September 10, 2018

BY RESS

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Dear Ms. Walli:

Re: Union Gas Limited ("Union")
Chatham-Kent Rural Project
EB-2018-0188

Attached please find the updated Schedule 20 which includes the entire Environmental Report, not only the Cultural Heritage Report, of Union's application and pre-filed evidence for the above-noted project.

In the event that you have any questions on the above or would like to discuss in more detail, please do not hesitate to contact me.

Yours truly,

[original signed by]

W.T. (Bill) Wachsmuth, RPF
Senior Administrator, Regulatory Projects
:sb
Attach.

cc: N. Marconi
Z. Crnojacki
Regulatory Library

Chatham Kent Rural Pipeline Expansion Project: Environmental Report

FINAL REPORT

Prepared for:
Union Gas Limited
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Chatham ON N7M 5M1

Prepared by:
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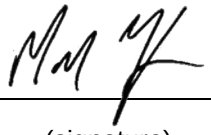
File: 160961248
May 31, 2018

Sign-off Sheet

This document entitled Chatham Kent Rural Pipeline Expansion Project: Environmental Report was prepared by ("Stantec") for the account of Union Gas Limited (the "Client"). The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by  (signature)

Steve Thurtell, M.Sc.
Senior Environmental Consultant

Reviewed by  (signature)

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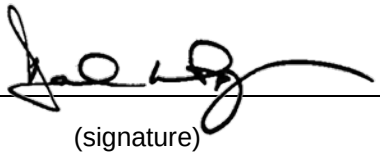
Reviewed by  (signature)

David Wesenger, BES
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Table of Contents

EXECUTIVE SUMMARY ..... **I**

ABBREVIATIONS ..... **III**

1.0 INTRODUCTION **1.1**
1.1 PROJECT DESCRIPTION 1.1
1.2 ENVIRONMENTAL STUDY 1.1
1.2.1 Objectives 1.1
1.2.2 Process 1.2
1.2.3 The Environmental Report 1.2
1.2.4 The OEB Regulatory Process 1.3
1.2.5 Additional Regulatory Processes 1.3

2.0 ROUTE EVALUATION AND SELECTION **2.1**
2.1 THE PROCESS 2.1
2.2 DEVELOP ROUTING PARAMETERS 2.1
2.2.1 Define a Study Area for Routing 2.1
2.2.2 Determine Routing Objectives 2.2
2.2.3 Identify Constraints and Opportunities 2.2
2.3 IDENTIFY ALTERNATIVE ROUTES 2.3
2.4 ROUTE EVALUATION 2.3
2.5 INPUT ON THE ROUTE 2.4
2.6 CONFIRMATION OF THE ROUTE 2.4

3.0 CONSULTATION PROGRAM **3.1**
3.1 OBJECTIVES 3.1
3.2 IDENTIFYING INTERESTED AND POTENTIALLY AFFECTED PARTIES 3.1
3.3 COMMUNICATION METHODS 3.2
3.3.1 Newspaper Notices 3.2
3.3.2 Letters and Emails 3.2
3.3.3 Display Boards, Newsletter and Exit Questionnaire 3.2
3.3.4 Project Webpage 3.3
3.4 CONSULTATION EVENTS 3.3
3.4.1 Meetings 3.3
3.4.2 Information Session 3.3
3.5 INPUT RECEIVED 3.3
3.5.1 Public Input 3.4
3.5.2 Agency Input 3.4
3.5.3 Municipal Input 3.4
3.5.4 Indigenous Input 3.4
3.5.5 Interest Group Input 3.5
3.6 REFINEMENTS BASED ON INPUT 3.5

4.0 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION **4.1**

4.1 METHODOLOGY 4.1
4.1.1 Construction 4.2
4.1.2 Operation 4.3
4.2 PHYSICAL FEATURES 4.4
4.2.1 Bedrock Geology and Drift Thickness 4.4
4.2.2 Surficial Geology and Physiography 4.4
4.2.3 Hydrogeology 4.6
4.2.4 Extractive Resources: Aggregates and Petroleum Pools 4.8
4.2.5 Soil and Soil Capability 4.9
4.2.6 Agricultural Tile Drains 4.11
4.2.7 Natural Hazards 4.12
4.3 BIOPHYSICAL FEATURES 4.13
4.3.1 Aquatic Features 4.13
4.3.2 Designated Natural Areas and Vegetation 4.18
4.3.3 Wildlife, Wildlife Habitat and Species at Risk 4.20
4.4 SOCIO-ECONOMIC ENVIRONMENT 4.29
4.4.1 Employment and Business 4.29
4.4.2 Community Services & Infrastructure 4.31
4.4.3 Perceived Health and Well-Being 4.36
4.4.4 Infrastructure 4.38
4.4.5 Air Quality and Noise 4.39
4.4.6 Contamination 4.40
4.4.7 Waste Management 4.41
4.4.8 Land Use 4.42
4.4.9 Archaeological Resources 4.43
4.4.10 Cultural Heritage Resources 4.44
4.4.11 Indigenous Interests 4.46
4.5 SUMMARY OF RECOMMENDATIONS 4.46

5.0 CUMULATIVE EFFECTS ASSESSMENT 5.1
5.1 METHODOLOGY 5.1
5.2 STUDY BOUNDARIES 5.2
5.3 ANALYSIS OF CUMULATIVE EFFECTS 5.2
5.3.1 Construction – Year 2019 ..... 5.3
5.3.2 Operation and Maintenance – Year 2024 ..... 5.4
5.4 SUMMARY OF CUMULATIVE EFFECTS 5.5

6.0 MONITORING AND CONTINGENCY PLANS 6.1
6.1 MONITORING 6.1
6.1.1 Exposed Soils 6.1
6.1.2 Water Wells 6.2
6.1.3 Watercourse Crossings 6.2
6.1.4 Vegetation and Wetlands 6.2
6.1.5 Species at Risk 6.2
6.1.6 Cultural Heritage Resources 6.2
6.1.7 Residents and Businesses 6.2
6.1.8 Municipal Roads 6.3

6.2 CONTINGENCY 6.3
6.2.1 Watercourse Sedimentation 6.3
6.2.2 Accidental Spills 6.4
6.2.3 Inadvertent Fluid Release during Horizontal Directional Drillings 6.4
6.2.4 Unexpected Finds 6.4

7.0 CONCLUSION 7.1

8.0 REFERENCES 8.1

LIST OF TABLES

Table 1-1: Summary of Potential Permits/Regulatory Requirements 1.4
Table 4-1: Fish Species in the Lake St. Clair Tributaries Subwatershed 4.14
Table 4-2: Potential Aquatic Species at Risk in Study Area Watercourses 4.15
Table 4-3: Terrestrial Species of Conservation Concern Potentially Occurring in the Vicinity of the Study Area 4.22
Table 4-4: Terrestrial Species at Risk with potential to occur in the vicinity of the Study Area 4.24
Table 4-5: Labour Characteristics, Chatham-Kent and Ontario, 2011 ..... 4.29
Table 4-6: Median Income, Chatham-Kent and Ontario, 2011 ..... 4.29
Table 4-7: Population by Gender, Chatham-Kent and Province, 2011 ..... 4.32
Table 4-8: Indigenous Population, Chatham-Kent and Ontario, 2011 ..... 4.32
Table 4-9: Health Indicators, Chatham-Kent Health Unit and Ontario, 2013 ..... 4.36
Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures 4.47

LIST OF APPENDICES

APPENDIX A: FIGURES
Figure 1: Study Area
Figure 2: Preferred Route

APPENDIX B: CONSULTATION
Appendix B1: Project Summary and Contact List
Appendix B2: Newspaper Notices
Appendix B3: Letters
Appendix B4: Display Boards, Newsletter and Exit Questionnaire
Appendix B5: Project Correspondence

APPENDIX C: EXISTING CONDITIONS FIGURES
Figure 1: Bedrock Geology
Figure 2: Drift Thickness
Figure 3: Physiography
Figure 4: Surficial Geology
Figure 5: Groundwater Conditions
Figure 6: Aggregates and Petroleum Resources
Figure 7: Soil Type
Figure 8: Soil Capability

Figure 9: Agricultural Tile Drainage
Figure 10: Floodplain and Regulation Limit
Figure 11: Watersheds
Figure 12: Potential Watercourse Crossings
Figure 13: Designated Natural Areas
Figure 14: Infrastructure
Figure 15: Archaeological Potential
Figure 16: Cultural Heritage Resources

APPENDIX D: DFO-OGLA/UGL AGREEMENT (2008)

APPENDIX E: STAGE 1 ARCHAEOLOGICAL ASSESSMENT AND CULTURAL HERITAGE REPORT

APPENDIX F: POTENTIAL SOURCES OF CONTAMINATION

Executive Summary

To meet the growing demand for natural gas, Union Gas is proposing to construct two new pipelines in the Municipality of Chatham-Kent, which make up the “Chatham-Kent Rural Pipeline Expansion Project. This Environmental Report covers one of them, being the Base Line Section, which is a new 8-inch, 13 km natural gas pipeline. This proposed pipeline begins at Union Gas’ existing Simpson Road Station, (near the community of Tupperville) and proceeds south within the road allowance of Simpson Road and east within the road allowance of Base Line then 300m south within Kent Bridge Road, east of Dresden. This proposed pipeline will meet the growing residential, agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent, including in the fast-growing greenhouse market. Construction is planned to begin as early as Spring/Summer 2019 with an in-service date approximately six months after the start of construction.

Union Gas hired Stantec Consulting Ltd. (‘Stantec’) to undertake an environmental study of the construction and operation of the proposed pipeline and related facilities. The environmental study included a route selection process, a consultation program, an impact assessment, and a cumulative impact assessment.

During the study, a preliminary preferred route was selected, and a preferred route was confirmed. The preferred route is currently illustrated within a general location. Union Gas will undertake detailed design to determine the exact location of the running line, temporary land use requirements and road/watercourse crossing methods. Detailed design will be influenced by supplemental studies (including environmental studies) and site-specific requests from landowners and municipal agencies. In general, this micro-siting exercise will seek to avoid sensitive natural features to the extent practicable.

A consultation program was conducted for the project to engage with federal and provincial agencies, conservation authorities, municipal staff, Indigenous communities, special interest groups, and directly affected and adjacent landowners. The consultation program included notices in local newspapers, project mailouts and an Information Session held on March 6, 2018. Union Gas and Stantec have also been in direct contact with agency and municipal staff. The consultation program aided in the selection of the preferred route. Union Gas has committed to on-going consultation with directly affected and interested parties through detailed design and construction and will continue to respond to concerns through the life of the project.

The potential effects and impacts of the project on physical, biophysical and socio-economic features have been assessed. In the opinion of Stantec, the recommended program of supplemental studies, mitigation and protective measures are considered sufficient to protect the features encountered. Monitoring and contingency measures will assess whether mitigation and protective measures were effective in both the short and long term.

The potential cumulative effects of the project were assessed by considering development that has a high probability of proceeding just prior to or concurrent with construction of the project. The cumulative effects assessment determined that, provided the mitigation and protective measures outlined in this report are implemented and that concurrent projects implement similar mitigation and protective measures, potential cumulative effects are not anticipated to be significant.

With the implementation of the recommendations in this report, on-going communication and consultation, and adherence to permit, regulatory and legislative requirements, potential adverse residual environmental and socio-economic impacts of the project are not anticipated to be significant.

