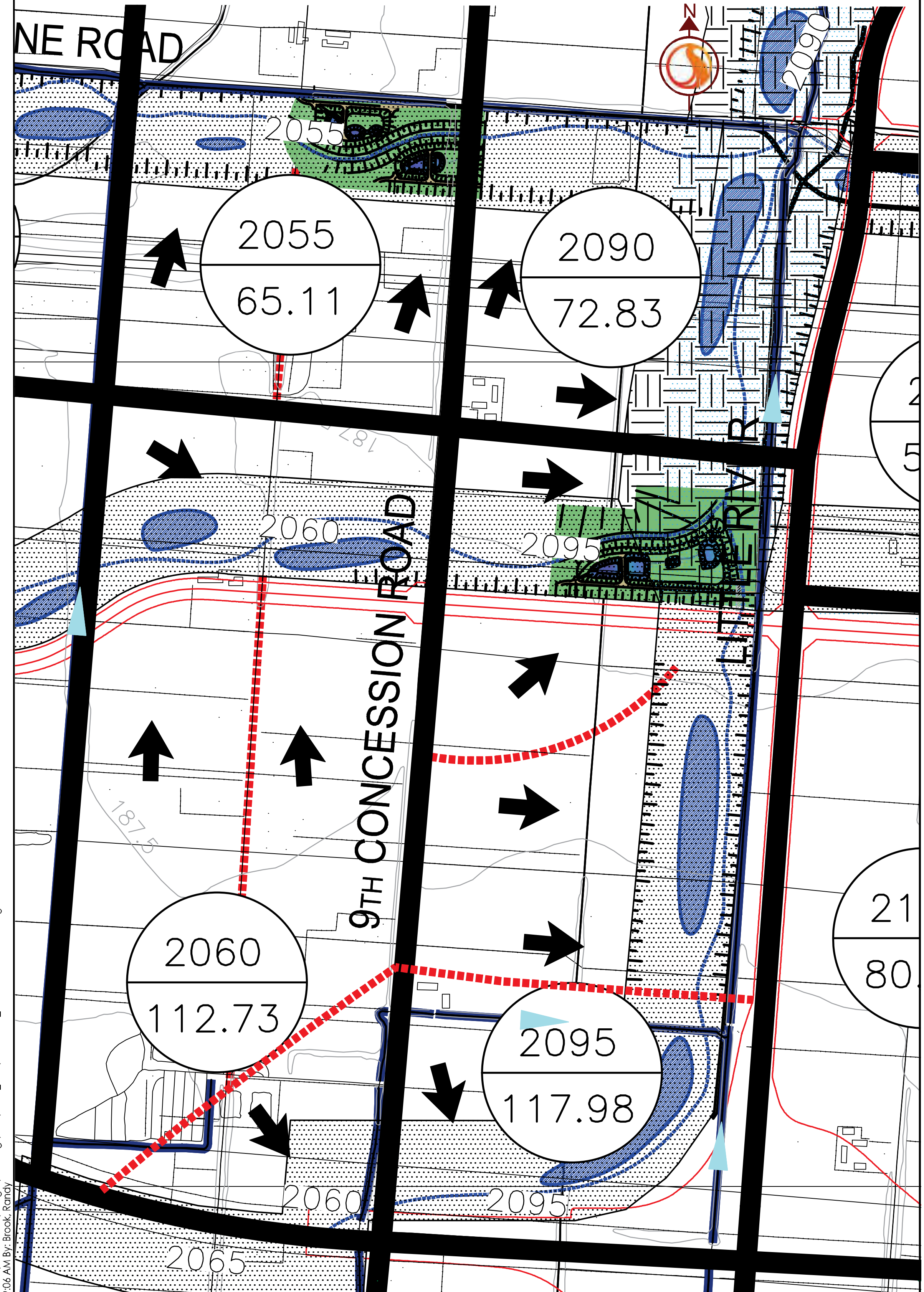
Draft Statement of Cultural Heritage Value or Interest: None identified.