Abbreviations

AA	Archaeological Assessment
ANSI	Area of Natural and Scientific Interest
BGS	Below ground surface
CHVI	Cultural Heritage Value or Interest
CKFES	Chatham-Kent Fire and Emergency Services
CLI	Canada Land Inventory for Agriculture
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EASR	Environmental Activity and Sector Registry
ECP	Environmental Construction Plan
ELC	Ecological Land Classification
EMS	Emergency Medical Services
END	Endangered
ER	Environmental Report
ERIS	Environmental Risk Information Services
ESA	*Endangered Species Act*
ESC	Erosion and sediment control
GIS	Geographic Information System
HDD	Horizontal Directional Drill
IA	Insect Atlas
IO	Infrastructure Ontario

IPZ	Intake Protection Zone
LIO	Land Information Ontario
MBCA	*Migratory Bird Convention Act*
MNR	Ontario Ministry of Natural Resources
MNRF	Ontario Ministry of Natural Resources and Forestry
MOE	Ontario Ministry of the Environment
MOECC	Ontario Ministry of the Environment and Climate Change
MTCS	Ministry of Tourism, Culture and Sport
NHIC	Natural Heritage Information Centre
NPS	Nominal pipeline size
O. Reg.	Ontario Regulation
OBBA	Ontario Breeding Bird Atlas
OEB	Ontario Energy Board
OHA	*Ontario Heritage Act*
OMA	Atlas of the Mammals of Ontario
OPCC	Ontario Pipeline Coordinating Committee
ORAA	Ontario Reptile and Amphibian Atlas
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenols
PSOC	Potential Sources of Contamination
PSW	Provincially Significant Wetland
PTTW	Permit to Take Water
QP	Qualified Person as defined by O. Reg. 153/04
RoW	Right of Way
SAR	Species at Risk
SARA	*Species at Risk Act*

SCRCA	St. Clair Region Conservation Authority
SC	Special Concern
Stantec	Stantec Consulting Ltd.
THR	Threatened
Union Gas	Union Gas Limited
VOC	Volatile Organic Compounds
WC	Watercourse Crossing
WHPA	Wellhead Protection Area
WWR	Water Well Record(s)

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

To meet the growing demand for natural gas, Union Gas is proposing to construct two new pipelines in the Municipality of Chatham-Kent, which make up the "Chatham-Kent Rural Pipeline Expansion Project. This Environmental Report covers on of them, being the Base Line Section, which is a new 8-inch 13 km natural gas pipeline. This proposed pipeline will begin at Union Gas' existing Simpson Road Station near the community of Tupperville and proceed south within the road allowance of Simpson Road and east within the road allowance of Base Line Road then south within Kent Bridge Road to an endpoint, east of Dresden. Construction is planned to begin as early as Spring/Summer 2019 with an in-service date approximately six months after the start of construction. This proposed pipeline will meet the growing residential, agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent, including in the fast-growing greenhouse market.

Union Gas hired Stantec Consulting Ltd. (Stantec) to undertake an environmental study of the construction and operation of the proposed pipeline and related facilities. For the remainder of this report, the construction and operation of the proposed pipeline is referred to as the 'project'.

1.2 ENVIRONMENTAL STUDY

1.2.1 Objectives

A multidisciplinary team of environmental planners and scientists from Stantec conducted the environmental study. Union Gas provided environmental support and engineering expertise throughout the study.

The environmental study was completed in accordance with the Ontario Energy Boards (OEB's) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 7th Edition* (*OEB Environmental Guidelines*) (2016), as well as relevant federal and provincial environmental guidelines and regulations.

The principal objectives of the environmental study were to, from an environmental perspective, select a preferred route for the pipeline and to outline various environmental mitigation and protection measures for the construction and operation of the project. To meet these objectives, the environmental study was prepared to:

- Undertake a route evaluation process
- Identify a preferred route that minimizes potential environmental impacts
- Complete a detailed review of environmental features along the preferred route and assess the potential environmental impacts of the project on these features

- Establish mitigation and protective measures that may be used to minimize or eliminate potential environmental impacts of the project
- Develop a consultation program to receive input from interested and potentially affected parties
- Identify any necessary supplemental studies, monitoring and contingency plans

1.2.2 Process

The environmental study was divided into three main phases:

Phase I: Identification of Study Area and Potential Routes

The environmental study began with the identification of the study area. The first step was to confirm the desired start and end points through communication with Union Gas. Next, a study area was delineated based on those points. Then, a route evaluation and selection process was undertaken to identify environmentally acceptable routes within the study area in consideration of the routing objectives and environmental and socio-economic constraints and opportunities using desktop available information. The process identified a potential route for the proposed pipeline along Base Line but was unable to identify practical alternative routes. The suitability of the potential route was confirmed during a field reconnaissance survey.

Phase II: Route Confirmation and Consultation

The alternative routes were assessed, and a preliminary preferred route was identified. Feedback was sought through newspaper notices, letters, and an Information Session. Following the Information Session, based on feedback received, the preliminary preferred route was confirmed as the preferred route.

Phase III: Environmental Report

Phase III involved determining potential environmental and socio-economic impacts and cumulative effects that would result from the project and identifying mitigation and protective measures, supplemental studies, monitoring and contingency plans to avoid or reduce potential impacts. The environmental study concluded with the preparation of this Environmental Report (ER) as well as a photomosaic to identify site-specific mitigation and protective measures to be implemented along the proposed pipeline route (see Appendix G).

1.2.3 The Environmental Report

The environmental study has relied on technically sound and consistently applied procedures that are replicable and transparent. As mentioned above, the study was undertaken in accordance with the OEB *Environmental Guidelines* (2016), as well as relevant federal and provincial environmental guidelines and regulations. The ER, which documents the environmental study, will form the foundation for future environmental management activities related to the project.

The ER is organized into the following sections:

1.0 **Introduction:** provides a description of the project and the environmental study

2.0 **Route Evaluation and Selection**: provides an overview of the pipeline route evaluation and selection process

3.0 **Consultation Program:** describes the consultation program

4.0 **Impact Identification, Assessment and Mitigation:** describes the existing conditions, predicts potential effects and impacts, recommends supplemental studies, mitigation and protective measures, and considers net impacts

5.0 **Cumulative Effects**: provides an analysis of potential cumulative effects associated with the proposed project

6.0 **Monitoring and Contingency Plans**: describes monitoring and contingency plans to address potential environmental impacts of the proposed project

7.0 **Conclusion:** summarizes the significance of the impacts of the project

The ER also includes references and appendices for documentation.

1.2.4 The OEB Regulatory Process

Once complete, the ER is circulated to affected municipalities, conservation authorities and to the Ontario Pipeline Coordinating Committee (OPCC) for their review and comment. The OPCC is an inter-ministerial committee that includes provincial government ministries, boards, and authorities with potential interest in the construction and operation of hydrocarbon transmission and storage facilities. The ER is also circulated to landowners, Indigenous communities, and other interested parties. The ER will accompany a future Union Gas 'Leave-to-Construct' application to the OEB for the proposed project.

Upon receiving the application, the OEB will hold a public hearing. Communication about the hearing will include notices in local newspapers and letters to directly affected landowners, both of which will outline how the general public and landowners can get involved with the hearing process. If after the public hearing the OEB finds the project is in the public interest it will approve construction of the project. The OEB normally attaches conditions to a project it approves. Union Gas must comply with these conditions at all stages of the project, including during construction and site restoration.

1.2.5 Additional Regulatory Processes

Union Gas will also be required to obtain additional permits and approvals from federal and provincial agencies and provide notifications to municipalities, as outlined in Table 1-1 below. This ER will serve to support these permit and approval applications and notifications.

Table 1-1: Summary of Potential Permits/Regulatory Requirements

Permit/Approval Name	Administering Agency	Description
FEDERAL PERMITS AND APPROVALS		
Clearing of Vegetation under the *Migratory Bird Convention Act* (MBCA) (1994)	Environment Canada	No permit is necessary; however, precautions need to be made so that no breeding birds or their nests are harmed or destroyed during the bird nesting season. Nest sweeps will be required at a maximum of 7 days prior to vegetation removal during the bird nesting season (April 1 to August 31), as per the MBCA.
Review and authorization under the *Fisheries* Act (1985)	Fisheries and Oceans Canada (DFO)	Union Gas and DFO have established an agreement that allows Union Gas to conduct watercourse crossings under a specific set of conditions and mitigation measures without DFO review (see Appendix D). However, as per the agreement, DFO review and possible *Fisheries Act* authorization is required at watercourse crossings containing species protected under the *Species at Risk Act* (SARA) (2002). The DFO may authorize activities that have the potential to affect fish or mussel species protected under the SARA (2002). As per Section 35 (1) of the *Fisheries Act* (1985), "No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery. As per Section 35 (2)(b) of the *Fisheries Act* (1985), there are some exceptions under which a person may carry on a work, undertaking or activity without contravening subsection (1), including an authorization from DFO, which typically includes conditions.
Permitting under the SARA (2002)	DFO	A SARA permit is required to capture, handle and relocate SARA Schedule 1 fish or mussel species during construction. As indicated in Section 32 (1) of the SARA (2002), "No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species." As indicated in Section 73 (1) of the SARA (2002), "The competent minister may enter into an agreement with a person, or issue a permit to a person, authorizing the person to engage in an activity affecting a listed wildlife species, any part of its critical habitat or the residences of its individuals."
PROVINCIAL PERMITS AND APPROVALS		
Approval under the *Ministry of Infrastructure Public Work Class Environmental Assessmen*t (2012) (Class EA)	Infrastructure Ontario (IO)	A Public Works Class EA may be required to obtain easements on lands managed by IO.
Development Permits under *Ontario Regulations (O. Reg) 171/06* (Regulation	St. Clair Region Conservation Authority (SCRCA)	Required for works within SCRCA Regulated Areas, including shorelines, watercourses, wetlands and hazardous lands (flooding and erosion hazards, and unstable soils and

Table 1-1: Summary of Potential Permits/Regulatory Requirements

Permit/Approval Name	Administering Agency	Description
of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses), as per the *Conservation Authorities Act* (1990)		bedrock).
Permit to Take Water (PTTW) or Environmental Activity and Sector Registry (EASR) (surface and groundwater) under the *Ontario Water Resources Act* (1990)	Ministry of the Environment and Climate Change (MOECC)	Under O. Reg. 64/16 and O. Reg. 63/16, the MOECC requires a PTTW for dewatering in excess of 400,000 L/day, and an EASR for dewatering between 50,000 and 400,000 L/day. This can include trench dewatering and taking water for hydrostatic testing from a pond, lake, etc. There are some exceptions for surface water takings where active or passive surface water diversions occur such that all water taken is returned to within another portion of the same surface water feature.
Permitting or registration under the *Endangered Species Act* (ESA) (2007)	Ministry of Natural Resources and Forestry (MNRF)	An ESA permit or Registration is required for activities that could impact species protected under the ESA. Consultation will occur with the MNRF to determine ESA permitting requirements. As indicated in Section 9 (1) a of the ESA (2007), "No person shall kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species." As indicated in Section 17 (1), "the Minister may issue a permit to a person that, with respect to a species specified in the permit that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species, authorizes the person to engage in an activity specified in the permit that would otherwise be prohibited by section 9 or 10."
Archaeological clearance under the *Ontario Heritage Act* (OHA) (1990)	Ministry of Tourism, Culture, and Sport (MTCS)	A Stage 1-2 archaeological assessment (AA) is required along the construction site to identify areas of archaeological potential prior to any ground disturbances and/or site alterations. Depending on the results of the Stage 1-2 AA, Stage 3 and 4 AA's may be required. The completed archaeological assessment reports are forwarded to the MTCS for review and comment.
Review of Built Heritage and Cultural Landscape under the OHA (1990)	MTCS	A Heritage Overview Study was completed to determine the presence of built heritage and cultural landscapes. It identified that a Heritage Impact Assessment was required to determine the effects of the project on heritage resources and recommend mitigation measures. The Cultural Heritage Report has recommendations and can be found in Appendix E.

Table 1-1: Summary of Potential Permits/Regulatory Requirements

Permit/Approval Name	Administering Agency	Description
MUNICIPAL PERMITS AND APPROVALS		
Noise By-law 41-2004 and Noise By-law Amendment 43-2005	Municipality of Chatham-Kent	Project activities should adhere to local noise by-laws.
Encroachment Permit	Municipality of Chatham-Kent	Required for works being conducted within municipal RoW.

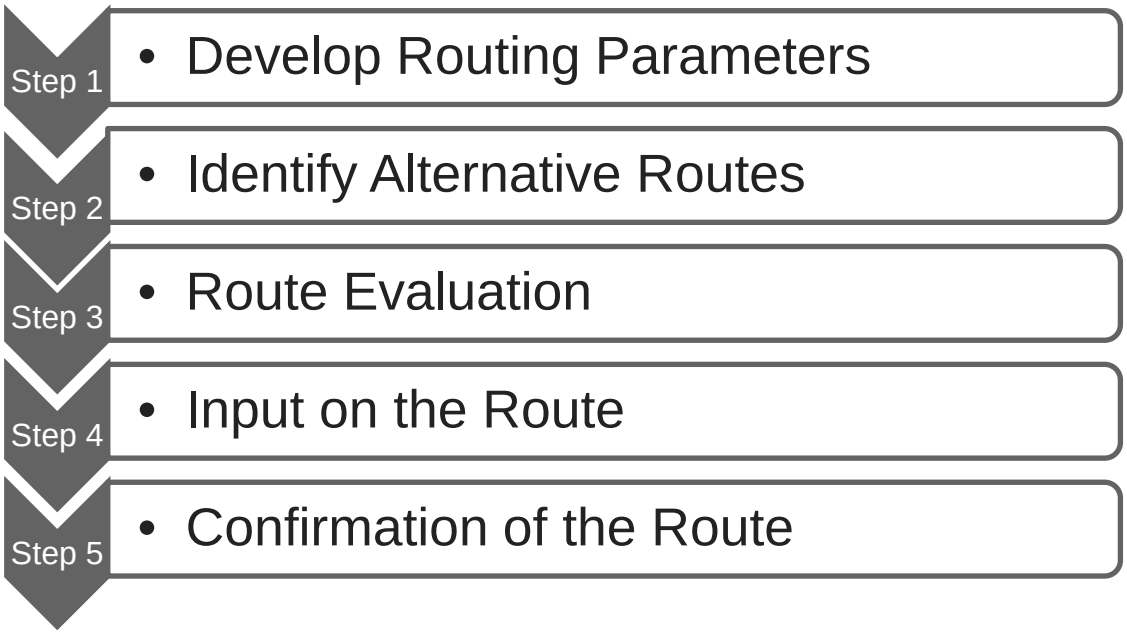
2.0 ROUTE EVALUATION AND SELECTION

2.1 THE PROCESS

The route evaluation and selection process was undertaken in accordance with the OEB *Environmental Guidelines (2016)*, which identify the environmental and socio-economic features to take into consideration and the routing principles to be considered.

The five-step route evaluation and selection methodology is illustrated in Figure 2.1.

Figure 2-1: Route Evaluation and Selection Methodology



2.2 DEVELOP ROUTING PARAMETERS

2.2.1 Define a Study Area for Routing

The terminal points of the proposed pipeline defined the western and eastern boundaries of the study area. The western endpoint ties the proposed pipeline into the existing Union Gas NPS 20-inch Panhandle Pipeline at the Simpson Road Valve Station. The eastern endpoint of the proposed pipeline is located on Kent Bridge Road near the corner of Base Line. The terminal points were determined by Union Gas based on the presence of existing infrastructure to facilitate integration into the existing pipeline system.

The Sydenham River establishes the northern boundary of the study area. The southern boundary is formed by an east-west transect situated approximately 8 km south of, and generally parallel to, the Sydenham River. Inclusion of lands south of Base Line within the study area allowed for the consideration of a number of additional road allowances as potential route options. The study area is illustrated in Appendix A, Figure 1.

2.2.2 Determine Routing Objectives

The objective of the route selection process is to identify a route that has the least potential for adverse environmental and socio-economic impacts. The following routing principles support that objective:

1. Routes should follow a reasonably direct path between endpoints to reduce length; in general, a shorter route will help eliminate or minimize the extent of any potential environmental and socio-economic impacts.
2. Routes should avoid sensitive environmental and socio-economic features wherever practicable; where such features cannot be avoided, routes should be located to minimize potential impacts.
3. Existing linear infrastructure should be used or paralleled to the greatest extent feasible to minimize impacts on previously undisturbed environmental and socio-economic features and to limit constraints on future land development.
4. Where new easements are required, existing lot and property lines should be followed to the extent feasible to avoid deviations into previously undisturbed environmental and socio-economic features.

2.2.3 Identify Constraints and Opportunities

Chapter 4 of the OEB Environmental Guidelines (2018), ‘Route or Site Selection’, outlines environmental and socio-economic features that should be considered during the route selection process. Features in the study area were considered as either pipeline routing constraints or opportunities.

Pipeline routing constraints are existing features that meet the following criteria:

- Site-specific mitigation measures would be required to reduce potential effects
- The feature has been selected or designated for protection
- The feature has been recognized through local, regional, provincial, or federal policy, plan, or statute, or is otherwise valued as an environmental or socio-economic resource

Pipeline routing opportunities are existing features which provide a potential location for the alignment of a pipeline to avoid or minimize environmental or socio-economic impact.

Constraints and opportunities were mapped in a Geographic Information System (GIS) database from existing government databases, including base data and environmental data provided through the MNRF's Land Information Ontario (LIO) data warehouse. LIO is the province's central repository for authoritative digital data, from the MNRF itself as well as other governmental departments and agencies.

As illustrated in Appendix C, a variety of routing constraints (as defined above) exist in the study area including: prime agricultural lands, aggregate sites, designated natural gas storage area, greenhouse facilities, roads, and environmental features such as watercourses (including those containing Species at Risk (SAR)), and wooded areas. No known areas of bedrock, watercourses with cold/cool thermal regimes, or wetlands were identified to exist in the study area. Routing opportunities (as defined above) were limited to paralleling lot fabric and existing road allowance.

2.3 IDENTIFY ALTERNATIVE ROUTES

A preliminary preferred route along Simpson Road and Base Line was identified early in the route evaluation process. Stantec was unable to identify any other practical alternative routes in the study area consistent with routing objectives that would be considered practical to be presented at the Information Session. The rationale for discounting any other routes other than the Base Line Road route is discussed in section 2.4.

A summary description of the preliminary preferred route and the discounted alternate routing possibilities is presented below.

The Base Line route originates at the Simpson Road valve station and travels south to Base Line. At Base Line the route travels east to an endpoint on Kent Bridge Road near the intersection of Base Line. This route is approximately 12.8km in length and potentially crosses 10 watercourses or drains, see Section 4.3.1.

The only possible routing option south of Base Line originates at the Simpson Road valve station and travels south to Base Line. At Base Line the route travels east to Centre Sideroad. At Centre Sideroad the route travels southeast and then northeast on Countryview Line to an endpoint near the intersection of Base Line and Kent Bridge Road. This route is approximately 17.2km in length and potentially crosses 20 watercourses or drains.

The only possible routing option north of Base Line Road originates at the Simpson Road valve station and travels north to John Park Line. At John Park Line the route travels east through the community of Tupperville. East of Tupperville the route follows Glasgow Line to the community of Dresden. In Dresden the route goes south on Uncle Tom's Road and then east on Park Street to North Street. At North Street the route travels south to Base Line Road where it turns east to an endpoint near the intersection of Base Line and Kent Bridge Road. This route is approximately 16.7km in length, crosses 11 potential watercourses or drains and travels through two communities.

2.4 ROUTE EVALUATION

The route south of Base Line is the longest in distance and crosses the most watercourses or drains. Given the difference in lot fabric between the municipalities north and south of Base Line, roads and lot lines are oriented diagonally to Base Line. Due to the inconsistent and nonparallel orientation of the lot fabric in the municipality south of Base Line, it was determined that lots lines and roads did not provide an opportunity to provide a reasonably direct route to generate alternate routes between the endpoints.

Using non-direct routes is not consistent with the routing objective to minimize distance between endpoints.

A route north of Base Line is the second longest route and crosses the second most watercourses or drains. This route also travels through the communities of Tupperville and Dresden. Construction of this alternative will result in inconvenience to residences and businesses because of construction activity and increased traffic, noise, and dust. In addition, this route travels closely parallel to the Sydenham River in a number of locations increasing the potential for construction related disturbance to the river. The need to travel through the communities of Tupperville and Dresden and adjacent to the Sydenham River are not consistent with the routing objective to minimize impacts to sensitive environmental and socio-economic features.

The Base Line route was determined to be the only practical route option. The Base Line potential route provides a direct route between the endpoints, has the fewest potential watercourse or drain crossings and is significantly shorter than possible options north and south of Base Line Road. While routing possibilities south and north of Base Line Road follow existing lot and road fabric their significantly greater length excludes them from further consideration. In addition, the Base Line Road route has no direct impacts to the Sydenham River and the communities of Tupperville and Dresden.

2.5 INPUT ON THE ROUTE

The Base Line route was presented as the preliminary preferred route to the public, stakeholders and directly affected landowners though mailed letters, newspaper notices and an Information Session. Further details are provided in Section 3.
No issues or concerns were identified that would change the alignment of the preliminary preferred route (Appendix A, Figure 2).

2.6 CONFIRMATION OF THE ROUTE

As no feedback was received that influenced the selection of the preliminary preferred route, the preliminary preferred route was confirmed as the preferred route (Appendix A, Figure 2). The preferred route is anticipated to be constructed almost entirely within road allowance. Union Gas will undertake detailed design to determine the exact location of the running line, temporary land use requirements and road/watercourse crossing methods. Detailed design will also be influenced by supplemental studies (including environmental studies) and site-specific requests from landowners and agencies. In general, this micro-siting exercise will seek to avoid sensitive natural features to the extent practicable. Union Gas has also committed to minimize the disturbance to natural areas to the extent possible.

3.0 CONSULTATION PROGRAM

3.1 OBJECTIVES

Consultation and engagement is an essential requirement of the *OEB Environmental Guidelines* (2016). Consultation and engagement is the process of identifying interested and potentially affected parties and informing them about the project, soliciting information about their values and local environmental and socio-economic circumstances, and receiving advice about key project decisions before those decisions are finalized.

The consultation program for this project included the following objectives:

- Identify interested and potentially affected parties early in the process
- Inform and educate interested parties about the nature of the project, potential impacts, proposed mitigation measures and how to participate in the consultation program in a clear, concise, relevant and timely manner
- Provide a forum for the identification of issues
- Identify how input will be used in the planning stages of the project
- Summarize issues for resolution, and resolve as many issues as feasible
- Revise the program to meet the needs of those being consulted, as feasible
- Develop a framework for ongoing communication during the construction and operation phases of the project

3.2 IDENTIFYING INTERESTED AND POTENTIALLY AFFECTED PARTIES

The identification of interested and potentially affected parties was undertaken using a variety of sources, including the OEB's OPCC Members List, the MOECC's Environmental Assessment Government Review Team Master Distribution List, and the experience of Union Gas and Stantec. Indigenous communities were identified through provision of a Project Summary to the Ministry of Energy (MOE) in April 2017 (see Appendix B1).

In addition, the parties listed below were among those considered when developing the initial stakeholder contact lists:

- Federal and provincial agencies and authorities, including the SCRCA and members of the OPCC
- Municipal personnel
- Special interest groups
- Indigenous communities
- Directly affected and adjacent landowners

The initial contact list was updated as the environmental study progressed because of changes in personnel, correspondence received and attendees at meetings and the Information Session. The final Agency and Indigenous Contact List is located in Appendix B1.

Directly affected and adjacent landowners were identified through a search of municipal tax rolls and were tracked in a Landowner Contact List. Union Gas also undertook direct consultation with landowners and elected officials. Members of the public who provided feedback or who attended an Information Session were tracked in a Public Contact List.

3.3 COMMUNICATION METHODS

3.3.1 Newspaper Notices

A Notice of Commencement and Information Session was published on February 22 and February 23, 2018 in the Chatham Daily News and the Wallaceburg Courier Press, respectively. The Notice described the project, identified the preliminary preferred route, provided a map, noted the format, time and location of the Information Session, and listed project contact information.

Copies of tear sheets from the newspaper notices are located in Appendix B2.

3.3.2 Letters and Emails

Letters and emails were sent to all parties identified as landowners and those on the Agency and Indigenous Contact Lists between February 16-23, 2018 to inform them of the commencement of the project, outline the environmental study process, introduce the Preliminary Preferred Route and invite them to the Information Session. The letters included a copy of the Notice of Commencement and Information Session that was published in the newspaper. The letters and emails sent to agencies solicited information on planning principles or guidelines that may affect the project, background environmental and socio-economic information, and other developments proposed in the area. The letters and emails sent to Indigenous communities requested information on adverse impacts that the project may have on constitutionally protected aboriginal or treaty rights and measures for mitigating those adverse impacts.

Generic copies of the letters noted above are located in Appendix B3.

3.3.3 Display Boards, Newsletter and Exit Questionnaire

Display boards were developed for the Information Session. The display boards presented at the Information Session provided information on the project, the regulatory process, the Preliminary Preferred Route, environmental mitigation and next steps. A newsletter was developed for distribution at the Information Session to summarize the content provided on the display boards.

An exit questionnaire was also provided to Information Session attendees. The exit questionnaire requested feedback on potential impacts, the preliminary preferred route, and the content of the Information Session.