Identified Heritage Attributes: None identified.

Identification of CHVI: No	**Cultural Heritage Resource Number:** N/A
Completed by (name): Laura Walter	**Date Completed:** May 14, 2018.

APPENDIX B

Conceptual Project Drawings



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www.stantec.com

Legend

CATCHMENT BOUNDARY

SUB-CATCHMENT BOUNDARY

DIRECTION OF FLOW

Client/Project

ESSEX REGIONAL CONSERVATION ATHORITY
UPPER LITTLE RIVER
ENVIROMENTAL ASSESSMENT

Figure No.

17

Title

CONCEPTUAL STORMWATER
LAYOUT PLAN

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9/6/2017 3:28:08 PM By: Brook, Randy

ORIGINAL SHEET – ANSI B

FEBRUARY 2012
1603–11265

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Legend

TRAIL / ACCESS ROAD

CHANNEL

PERMANENT POND

1:1250 — 0, 12.5, 37.5, 62.5m

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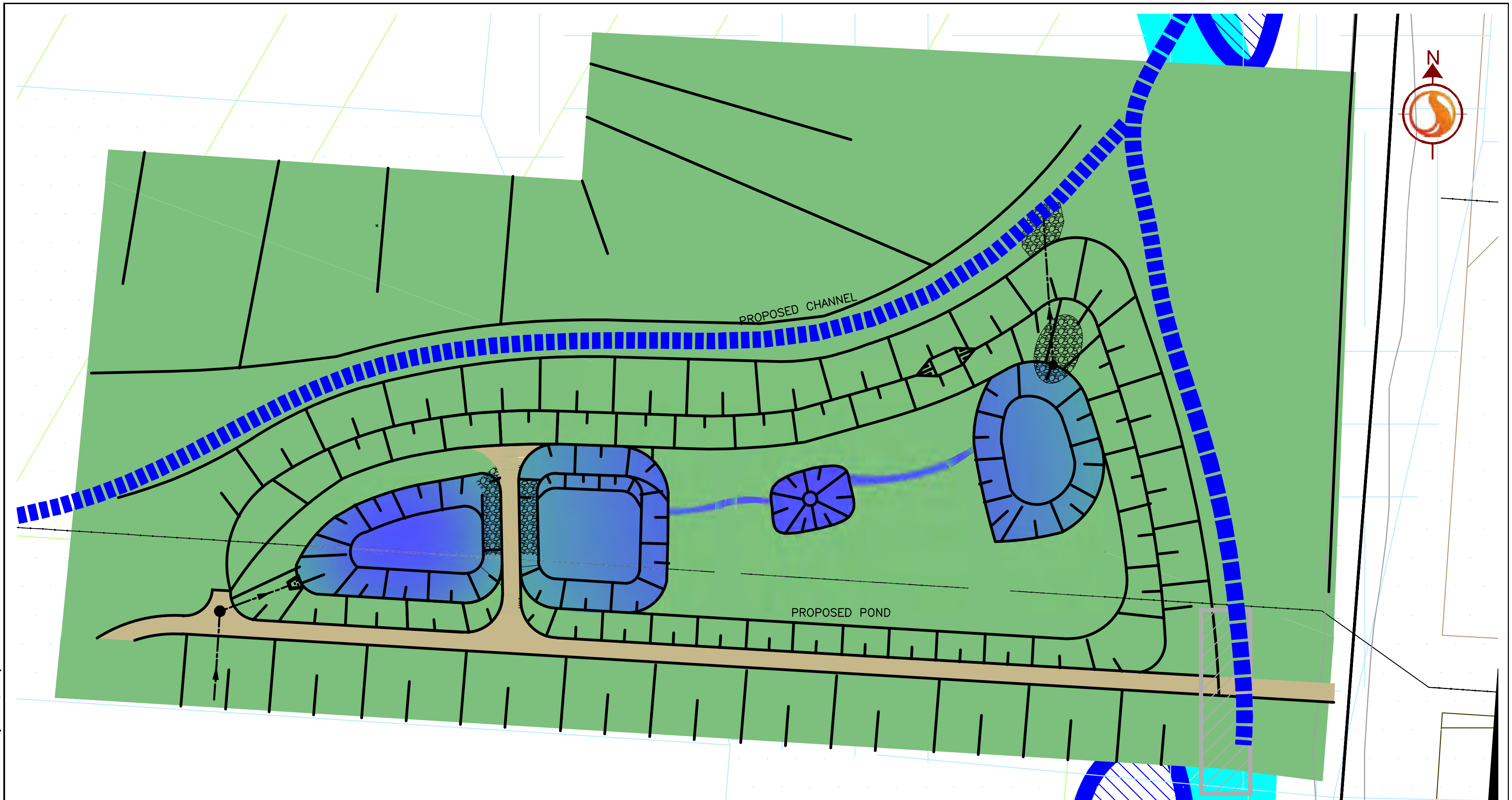
ESSEX REGION CONSERVATION AUTHORITY
UPPER LITTLE RIVER
ENVIROMENTAL ASSESSMENT