Copies of the display boards, newsletters and exit questionnaire are located in Appendix B4.

3.3.4 Project Webpage

A project webpage was developed on the Union Gas website (uniongas.com/projects/ck-rural-pipeline). The webpage contained information on the project, the regulatory process and Union Gas' commitment to the environment. Communication materials were regularly updated on the webpage as the environmental study progressed. The project webpage was communicated to interested and potentially affected parties on the newspaper notices, display boards and newsletter.

3.4 CONSULTATION EVENTS

3.4.1 Meetings

As part of the routing process, meetings occurred between Union Gas and the municipality to discuss the planning process and to receive feedback on permitting requirements. Following the selection of the preliminary preferred route, additional outreach has occurred to review the route and obtain more detailed feedback on permitting requirements.

3.4.2 Information Session

An Information Session was held for the project on March 6, 2018 from 5:00 p.m. to 8:00 p.m. at the Old Czech Hall in Dresden, Ontario.

The purpose of the Information Session was to:

- Inform the community about the project
- Present the Preliminary Preferred Route
- Provide attendees the opportunities to ask questions and comment on the project
- Respond to questions and comments

At the Information Session, Union Gas and Stantec representatives were present to provide details on the project, answer questions, and receive comments. Display boards and newsletters were provided to inform attendees about the project and exit questionnaires were provided to encourage feedback (see Section 3.3.3). The Information Session registered 25 attendees. Attendees included mostly landowners and members of the public. Attendees who registered their attendance were added to the appropriate contact list. These lists may be used to distribute future project notices. Three completed exit questionnaires were received.

3.5 INPUT RECEIVED

The consultation and engagement program allowed interested or potentially affected parties to provide input into the project. Input was evaluated and integrated into the project. The following sections summarize key input received.

A comment-response summary table and a copy of all written comments and responses are located in Appendix B5.

3.5.1 Public Input

Five (5) comments were received from members of the public at the time of writing this ER. The main areas of input included:

- Potential impacts from the micro-siting within the preferred pipeline route (south vs. north side of Base Line)
- How soil and drainage is managed
- Utilities in the road ditches
- Unique features along the route

3.5.2 Agency Input

One comment was received from an agency at the time of writing this ER. The main area of input included:

- The MTCS outlined the process to be followed for identifying and reporting archeological resources, built heritage and cultural heritage landscapes, and asked for an update on Stage 1 Archaeological Assessment.

3.5.3 Municipal Input

Union Gas has met with the Municipality of Chatham Kent multiple time both in an office and on the proposed site to discuss existing utilities and the most suitable locations for avoiding these utilities.

3.5.4 Indigenous Input

As a result of the MOE Duty to Consult letter, Union Gas has requested input, by letter or email, from the following Indigenous communities:

- Aamjiwnaang First Nation
- Bkejwanong (Walpole Island) First Nation
- Caldwell First Nation
- Chippewas of the Thames First Nation
- Chippewas of Kettle and Stoney Point
- Oneida Nation of the Thames.

Union Gas is undertaking all direct engagement and meetings with Indigenous communities and will outline the status of such engagement in their ‘Leave to Construct’ application to the OEB. No comments

regarding the environmental study were received from Indigenous communities at the time of writing this ER.

3.5.5 Interest Group Input

No comments were received from interest groups at the time of writing this ER.

3.6 REFINEMENTS BASED ON INPUT

At each stage of the consultation program input received was compiled, reviewed, and incorporated into the environmental study process. No objections or inputs to the preferred route were received.

Union Gas has committed to on-going consultation with directly affected and interested parties through detailed design and construction and will continue to respond to concerns through the life of the project. Input from agencies was reviewed and considered during the identification of potential impacts and determination of mitigation and protective measures.

The Union Gas lands department is committed to work with directly affected landowners to address specific concerns they may have regarding tile drainage repairs, monetary compensation, land access during construction, field crew access, and safety.

In southern Ontario, it is not uncommon for residential homes to be located adjacent to natural gas transmission corridors. The proposed pipeline will be designed to meet or exceed all safety regulations and codes.

4.0 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION

4.1 METHODOLOGY

The potential effects and impacts of the project on physical, biophysical and socio-economic features have been assessed along the proposed pipeline route. With an understanding of pipeline construction and operation activities (see Sections 4.1.1 and 4.1.2), the assessment:

- Describes the environmental and socio-economic setting along the proposed pipeline route
- Predicts the effects and associated impacts of pipeline construction and operation activities
- Recommends supplemental studies, mitigation and protective measures (including pipeline construction methods and timing, site-specific mitigation, environmental protection measures, and compensation measures)
- Outlines the net impacts that are likely to remain

The inventory of existing environmental conditions, determination of effects and impacts, and mitigation and protective measures are a reflection of:

- Comments expressed during the consultation program
- Information available from published and unpublished literature
- Maps and digital data
- Mitigation guidance documents
- Field visits conducted by Stantec technical staff
- The pipeline development experience of Union Gas and Stantec

By necessity, the analysis, integration, and synthesis of the data is an iterative process since information becomes available at various stages of the study and at different mapping scales. The level of detail of data and mapping increases as the study moves from analysis of the study area, to analysis of alternative routes, to a site-specific survey of features along the proposed pipeline route. The data available at the current stage of the environmental study is appropriate for predicting effects and potential impacts and recommending mitigation and protective measures.

Specific information requests were made to several agencies throughout the project. The information continues to be collected to identify environmental features and constraints located on and adjacent to the proposed pipeline route, the potential presence of SAR and their habitat, predicting effects and potential impacts, and developing mitigation and protective measures. Where agencies requested that information be kept confidential, such as the precise location of rare, threatened, vulnerable or endangered species, such information would be withheld from the report or mapped in such a way that specific site locations cannot be determined. If new information surfaces that changes the interpretations contained in this report appropriate mitigation measures will be identified.

Preliminary site-specific field surveys were completed during preparation of the ER. This information was used to review background and third-party information and assist in developing mitigation and site-specific protective measures.

The existing conditions maps (Appendix C) have been generated from base mapping provided from Union Gas and data obtained from LIO. Conservation Authority regulated area data was obtained from SCRCA. Scales have been adjusted from the original to better represent the features mapped. Stantec has digitally reproduced features added to the base maps. Additional mapping sources are identified on the respective map, and in the references.

There are instances where field investigations are recommended along the proposed pipeline route before construction. Given the location of the proposed pipeline route and experience of Stantec in providing environmental services for natural gas pipelines, these supplemental studies are not expected to change the conclusions regarding potential adverse residual impacts. The environmental and socio-economic information presented in the ER is based on sources cited throughout.

4.1.1 Construction

The preferred route for the proposed pipeline project is within existing road allowances. The land uses adjacent to the road allowances consist of residential front yards, driveways, and agricultural lands. The pipeline construction process within a road allowance includes various activities as described below:

1. Site Preparation and Clearing: The first crew to enter the construction site is typically the survey and staking crew who delineate the boundaries of the construction site and temporary work areas within the existing road allowances. Next, the clearing crew clears brush and trees (typically during winter, under frozen ground conditions). In the spring, the crew braces and cuts any fences requiring relocation within the construction site. Safety fence is installed at the edge of the construction site where public safety considerations are required, and aspects of the traffic management plan are implemented (i.e., signs, vehicle access). At this time, pre-tiling work would be completed, if encountered, to accommodate agricultural drainage on temporary land use areas or for outlets extending from adjacent fields into the road allowances.
2. Grading and Stripping: Next, the grading crew prepares the construction site for access by construction equipment. At this stage, if temporary workspace requirements impact agricultural lands, the topsoil is stripped by bulldozers, excavators, or graders then segregated so it will not be lost or mixed with subsoil. Within the construction site, overburden soils will be stripped and stored for backfill operations.
3. Stringing: The stringing crew lays pipe on wooden skids adjacent to the trench area.
4. Pipe Fabrication: Next, the pipe is bent as required and the welding crew welds the pipe into continuous lengths. The pipe welds are non-destructively tested (i.e. x-ray) and coated.
5. Trenching and Lowering-in: After the pipe is fabricated, a trenching machine or hydraulic excavator can begin excavating the trench. If agricultural lands are impacted, tiles encountered during the trench excavation are flagged and repaired as quickly as practical. Crews also install pipes under

obstacles such as roads or watercourses through a variety of different means. Then, the mainline pipe is lowered into the ditch.

6. Backfilling: On sites within road allowances, the backfilling crew backfills the originally excavated soil over the pipe in the trench. In stony areas, the pipe may be sand-padded to protect the coating. In shallow water table areas, the pipeline may be weighted to provide negative buoyancy. If adjacent agricultural areas are impacted, after the trench is backfilled, a tiling crew repairs disturbed or broken tiles if they were encountered. Landowners with tile drainage are given the opportunity to inspect tile repairs. A tile consultant can be retained to oversee tile repairs and the design of a header tile system if required. Agricultural land may require decompaction (i.e. chisel ploughing) and stone picking of the subsoil for productivity. Where adjacent agricultural areas were impacted, the original topsoil is replaced after the preparation of the subsoil is complete.
7. Hydrostatic Testing: The pipeline is then tested hydrostatically. Water is typically drawn by permit from nearby water sources such as watercourses or lakes, if available. Municipal water may, at times, also be used for hydrostatic testing. Upon completion of the hydrostatic testing, the pipeline is purged of air and packed with natural gas.
8. Clean-Up and Restoration: The clean-up crew is responsible for the restoration of the construction site and other impacted areas. In the road allowance, the clean-up crew undertakes restoration including re-seeding of the construction site and restoring ditch banks and watercourse crossings and removing erosion and sediment controls when vegetation is re-established.

4.1.2 Operation

Pipeline operation consists of gas flowing through the pipeline. Mainline valves located at the proposed stations will serve to shut off and isolate the pipeline for maintenance and security purposes. Additional above-ground facilities along the pipeline include post-mounted signs identifying the pipeline, aerial patrol signs for fixed wing patrols, fence stiles, foot bridges for ditch crossings, and "test boxes" located along fence lines at roads that are used to assess the adequacy of the corrosion protection system.

Once the pipeline is operational, the following activities are undertaken to patrol and maintain the pipeline:

- Completing a ‘line walk’ of the entire pipeline by Union Gas personnel once a year to check for exposed pipelines, evidence of damage to aboveground equipment and piping, evidence of damage to underground piping and gas leaks, and identify any construction activity near the pipeline construction site.
- Checking cathodic corrosion protection – an electric current that runs along the length of the pipeline to prevent the development of corrosion
- Reviewing operating conditions of pipeline facilities such as valve sites
- Completing depth of cover surveys, so that the amount of soil cover over the pipeline is maintained
- Performing periodic inspection by running electronic tools through the interior of the pipeline to assess for the presence of corrosion or dents and the need for repairs

- Completing class location surveys, adding all new buildings and structures to the Union Gas mapping system

4.2 PHYSICAL FEATURES

4.2.1 Bedrock Geology and Drift Thickness

Existing Conditions

The bedrock geology along the proposed pipeline route is comprised of Kettle Point Formation (OGS, 1991).

A review of available well logs in the Water Well Records (WWR) within 500 m of the proposed pipeline route indicate depth to bedrock between approximately 6.1 to 51.8 m below ground surface (BGS).

Maps of bedrock geology and drift thickness are in Appendix C, Figures 1 and 2, respectively.

Potential Impacts

The background information indicates that bedrock is not likely to be encountered. If bedrock is encountered during trench excavation, it will be excavated by hoe-ram or blasting. Where bedrock materials are excavated, noise, vibration and dust may impact wildlife and residents.

Mitigation and Protective Measures

Mitigation and protective measures for sensory disturbance to wildlife are outlined in Section 4.3.3 and to residents are outlined in Section 4.4.3. Should blasting occur, mitigation measures should follow those outlined in the Union Gas Blasting Specification. As blasting will not occur near watercourses, no mitigation or protective measures are required.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts as a result of bedrock removal are anticipated.

4.2.2 Surficial Geology and Physiography

Existing Conditions

The proposed pipeline route commences within the physiographic region of the St. Clair Clay Plains (first 1.5 kilometers) and then proceeds east-ward through the physiographic region of the St. Clair Sand Plains (Chapman and Putnam, 1984).

Surficial geology mapping indicates that the pipeline crosses course-textured glaciolacustrine deposits for the majority of its length, with both start and endpoints of the proposed pipeline within massive to well-laminated glaciolacustrine deposits (OGS, 2010). A small section of the proposed pipeline crosses an area of older alluvial deposits.

Topography along the proposed pipeline route is flat, with elevation changes ranging from 1-3 m.

Maps of physiography and surficial geology are in Appendix C, Figures 3 and 4, respectively.

Potential Impacts

Disturbance to the overburden along the proposed pipeline may cause surface soil erosion and trench slumping during construction or post-construction at areas that may require further rehabilitation.

Mitigation and Protective Measures

Surface soil erosion can result from the absence of vegetative cover. Where there is potential for soil erosion, the need for and location of erosion and sediment control (ESC) measures will be recommended by an inspector with appropriate qualifications and installed prior to the commencement of clearing.

When land is exposed, the exposure should be kept to the shortest practical period. Natural features will be preserved to the extent practical. It is recommended that measures such as temporary vegetation and erosion control matting be used to protect areas as appropriate. Where appropriate, natural vegetation should be re-established as soon as practical.

The contractor must obtain adequate quantities of materials to control erosion. Additional supplies should be maintained in a readily accessible location for maintenance and contingency purposes. ESC features should be reviewed to maintain their effectiveness through the life of construction and post-construction rehabilitation.

Extreme precipitation events could result in damage to ESC measures which could lead to erosion. When site conditions permit, ESC measures should be maintained and re-installed on erosion susceptible surfaces. If the erosion is resulting from a construction-related activity, the activity should be halted immediately until the situation is rectified.

To avoid the trench from slumping, Stantec recommends that trench walls be sloped and be monitored during wet conditions for the potential to slump.

For watercourse crossings, the requirement for and location of ESC measures should adhere to Union Gas' DFO-endorsed Generic Sediment Control Plans (see Appendix D). Slope stability should be reviewed at crossing locations. Watercourse banks should be seeded and stabilized immediately following crossing. ESC and stabilization measures should be maintained during construction, restoration and rehabilitation until vegetative cover is established. Where evidence of erosion exists, corrective control measures should be implemented as soon as conditions permit.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on or from the overburden material are anticipated.

4.2.3 Hydrogeology

Existing Conditions

Based on physiographic (Chapman and Putnam, 1984) and surficial geology mapping (OGS, 2010), the proposed pipeline route traverses course-textured glaciolacustrine deposits, and localized fine-textured glaciolacustrine deposits and older alluvial deposits. Aquifer vulnerability mapping indicates high aquifer vulnerability along almost the entire proposed pipeline route (MOECC, 2016a), with a vulnerability score of 6 out of 10, except for the eastern end of the route (Appendix C, Figure 5). Highly vulnerable aquifers primarily correspond to areas with coarser textured earthen materials.

The MOECC WWRs within 500 m of the pipeline section indicate approximately 151 registered water wells, 29 of which are labelled domestic (MOECC, 2018). A review of 62 MOECC WWR for which water level data was available indicated that 17 wells are installed within the overburden at depths ranging from 7.6 m BGS to 28.9 m BGS. The groundwater level measured in these 17 wells ranged from 1.8 m BGS to 15.2 m BGS. There is a buried domestic water system servicing the fire hydrants that exist along Base Line. It is assumed that this municipal water line services the businesses and residences along Base Line.

Regional groundwater flow near the proposed pipeline route in the overburden aquifer is generally to the west towards Lake St. Clair (MOECC, 2016a). Local groundwater flow conditions are impacted by surface water features.

The proposed pipeline does not cross through any wellhead protection areas (WHPA) since there are no municipal groundwater intake supply systems nearby. A review of nearby surface water system intake protection zones (IPZs) indicates that the preferred pipeline route does not cross any IPZ-1 or IPZ-2 for a surface water system (MOECC, 2016a). The western end of the proposed pipeline route has a small area within IPZ-3 which is the least sensitive of the three zones. Since the proposed pipeline is almost entirely outside the sensitive zones, it is not considered a significant source water threat.

Appendix C, Figure 5 shows groundwater conditions and aquifer vulnerability.

Potential Impacts

Hydrostatic Testing and Dewatering/Sand-pointing

Once the installation of the proposed pipeline is complete, a hydrostatic test will be undertaken. The hydrostatic test will involve filling the new pipeline with water, and then compressing and holding the water for a specified time to confirm the structural integrity. The source of the water is typically either surface water or from a domestic source. In this case, since there is a locally accessible domestic source, from the hydrants on Base Line, it is anticipated that the source would be domestic. Once the test is complete the water would be released to the environment.

If during trenching, shallow groundwater conditions are encountered or following a large precipitation event, removing water from the trench (known as dewatering) may be necessary. During trench dewatering, discharge water may be released to the environment. An uncontrolled discharge of water could cause downstream flooding, erosion, sedimentation or contamination.

Private Water Wells

There are approximately 151 water wells registered within 500 m of the proposed pipeline route, 29 of which are labelled domestic. The majority of these private domestic wells are drilled into the bedrock and are located greater than 200 m from the proposed pipeline route, with only 14 mapped private domestic supply wells within a 100 m radius. Depending on the proximity to wells, the depth of the well installation and the groundwater levels encountered during typical excavation, trench dewatering has the potential to impact water well quality or quantity at some of the overburden supply wells.

Municipal Water Supply

The proposed pipeline does not extend through any WHPAs associated with any municipal groundwater supply system but does extend, briefly, through the IPZ-3 for the nearby surface water systems. The western portion of the pipeline extends through an area mapped as a highly vulnerable aquifer, with vulnerability scores of 6.

There is a municipal water supply line that runs within the Base Line road allowance. The construction of the proposed pipeline has the potential to cause a temporary disruption to the flow of water supplied by the pipeline.

Based on *the Clean Water Act* (2006), there are no significant chemical, pathogen or dense non-aqueous phase liquids source water threats to municipal supply sources based on the construction or operation of the proposed pipeline.

Mitigation and Protective Measures

Hydrostatic Testing and Dewatering/Sand-pointing

For groundwater dewatering, the MOECC allows registration under the EASR for construction dewatering projects where takings will be greater than 50,000 L/day and less than 400,000 L/day; however, if groundwater takings exceed 400,000 L/day, a PTTW may be required from the MOECC.

If surface water is used as the source water for the hydrostatic test, a PTTW application would be required and would include an assessment of the capacity of the source to provide the required water without impacting the ecosystem, and recommendations for mitigation measures such as screened water intakes to limit intake of debris and organisms and energy dissipation/erosion control measures during discharge to limit erosion and sedimentation.

If municipal water is used as the source water for the hydrostatic test, approval should be obtained from the MOECC for a Class IV – Planned Spill/Release. The request for approval would include details of proposed discharge, proposed mitigation measures and potential impacts to the receiving environment.

To reduce the potential for erosion and scouring at discharge locations during construction dewatering/sand-pointing and/or hydrostatic testing, energy dissipation techniques may be used. Discharge piping should be free of leaks and be properly anchored to prevent bouncing or snaking during surging. Protective measures may include dewatering at low velocities, dissipating water energy by discharging into a filter bag or equivalent, and utilizing protective riprap or equivalent. If energy dissipation measures are found to be inadequate, the rate of dewatering should be reduced or dewatering

discontinued until satisfactory mitigation measures are in place. Discharge should be monitored to make sure that no erosion or flooding occurs.

To assess the potential for introduction of contaminated water to soils or bodies of water, testing of hydrostatic and trench dewatering discharge water should be considered. Testing requirements can be influenced by the nature and quality of the source water used, any additives to the test water, the nature of the pipeline, and pipeline contents. An environmental consultant should be consulted to determine what testing is necessary for the discharge water.

If a planned interruption to the flow of water in the municipal water line is required for the proposed construction project, users of the water should be notified in advance. Issues regarding the interruption should be appropriately addressed. If an incidental interruption to flow occurs as the result of the construction project, impacts to users of the water should be appropriately addressed.

Private Water Wells

A private water well survey should take place to assess domestic groundwater use near the preferred pipeline route and a private well monitoring program may be recommended for residents who rely on overburden groundwater supply for domestic use.

Highly Vulnerable Aquifer

During construction, the primary concern to groundwater quality is the potential for a contaminant spill.

- Due to the highly vulnerable aquifer area, refueling of equipment in this area should include special refueling procedures designed for sensitive areas. This includes, at a minimum, using a two-person refueling system with one worker at each end of the hose.
- To reduce the impact of potential contaminant spills, the contractor should implement management protocols such as two operators on the fuel truck; one at either end of the hose, secondary containment of any temporary fuel storage and preparation of a spill response plan.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on groundwater are anticipated.

4.2.4 Extractive Resources: Aggregates and Petroleum Pools

Existing Conditions

A review of aggregate resource deposits in the Municipality of Chatham-Kent OP (2017) indicates that no aggregate resources are located within the study area. The Municipality of Chatham-Kent OP does identify both active and abandoned petroleum pools along the preferred proposed pipeline route. Ministry base mapping confirms that an active and an abandoned petroleum pool occur along the proposed pipeline route and that several petroleum wells occur within the study area (LIO, 2016).

A map of extractive resources and gas pools can be seen in Appendix C, Figure 6.

Potential Impacts

Since the proposed pipeline route is located within existing road allowances and there are no aggregate extraction sites located along the route, potential impacts to aggregate resources are not anticipated.

The proposed pipeline route crosses a designated gas storage area operated by Enbridge Gas Distribution, an active natural gas pool and an abandoned natural gas pool. Due to the shallow nature of pipeline construction, no impacts to these natural gas features are anticipated.

Mitigation and Protective Measures

Since potential impacts to extractive resources, natural gas storage areas or natural gas pools are not anticipated, mitigation and protective measures have not been developed.

4.2.5 Soil and Soil Capability

Existing Conditions

There are eight soil types identified along the proposed pipeline route; Colwood silt loam, Maplewood fine sandy loam, Normandale loamy very fine sand, Plainfield fine sand, St. Williams very fine sandy loam, Toledo loam, Tuscola silt loam and Tavistock loam (LIO Soil Survey Complex, 2017a). This is a comparatively large variety of soil types along a 13 km route. The locations and extent of these soils are shown in Appendix C, Figure 7. These soils range in texture from silt loam to sand which is a common textural range for upland terrain for this area of Ontario.

Soil capability for agricultural lands is mapped in the Canada Land Inventory for Agriculture (CLI) by Agriculture and Agri-Food Canada on a scale from one to seven. Lands classified as Class 1 are the most agriculturally productive, while those classified as Class 7 have the lowest capability for agriculture. Class 1 to 5 agricultural lands are generally arable, while classes 1 through 3 are defined by the Ontario Ministry of Agriculture, Food and Rural Affairs to be prime agricultural soils for common field crop production.

The greater area surrounding the study area is known for its' high concentration of prime agricultural lands. The preferred route is within existing road allowances. As can be seen in Appendix C, Figure 8, the soils adjacent to the proposed pipeline route, outside of the disturbed roadway, range in CLI rating from Class 1 to Class 3 which are prime agricultural lands. Class 1 soils have no limitations in use for crops. Class 2 soils have moderate limitations that restrict the range of crops or require moderate conservation practices. Class 3 soils have moderately severe limitations that restrict the range of crops or require special conservation practices (AAFC, 2005).

Potential Impacts

The proposed pipeline route is within road allowances that are adjacent to prime agricultural land. During construction, the work zone may extend beyond the road allowance to allow for stringing of pipe or undercrossing of existing infrastructure. At these locations, potential impacts to agricultural topsoil may occur as a result of construction including compaction, loss of organic matter and degraded soil structure. No agricultural topsoil should be removed from the site. Excess subsoil may be removed from the site.

Trenching and construction activities on agricultural land have the potential to affect soil quality and agricultural capability. The movement of heavy machinery on wet soil may cause rutting, compaction, and mixing of topsoil with subsoil. When exposed, soils are more prone to erosion from the loss of vegetative cover. Improperly salvaged topsoil can result in topsoil and subsoil mixing, compaction, rutting, and erosion, which can potentially decrease crop yields.

If equipment is moving from one agricultural field to another, there is the potential for the spread of soil pests/diseases to previously unimpacted fields.

Mitigation and Protective Measures

Excess Soil

If excess soil is generated from the road allowances along the proposed construction project, it is recommended that Union Gas meet the guidelines and regulations regarding the handling of access soil. If detailed information is required, it is recommended that Union retain a qualified person (QP) who is knowledgeable in the current excess soils guidelines, as well as the proposed MOECC regulation, to make recommendations for the management of excess soils for this project.