Figure No.
18

Title
STORMWATER MANAGEMENT
POND CONCEPT 1



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9/6/2017 3:16:38 PM By: Brook, Randy
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TRAIL / ACCESS ROAD

CHANNEL

PERMANENT POND

1:1250 0 12.5 37.5 62.5m

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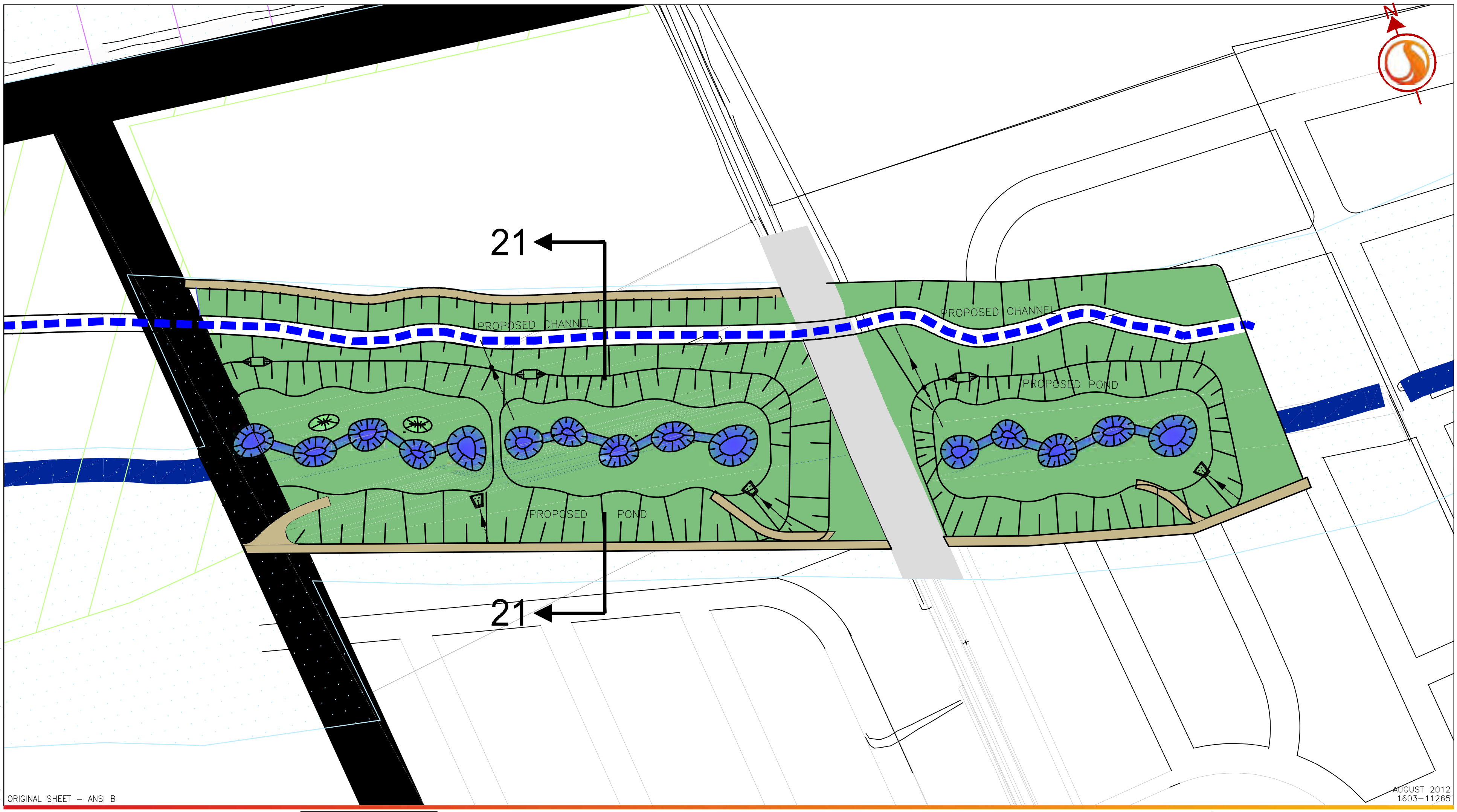
ENVIROMENTAL ASSESSMENT