Wet Soil Shutdown

To the extent feasible, construction activities are recommended to occur during drier times of the year. Lands affected by heavy rainfall events should be monitored for excessively wet soil conditions. If adjacent agricultural lands are impacted, construction activities on those lands should be temporarily halted while excessively wet soil conditions exist, as per Union Gas' standard wet soils shutdown practice. Union Gas' on-site inspection team will determine when it is appropriate for construction activities to resume.

If a situation develops that necessitates construction during wet soil conditions, soil protection measures should be implemented, such as confining construction activities to the least area practical, installing soil surface protection measures, and using wide tracked or low ground pressure vehicles.

High Winds

During construction activities, weather should be monitored to identify the potential onset of high wind conditions and to limit wind erosion. If high winds occur, the contractor should implement protective measures such as:

- Suspend earth moving operations
- Apply dust suppressants or vegetate the piles
- Protect soil stockpiles with a barrier or windscreen

In conjunction with the above measures, all required materials and equipment should be readily accessible and available for use as required.

Soil Stripping

If construction impacts privately owned lands, Union Gas should discuss, with the landowner, the proposed method of handling topsoil on their property. Landowner requests, and preferences for

additional stripping or no stripping, should be accommodated where practicable. If topsoil stripping is undertaken on agricultural land, topsoil and subsoil should be stripped and stockpiled separately to avoid mixing. On those agricultural lands, topsoil depth should be measured prior to stripping so that the proper depth of topsoil is removed and replaced.

If clean-up is not practical during the construction year, it will be undertaken in the year following construction, starting once the soils have sufficiently dried. Interim soil protection measures should be implemented in sensitive areas to stabilize the construction site for over-wintering.

Soil Compaction

If agricultural lands are compacted by the construction process, an agrologist should determine where decompaction may be necessary. Compaction can be alleviated by using an agricultural subsoiler, followed by discing, chisel ploughing and cultivating, to smooth the surface, this should be considered on agricultural lands. In high traffic agricultural lands, where deep compaction persists, additional deep tillage or subsoiling may be required on a site-specific basis. Soil density and/or penetrometer measurements on and off the agricultural lands may be used as a means of assessing the relative degree of soil compaction caused by construction as well as determining that the disturbed area has been sufficiently decompacted.

Soil Pests/Diseases

Prior to the initiation of construction Union Gas, in consultation with the landowner and an agrologist, should develop and implement a soil sampling plan for any impacted agricultural lands to screen for potential pests and/or diseases that are known to the area. If the results indicate an issue or concern, in consultation with the landowner, Union Gas should work with an agrologist if necessary, to develop a best practice protocol. Additionally, any imported topsoil used for rehabilitation on agricultural lands should also have a composite sample analyzed for identified concerns before it is placed on the construction site.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on soil or soil capability are anticipated.

4.2.6 Agricultural Tile Drains

Existing Conditions

Adjacent to the preferred pipeline route there are multiple properties mapped as containing both systematic and random agricultural tile drains. Even though the preferred pipeline route is within existing road allowance, agricultural tile drains may be impacted on temporary land use areas or tile outlets within the construction site (LIO, 2017b). A map of agricultural tile drains is located in Appendix C, Figure 9.

Potential Impacts

Construction activities, including trenching and the movement of heavy machinery, have the potential to crush and/or sever agricultural tile drains.

Mitigation and Protective Measures

If agricultural lands are impacted, Union Gas should undertake consultation with the landowners to confirm where systematic tile drainage is present. Tile drains impacted by the project should be appropriately handled. In the unlikely event that tile drainage is encountered within the construction site, standard mitigation measures should be followed to avoid flooding of tiles upstream and avoid flooding of the construction site.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on agricultural tile drains are anticipated.

4.2.7 Natural Hazards

Existing Conditions

Natural hazards are elements of the physical environment that have the potential to affect a project in an adverse manner. Potential natural hazards along the proposed pipeline route are limited. Natural hazards that may occur are seismic activity and flooding.

The proposed pipeline route lies within the southern Great Lakes Seismic Zone (Natural Resources Canada, 2016). This zone has a low to moderate level of seismicity when compared to the more active seismic zones to the east, along the Ottawa River and in Quebec. Over the past 30 years, on average, two to three magnitude 2.5 or greater earthquakes have been recorded in the southern Great Lakes region. By comparison, over the same time period, the smaller region of Western Quebec experienced 15 magnitude 2.5 or greater earthquakes per year.

Three moderate sized (magnitude 5) events have occurred in the 250 years of European settlement of this region, all of them in the United States - 1929, Attica, New York, 1986, near Cleveland, Ohio, and 1998, near the Pennsylvania/Ohio border. All three of these earthquakes were widely felt but caused no damage in southern Ontario.

A map of the floodplain and regulation limits of SCRCA is located in Appendix C, Figure 10.

Potential Impacts

The probability of significant seismic activity in the area traversed by the proposed pipeline is low; therefore, no potential impacts are anticipated.

The likelihood of a flooding event interfering with pipeline construction is reduced by construction occurring outside of the spring freshet. A flooding event during construction could result in construction delays, soil erosion, sedimentation of a watercourse, trench slumping, and damage or loss of construction equipment and contamination of a watercourse as a result of equipment entering a watercourse. The nature of these impacts would depend on the spatial extent, duration, and magnitude of the flooding event.

Mitigation and Protective Measures

If flooding necessitates a change in the construction schedule, affected landowners and regulatory agencies should be notified and construction should continue at non-affected locations. Temporary workspaces, should be located above the floodplain to the extent practical, unless necessary for watercourse crossings. All work in the floodplains will be subject to a permit under O. Reg. 171/06 from SCRCA.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts from natural hazards are anticipated.

4.3 BIOPHYSICAL FEATURES

4.3.1 Aquatic Features

Existing Conditions

The proposed pipeline route is located in the Lower East Sydenham and Lake St. Clair Tributaries subwatershed, within the jurisdiction of the SCRCA (Appendix C, Figure 11). According to the DFO Drain Class Mapping, which shows natural and constructed drainage, the preferred pipeline route crosses 10 watercourses. Several of which are also municipal drains (Appendix C, Figure 12).

Information on the watercourses crossed by the proposed pipeline is provided below by subwatershed.

Lower East Sydenham Subwatershed (Stream Crossing 1 (SC1) and SC2)

The Lower East Sydenham Subwatershed drains an area of approximately 397 km^2 (SCRCA 2013a) and includes two small drainage features, Cross Drain (SC1) and Stone and George Drain (SC2). Stone and George Drain has been classified as a municipal drain and at the proposed crossing is a Type T Drain (tiled) (MNRF, 2018a).

Lake St. Clair Tributaries Subwatershed (SC3 to SC10)

The Lake St. Clair Tributaries subwatershed includes Maxwell Creek, Little Bear Creek, and Rankin Creek, and their tributaries. This subwatershed drains an area of approximately 484 km^2 (SCRCA 2013b) and four of the watercourses in this subwatershed are municipal drains (SC5, SC6, SC7 and SC8) (MNRF 2018b). Fish species documented in the Lake St Clair watershed which includes the Lower East Sydenham River are provided in Table 4-1.

SC3 is a warm water feature and is the only watercourse that crosses the proposed pipeline route that has been assigned a thermal regime (MNRF 2018a). DFO assigns Drain Types to the watercourses. Among the eight watercourse crossings in this subwatershed, there is one Type B Drain (permanent flow regime, spring spawning fish species, sensitive species present) and five Type F Drains (intermittent flow regime), and two Type T Drains (Tiled) (Appendix C, Figure 12).

Table 4-1: Fish Species in the Lake St. Clair Tributaries Subwatershed

Fish Species in the Lake St. Clair Tributaries Subwatershed	
Common Name	**Latin Name**
Black Bullhead	*Ameiurus melas*
Central Mudminnow	*Umbra limi*
Channel Darter	*Percina copelandi*
Grass Pickerel	*Esox americanus vermiculatus*
Ghost Shiner	*Notropis buchanani*
Goldfish	*Carassius auratus*
Gizzard Shad	*Dorosoma cepedianum*
Lake Chubsucker	*Erimyzon sucetta*
Largemouth Bass	*Micropterus salmoides*
Northern Pike	*Esox lucius*
Pugnose Minnow	*Opsopoeodus emiliae*
Pugnose Shiner	*Notropis anogenus*
Pumpkinseed	*Lepomis gibbosus*
Silver Chub	*Macrhybopsis storeriana*
Spotted Sucker	*Minytrema melanops*
Sunfish Species	*Centrarchidae sp.*
White Crappie	*Pomoxis annularis*
Yellow Bullhead	*Ameiurus natalis*

Source: SCRCA 2013a

Aquatic Species at Risk

The proposed pipeline route crosses drains that are tributaries of Maxwell Creek and Little Bear Creek (MNRF 2018a). Based on a review of the DFO aquatic SAR digital data (DFO 2018), Maxwell Creek at the proposed crossing location (SC3) may support Grass Pickerel.

Based on a review of the DFO aquatic digital SAR data (DFO 2018), at the proposed crossing locations of Little Bear Creek tributaries (SC8 and SC9), the watercourses support at least one of the following fish SAR: Blackstripe Topminnow, Grass Pickerel, Lake Chubsucker, Pugnose Minnow, Spotted Sucker and/or Pugnose Shiner. According to the *Recovery Potential Assessment of Pugnose Shiner* (MNR, 2010a) Pugnose Shiner has been confirmed in Little Bear Creek.

In-water work at locations that support a SARA Schedule 1 Threatened or Endangered species will require approval under the SARA (2002) and any in-water work at locations that support a ESA Threatened or Endangered species will require approval under the ESA (Table 4-2). Consultation is currently on-going with the MNRF and DFO to confirm the presence of aquatic SAR along the proposed pipeline route.

Table 4-2: Potential Aquatic Species at Risk in Study Area Watercourses

Common Name	Scientific Name	Provincial Status (COSSARO/ESA)	Federal Status (COSEWIC)	Federal Status (SARA)
Blackstripe Topminnow	*Fundulus notatus*	SC	SC	Schedule 1 – SC
Grass Pickerel	*Esox americanus vermiculatus*	SC	SC	Schedule 1 – SC
Lake Chubsucker	*Erimyzon sucetta*	THR	END	Schedule 1 – END
Pugnose Minnow	*Opsopoeodus emiliae*	THR	THR	Schedule 1 – SC
Pugnose Shiner	*Notropis anogenus*	THR	THR	Schedule 1 – END
Spotted Sucker	*Minytrema melanops*	SC	SC	Schedule 1 – SC

COSSARO – Committee on the Status of Species at Risk in Ontario
ESA – *Endangered Species Act*, 2007
COSEWIC – Committee on the Status of Endangered Wildlife in Canada
SARA – *Species at Risk Act*
END – Endangered - a species facing imminent extinction or extirpation
THR – Threatened - a species that is at risk of becoming endangered
SC – Special Concern - a species with characteristics that make it sensitive to human activities or natural events
Sources:
MNRF, 2018b; MNRF, 2018c; Government of Canada, 2018

Potential Impacts

The proposed pipeline route crosses an estimated 10 watercourses. The number and location of the crossings should be confirmed following field investigations. Field surveys should be conducted prior to construction to confirm aquatic habitat conditions and fish communities. The results of the surveys, including any additional appropriate mitigation or protection measures, should be summarized in a report and distributed to appropriate agencies and municipalities for review and comment.

Union Gas has worked with the DFO since the late 1990's to develop watercourse crossing plans that meet the requirements of DFO for fish and fish habitat protection. These plans include isolated watercourse crossing methods such as the Dam and Pump crossing method, and trenchless crossing methods such as the Horizontal Directional Drill (HDD) method. Union Gas has adopted these plans and uses the methods and practices outlined in the plans in its construction specifications for pipeline construction projects.

Dam and Pump Crossing

The Dam and Pump Crossing method isolates water flow from the construction area and avoids most of the technical risks inherent in other crossing techniques. Construction of an open cut crossing has the potential to affect fish directly through impacts on water quality (erosion, sedimentation, and accidental spills), disruption/harassment (vibration and noise) and loss of habitat. Indirect impacts include restrictions to habitat use and fish passage. Long term impacts can include changes to habitat such as substrate, increased erosion potential, loss of in-stream cover and riparian shading.