Figure No.
19

Title
STORMWATER MANAGEMENT
POND CONCEPT 2



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	TRAIL / ACCESS ROAD
	ROAD
	CHANNEL
	PERMANENT POND
	MOUND

1:2500 0 25 75 125m

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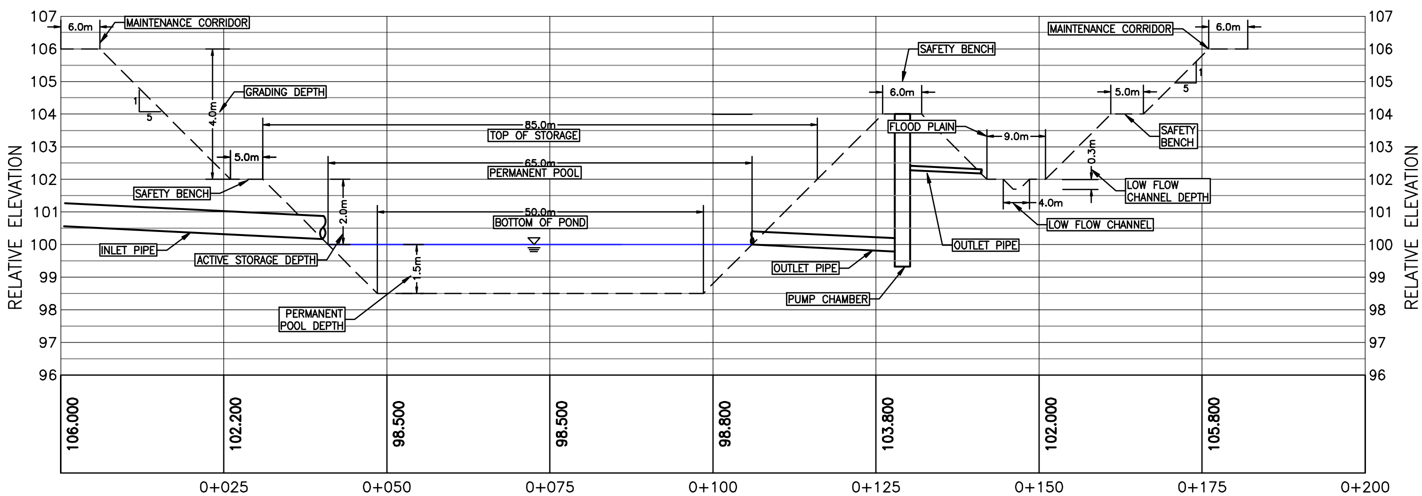
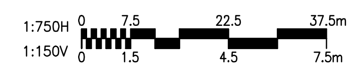
UPPER LITTLE RIVER
ENVIROMENTAL ASSESSMENT