Horizontal Directional Drilling

HDD may be utilized to install the proposed pipeline underneath a watercourse at select crossing locations. The HDD process involves drilling a pilot bore hole underneath the watercourse and back-

reaming the bore hole to the drill rig while pulling the pipe along through the hole. This process typically uses the freshwater gel mud system composed of a mixture of freshwater as the base, bentonite (clay-based drilling lubricant) as the viscosifier, and synthetic polymers. Potential impacts that may result from HDD include the escape of drilling mud into the environment, tunnel collapse, or the inadvertent release of fluid to the surface.

Mitigation and Protective Measures

Mitigation and protective measures for erosion and sediment control are outlined in Section 4.2.2 and accidental spills in Section 6.2.2.

HDD and dam and pump pipeline crossings should be completed following the measures outlined in the agreement letter between Union Gas and DFO (2008) included in Appendix D.

When working near aquatic features, the following mitigation measures are recommended:

- ESC measures should be used adjacent to sensitive receptors when exposed soil slopes are at risk of eroding.
- ESC measures should be monitored regularly and properly maintained, as required. Controls are to be removed only after the soils of the construction area has been stabilized and adequately protected until vegetation cover is re-established.
- Materials requiring stockpiling (e.g., fill, topsoil, etc.) should be stabilized and kept a minimum of 30 m from watercourses, natural features, drainage features and top of steep slopes. When such a distance is not possible, stockpiled materials should be appropriate contained to prevent erosion and sedimentation.
- Exposed soil areas near a watercourse should be stabilized through the placement of seed, mulch, and/or erosion and sediment control measures to prevent sediment deposition in the watercourse.
- Refueling of equipment should be undertaken at least 30 m from watercourses, to reduce potential impacts to surface water quality in the event that an accidental spill occurs. If a 30 m refueling distance is not possible, under approval from on-site environmental personnel, special refueling procedures for sensitive areas should be undertaken that include, at a minimum, using a two-person refueling system with one worker at each end of the hose. Refueling activities should be monitored, and vehicles should not be left unattended when being refueled. Containers, hoses and nozzles should be free of leaks. Fuel nozzles should be equipped with functional automatic shut-off devices.
- Fueling and lubrication of equipment should be carried out in a manner that reduces the possibility of spills to the extent possible. On-site fuel tanks and generators should be situated in designated areas with secondary containment.
- Bank slopes should be restored to match existing grades; however, alterations may be made to maintain slope stability and limit future erosion. Exposed banks should be re-vegetated with native shrubs and grasses to provide riparian cover and aid in erosion and sediment control. ESC measures should be removed when the site is permanently stabilized.

For HDD, the following additional mitigation measures are recommended:

- The watercourse should be monitored for signs of inadvertent release of fluids during all phases of construction.
- The contractor must develop an Emergency Response and Contingency Plan for inadvertent fluid release.

If in-water work is required, the following mitigation measures are recommended:

- In-water work should be conducted within the appropriate construction timing window. The standard timing window for warm water streams in MNRF's southern region prohibits in-water work between March 15 and July 1 (MNR 2013); the timing window should be confirmed with the MNRF.
- Isolate temporary in-water work zones to maintain downstream flow during construction.
- Transfer fish in the work area away from the construction area using capture, handling, and release techniques to reduce harm and stress. Intakes of pumping hoses should be equipped with an appropriate device to avoid entraining and impinging fish (see DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2016).
- Manage water from dewatering operations to reduce the risk of erosion and/or release of sediment laden or contaminated water to the waterbody (e.g., settling basin, filter bag, energy dispersion measures).

Permitting

The proposed pipeline route is located within the regulated boundary of the SCRCA. Permits under O. Reg. 171/06 are required prior to construction activities in the regulated areas. Watercourse crossing plans and associated permits typically include measures to protect the environment during construction of the pipeline across the watercourses. Crossing methods and details will be determined following geotechnical investigations and should follow measures outlined in the agreement letter between Union Gas and DFO with respect to watercourse crossings (DFO-OGLA/UGL Agreement, 2008) (see Appendix D).

Permits under the ESA (2007) and SARA (2002) may be required for specific crossing locations, depending on the proposed crossing method(s) and if the MNRF/DFO of field survey results determine that a watercourse supports aquatic SAR.

In the event the project requires crossing methods or activities that do not meet the conditions of the agreement letter between Union Gas and DFO (DFO-OGLA/UGL Agreement, 2008), a Self-Assessment should be conducted to determine if the submission of a Request for Review form to DFO is required. The Request for Review may result in a letter of advice or the requirement to initiate a *Fisheries Act* Authorization.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on aquatic features are anticipated.

4.3.2 Designated Natural Areas and Vegetation

The proposed pipeline route falls within the Niagara section of the Deciduous Forest Region (Rowe, 1972). The vegetation communities in the area have been significantly altered by anthropogenic activities, predominantly clearing and draining of land for agricultural purposes; very few woodlots remain in this region of Ontario. Most of the lands (>90%) have been converted to agricultural use, mostly tile-drained row crop fields. There are very few woodlots present, and existing woodlots are small and fragmented due to agricultural activities. There are two woodlots located within 120 m of the proposed pipeline route, both of which are considered significant woodlands (Chatham-Kent, 2017). Criteria for significant woodlands as defined in the Chatham-Kent OP (Chatham-Kent, 2017) is discussed below. There are also several hedgerows present along property boundaries, roads, drains and watercourses. Habitat for grassland birds (e.g., hayfields, pasture or fallow fields) may be present in the study. Designated natural features in and around the study area are shown on Figure 13 (Appendix C).

Wetlands

The Ontario Wetland Evaluation System is used to identify Provincially Significant Wetlands (PSWs). An evaluated wetland may be one contiguous unit or may be a series of smaller wetlands functioning as a whole. Evaluated wetlands that do not qualify as provincially significant may be designated locally significant and may be protected through local planning and policy measures. There may also be unevaluated wetlands in an area.

A review of the MNRF's Natural Heritage Information Centre (NHIC) database (MNRF, 2018b) and LIO mapping (MNRF, 2018a) indicates that the proposed pipeline route does not cross through any PSWs. The nearest PSW is Deyo's Woodlot, located approximately 400 m north of the preferred route along Base Line Road. There were also no unevaluated wetlands within 120 m of the proposed pipeline route based on MNRF mapping. Vegetation and Ecological Land Classification (ELC) surveys are recommended to be completed in 2018 to confirm presence of wetlands within 120 m of the proposed pipeline route.

Significant Woodlands

A woodland is defined as a treed area, woodlot or forested area. The Natural Heritage Reference Manual notes that the local planning authority has a responsibility for designating significant woodlands, using criteria that include size, ecological function, uncommon characteristics, and economic and social functional values (MNR, 2010b).

The criteria for designating significant woodlands at a provincial level includes: woodland size; ecological function (shape, proximity to other woodlands or natural features, linkages); species diversity; uncommon characteristics; and, economic and social values (MNR, 2010b). It is the local planning authority's responsibility to designate significant woodlands. The proposed pipeline is located in the Municipality of Chatham-Kent. The Chatham-Kent Official Plan (OP) (Chatham-Kent, 2017) was reviewed for the criteria and identification of significant woodlands that occur within the construction footprint.

The Chatham-Kent OP (2017) states that *"Woodlands greater than 0.5 hectares and less than 2.0 hectares in size are considered candidate significant woodlands."* Candidate significant woodlands

that meet the size criteria are evaluated for their significance through criteria identified in the Natural Heritage Reference Manual (Chatham-Kent, 2017). There are no woodlands within 120 m of the proposed pipeline route that meets the size criteria for potential significance as candidate significant woodlands.

The Chatham-Kent OP (2017) states that significant woodlands are defined as *"All woodlands 2 hectares in size or larger".* An examination of Schedule C10 (Natural Heritage and Hazard Features) of the OP (2017) and aerial photographs showed two significant woodlands within 120 m of the proposed pipeline route. Both are located north of Base Line; one on the east side and one on the west side of Connection Road.

Areas of Natural and Scientific Interest (ANSI)

Life science ANSIs are significant representative segments of Ontario's biodiversity and natural landscapes, including specific types of forests, valleys, prairies, savannahs, alvars and wetlands, their native plants and animals, and their supporting environments. They contain relatively undisturbed vegetation and landforms, and their associated species and communities. Provincially significant life science ANSIs include the most significant and best examples of the natural heritage features in the province, and many will correspond to other significant features and areas such as wetlands, valley lands and woodlands (MNR, 2010b).

A review of MNRF's NHIC (MNRF, 2018b) and LIO mapping (MNRF, 2018a) showed that no ANSI's are present within 120 m of the proposed pipeline route.

Potential Impacts

The proposed pipeline route is located within existing road allowance; but is within 120 m of natural areas including significant woodlands (Chatham-Kent, 2017). ELC and botanical surveys are recommended prior to construction activities to assess the significance and boundaries of vegetation communities on or within 120 m of the proposed pipeline, identify wetlands and other natural features, and to document vascular plant species. A review of the NHIC database (MNRF, 2018b) identified recent records for two plant species of conservation concern and three plant SAR that may occur within 120 m of the proposed pipeline route. These 5 species are discussed in Section 4.3.3. The results of all surveys and additional appropriate mitigation or protection measures, will be summarized in a report and shared with appropriate agencies and municipalities for their review and comment.

Where there is natural vegetation on or adjacent to the proposed pipeline route, potential impacts include the removal of native vegetation, introduction or spread of invasive species, and indirect effects such as dust, erosion, and accidental spills.

Mitigation and Protective Measures

Environmental mitigation and protective measures during construction recommended by Stantec includes the following:

- Limit vegetation clearing to the extent possible, particularly in sensitive areas such as along watercourses, adjacent to significant woodlands and in areas of significant groundwater recharge.

- The limits of clearing will be surveyed and staked in the field, to allow for the protection of off-site natural areas and vegetation.
- All brush and trees will be felled within the project footprint.
- To limit disturbance to vegetation and terrain, clearing will be done during dry soil conditions to the extent practical
- A field program to identify presence and extent of wetlands and riparian areas will be undertaken prior to construction, to determine where precautionary measures (e.g. equipment washing before site access) may be necessary to reduce the likelihood of spread of non-native species.
- A re-vegetation program will be initiated for all vegetated temporary work areas. Union Gas will consult with landowners and SCRCA to confirm replanting plans.
- Union Gas will undertake their standard tree replacement program, which involves the replanting of twice the area of woodlot removed during construction, and the replacement of individual trees on a 1:1 basis. Tree replacement consists of species native to the area, and ideally the same species removed. Union Gas encourages planting of replacement trees on the same property where the trees were removed, with the goal of enhancing a natural area and its associated wildlife habitat. If a landowner is not interested in planting trees on their property, Union Gas may offer the trees to SCRCA or to a local community group. It is recommended that Union Gas maintain the trees for a period of 3 years, or until the trees reach a 'free to grow' status as defined by a height of 1 m and tree of adjacent brush competition.
- Disturbed temporary work areas will be seeded with a native seed mix approved by SCRCA. Replaced soils will contain native seed bank, which will encourage successful revegetation.
- One year following construction, planted vegetation will be inspected for survival; in areas of severe dieback, dead and diseased planted vegetation will be replaced.

Mitigation and protective measures are outlined in Section 4.2.2 for erosion, Section 6.2.2 for accidental spills, and Section 4.4.5 for dust.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on designated natural areas and vegetation are anticipated.

4.3.3 Wildlife, Wildlife Habitat and Species at Risk

Existing Conditions

Wildlife habitat is defined as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle, and areas that are important to migratory and non-migratory species (MNR, 2000). Significant wildlife habitats are grouped into four categories:

1. Seasonal concentration areas
2. Animal movement corridors
3. Rare vegetation communities or specialized habitats

4. Habitats of species of conservation concern

Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. No seasonal concentration areas were identified in LIO (MNRF 2018a) mapping and the NHIC database (MNRF, 2018b) within 120 m of the proposed pipeline route.

Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (MNR, 2000). Rivers, creeks and drains may be used as movement corridors; these features were present within 120 m of the proposed pipeline route. Hedgerows may also serve as small linkages (MNR, 2000). A review of aerial photography indicates the presence of linear hedgerows within 120 m of the proposed pipeline route.