Figure No.
20

Title
STORMWATER MANAGEMENT
POND CONCEPT 3





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2017/09/06 2:52 PM By: Brook, Randy

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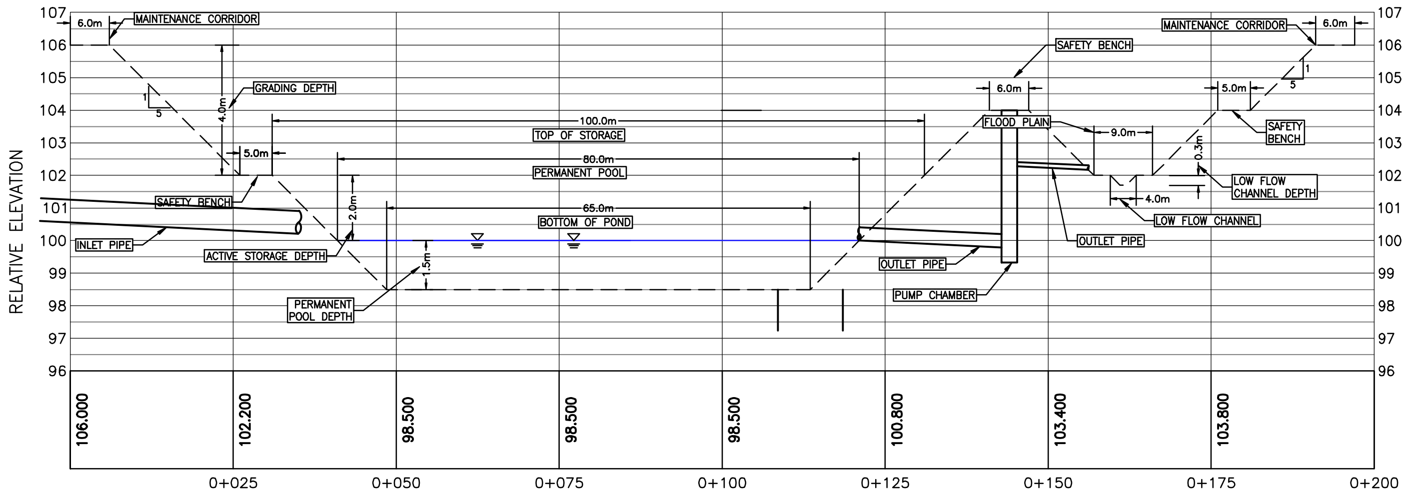
UPPER LITTLE RIVER
ENVIROMENTAL ASSESSMENT

Figure No.

21

Title

TYPICAL CROSS SECTION WITH ONE SWM FACILITY



1:500H 0 5 15 25m
1:100V 0 1 3 5m

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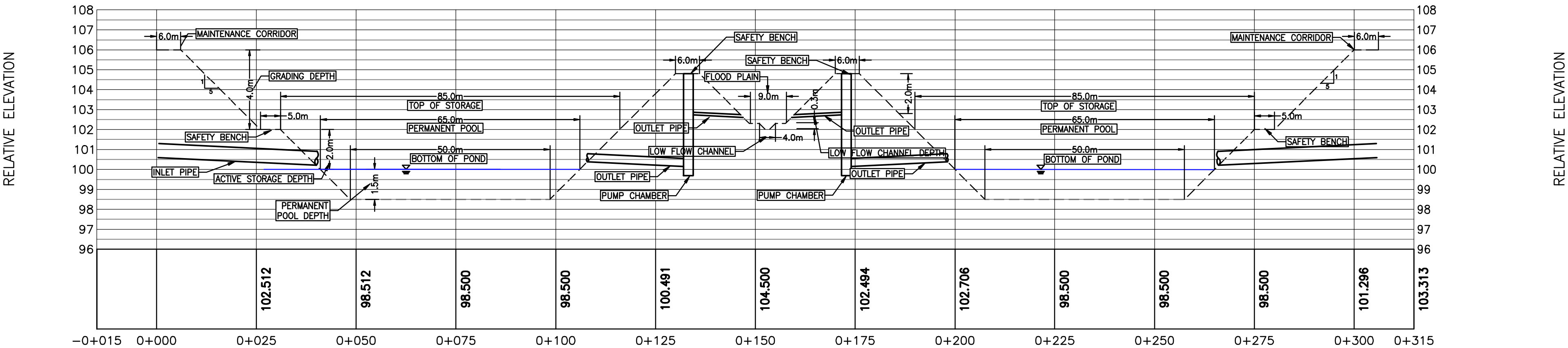
Figure No.
22

Title
CROSS SECTION WITH ONE
SWM FACILITY AND CONTINGENCY



1:1000H 0 10 30 50m

1:200V 0 2 6 10m

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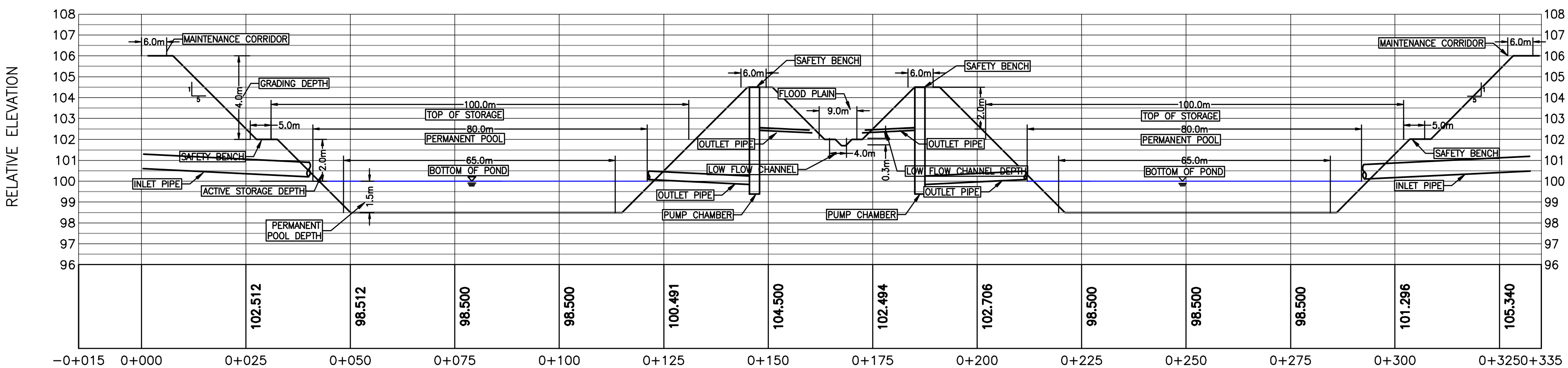
UPPER LITTLE RIVER
ENVIROMENTAL ASSESSMENT

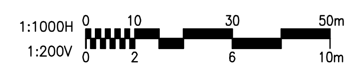
Figure No.

23

Title

TYPICAL CROSS SECTION WITH TWO SWM FACILITIES





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2017/09/06 2:52 PM By: Brook, Randy

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Figure No.

24

Title

TYPICAL CROSS SECTION WITH
TWO SWM FACILITIES AND CONTINGENCIES