Rare Vegetation Communities or Specialized Habitats

Rare or specialized habitats are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. SRANKS are rarity rankings applied to species at the “state”, or in Canada at the provincial level, and are part of a system developed under the auspices of the Nature Conservancy. Generally, community types with SRANKS of S1 to S3 (i.e. extremely rare to rare – uncommon in Ontario), as defined by the NHIC, could qualify. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant.

No rare vegetation communities were identified within 120m of the proposed pipeline route.

Specialized habitats are microhabitats that are critical to some wildlife species. Based on a preliminary examination of aerial photographs, there is potential for four of these habitats to occur within the vicinity of the proposed pipeline route: Turtle Nesting Areas, Seeps and Springs, Amphibian Breeding Habitat (Woodland and Wetland). Field investigations are recommended to determine if these specialized habitats for wildlife are present.

Habitat for Species of Conservation Concern

There are four types of species of conservation concern: those which are rare, those with significantly declining populations, those which have been identified as being at risk from certain common activities and those with relatively large populations in Ontario compared to the remainder of the globe.

Rare species are considered at five levels: globally rare, federally rare (with designations by COSEWIC), provincially rare (with designations by COSSARO), regionally rare (at the Site Region level), and locally rare (in the municipality or Site District). This is also the order of priority that should be assigned to the importance of maintaining species. Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated significant wildlife habitat. Examples include species vulnerable to habitat loss and species such as woodland raptors that may be vulnerable to forest management or human disturbance. The final group of species of conservation concern includes

species that have a high proportion of their global population in Ontario. Although they may be common in Ontario, they are found in low numbers in other jurisdictions.

Species of conservation concern (SOCC) are species identified as special concern by COSSARO or as a species with an SRANK of S1, S2 or S3 in Ontario. These species are not afforded habitat protection under the ESA (2007). The NHIC database (MNRF, 2018b) was searched to obtain historic records of SOCC from the vicinity of the proposed pipeline route. The following wildlife atlases were also consulted:

- 2nd Ontario Breeding Bird Atlas (Cadman et al. 2007)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2018)
- Atlas of the Mammals of Ontario (Dobbyn 1994)
- eBird Canada (eBird 2018)
- Ontario Butterfly Atlas (Jones et al., 2018)

Results of the background review identified 11 SOCC known to occur in the range of the proposed pipeline route, including two plant species, three insect species, two reptile species, four species of breeding birds (Table 4-3).

Exact locations of species are not available from these atlases and, instead, are recorded within 1 x 1 km or 10 x 10 km squares. The potential for species to be present will be limited by habitat suitability and availability. Therefore, the identified species recorded from these databases may not be present. This list will likely be further refined upon consultation with MNRF and SCRCA.

Table 4-3: Terrestrial Species of Conservation Concern Potentially Occurring in the Vicinity of the Study Area

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	Federal Status (COSEWIC)	Source
PLANTS					
Prairie Milkweed	*Asclepias sullivantii*	S2S3	---	---	NHIC
Wingstem	*Verbesina alternifolia*	S3	---	---	NHIC
INSECTS					
Blue-ringed Dancer	*Argia sedula*	S2	---	---	NHIC
Blue-tipped Dancer	*Argi6a tibialis*	S3	---	---	NHIC
Monarch	*Danaus plexippus*	S4B, S2N	SC	SC	IA
REPTILES					
Northern Map Turtle	*Graptemys geographica*	S3	SC	SC	ORAA
Snapping Turtle	*Chelydra serpentina*	S3	SC	SC	ORAA
BIRDS					
Eastern Wood-Pewee	*Contopus virens*	S4B	SC	SC	OBBA
Common Nighthawk	*Chordeiles minor*	S4B	SC	THR	OBBA
Red-headed Woodpecker	*Melanerpes erythrocephalus*	S4B	SC	THR	OBBA

Table 4-3: Terrestrial Species of Conservation Concern Potentially Occurring in the Vicinity of the Study Area

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	Federal Status (COSEWIC)	Source
Wood Thrush	*Hylocichla mustelina*	S4B	SC	THR	OBBA

SC – Special Concern
THR - Threatened
S2: Imperiled—Imperiled in the province, few populations (often 20 or fewer)
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)
S4: Apparently Secure—Uncommon but not rare
S#B- Breeding status rank
"---" – Not Listed
OBBA – Ontario Breeding Bird Atlas
ORAA – Ontario Reptile and Amphibian Atlas
IA – Insect Atlas
NHIC – Natural Heritage Information Centre

Species at Risk

Species at risk (SAR) are those species given status rankings, by the Federal Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or the provincial Committee on the Status of Species at Risk in Ontario (COSSARO), as threatened or endangered according to federal or provincial legislation. Endangered and threatened species receive general habitat protection under the ESA 2007. The NHIC database (MNRF 2018b) was searched to obtain historic records of species at risk from the vicinity of the proposed pipeline route. The following wildlife atlases and information sources were also consulted:

- 2nd Ontario Breeding Bird Atlas (Cadman et al. 2007)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2018)
- Atlas of the Mammals of Ontario (Dobbyn 1994)
- eBird Canada (eBird 2018)
- Ontario Butterfly Atlas (Jones et al. 2018)
- Species at Risk Ontario List (SARO) (MNRF 2018c)

Based on a review of background information, 13 SAR are known to occur in the range of the proposed pipeline route, including three plants species, two reptile species, five species of breeding birds and three species of mammals (Table 4-4).

Exact locations of species occurrences are not available from these atlases and, instead, are recorded within 1 x 1 km or 10 x 10 km squares. The potential for species to be present will be limited by habitat suitability and availability. Therefore, some of the species identified from these databases may not be present. This list will likely be further refined upon consultation with MNRF and SCRCA.

Table 4-4: Terrestrial Species at Risk with potential to occur in the vicinity of the Study Area

Common Name	Scientific Name	SRANK	Provincial Status (COSSARO)	Federal Status (COSEWIC)	Source
PLANTS					
Dense Blazing-star	*Liatris spicata*	S2	THR	THR	NHIC
Purple Twayblade	*Liparis liliifolia*	S2S3	THR	THR	NHIC
Butternut	*Juglans cinerea*	S3?	END	END	SARO
REPTILES					
Eastern Foxsnake (Carolinian population)	*Pantherophis gloydi*	S3	END	END	ORAA
Spiny Softshell	*Apalone spinifera*	S3	END	THR	ORAA
BIRDS					
Bank Swallow	*Riparia riparia*	S4B	THR	THR	OBBA
Barn Swallow	*Hirundo rustica*	S4B	THR	THR	OBBA
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR	OBBA
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR	SARO
Chimney Swift	*Chaetura pelagica*	S4B, S4N	THR	THR	OBBA
MAMMALS					
Eastern Small-footed Myotis	*Myotis leibii*	S2S3	END	---	OMA
Little Brown Myotis	*Myotis lucifugus*	S4	END	END	OMA
Northern Myotis	*Myotis septentrionalis*	S3?	END	END	OMA

THR – Threatened
END - Endangered
S2: Imperiled—Imperiled in the province, few populations (often 20 or fewer)
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)
S4: Apparently Secure—Uncommon but not rare
S#B- Breeding status rank
"---" – Not Listed
OBBA – Ontario Breeding Bird Atlas
ORAA – Ontario Reptile and Amphibian Atlas
NHIC – Natural Heritage Information Centre
OMA – Atlas of the Mammals of Ontario
SARO – Species at Risk Ontario List

Stantec completed a desktop assessment to evaluate the existing conditions of the proposed pipeline route. The land adjacent to the proposed pipeline route is predominantly agricultural row crops. There are two isolated woodlots located within 120 m of the preferred pipeline route. The proposed pipeline

route crosses roadways, drains, and watercourses. The 13 SAR and their associated habitat identified through background review (Table 4-4) are discussed below.

1. Dense Blazing-star is found in tall-grass prairies, oak savannahs, roadside ditches, along railways and hydro corridors, in dry to moist sites (COSEWIC 2010a). Known populations are restricted to Essex, Lambton, Middlesex and Elgin Counties, and the municipality of Chatham-Kent (COSEWIC 2010a); the largest population is found on Walpole Island First Nation (COSEWIC 2010a), approximately 20 km west of the study area. Site investigations (ELC and botanical inventory) will determine if any tall-grass prairies or suitable habitat in roadside ditches are present on or adjacent to the proposed pipeline route.

2. Purple Twayblade was last documented as occurring in Deyo's Woods, a PSW located in the Project Area, in 1997 (10 to 12 individuals), although more recent records (2008) documented no individuals - likely due to the presence of an invasive species (garlic mustard, *Alliaria petiolata*) (COSEWIC 2010b). Habitat for this species is typically found on a range of soil conditions in open to semi-open canopy cover in oak woodlands, savannahs, mixed deciduous forests, shrub thickets and alvars, deciduous swamps, and conifer plantations (COSEWIC 2010b). Deyo's Woods is located approximately 400 m north of the proposed pipeline route; however, potential habitat may occur in the two isolated woodlots located within 120 m of the proposed pipeline. These woodlots are located outside of the project footprint and are not anticipated to be impacted by the proposed pipeline.

3. Butternut is a medium-sized tree commonly found in a variety of habitats throughout Southern Ontario, including woodlands and hedgerows (Farrar 1995; COSEWIC 2003). This species may occur along the roadside, hedgerows or along the woodlot edges. Tree removal is not anticipated as a result of the project; however, ELC and botanical surveys will identify presence of Butternut in the study area.

4. The Carolinian population of Eastern Foxsnake is primarily found in open habitats such as old fields, prairies, marshes and dune shorelines. Foxsnakes may also use a variety of anthropogenic habitats with low human activity such as fields, hedgerows, canals, abandoned buildings, cottages and dump sites (Eastern Foxsnake Recovery Team, 2010). Brush piles, table rocks, tree stumps, root systems of downed trees and driftwood are also often used for shelter and basking sites (COSEWIC, 2008). Suitable habitat occurs for this species along the proposed pipeline route and surrounding areas. Targeted Eastern Foxsnake habitat assessments will be completed in 2018 to characterize the extent and quality of suitable habitat. Further discussions on Eastern Foxsnake with MNRF is recommended.

5. In southern Ontario, the Spiny Softshell occurs in riverine and coastal wetland habitats, typically in rivers, creeks, and lakes with a soft substrate (COSEWIC, 2016b). Spiny Softshell turtles require sand or gravel nesting areas that are close to water and clear of vegetation, shallow mud or sand-bottomed areas to burrow in, deep pools for winter hibernation, basking areas, and sufficient food resources (COSEWIC, 2016b). Records of Spiny Softshell are associated with the Sydenham River, which is located north of the proposed pipeline route. This species and its habitat is not considered present in the study area. No impacts to Spiny Softshell as a result of the project are anticipated.

6. Bank Swallows excavate nests in exposed earth banks along watercourses and lakeshores, roadsides, stockpiles of soil, and the sides of sand and gravel pits (Falconer et al., 2016). The proposed pipeline is located within an existing road allowance in a predominantly agricultural setting. Suitable habitat for Bank Swallow is not likely present in the study area; however, suitable habitat may be present if stockpiles of soil are present or in areas of sand/gravel extraction. Potential habitat will be identified during field surveys in 2018.

7. Barn Swallow nests on walls or ledges of barns as well and on other manmade structures such as bridges, culverts or other buildings (Heagy et al., 2014). Barn Swallow are open country species, which forage over meadows, hay, pasture, open water, cleared rights-of-way or even mown lawn (Heagy et al., 2014). Foraging habitat is considered present adjacent to the proposed pipeline route, in the open agricultural fields and watercourses. Suitable nesting habitat may be present within 120 m of the proposed pipeline route in barns and old structures; however, no structures are proposed for removal. Nesting habitat may also potentially occur in culverts associated with the watercourses in the study area. Habitat assessments will be conducted in 2018 to determine presence of nesting barn swallows in culverts located in the study area.

8. Chimney Swifts primarily use chimneys for roosting and nesting, and only rarely nest in large hollow trees (Fitzgerald et al. 2014; Zanchetta et al., 2014). Suitable habitat may be present in buildings located within 120 m of the proposed pipeline; however, no buildings are proposed for removal as a result of the project.

9. The Bobolink is a grassland or open country species, which nests primarily in forage crops with a mixture of grasses and broad-leaved forbs such as hayfields and pastures. Preferred ground cover species include grasses such as Timothy and Kentucky bluegrass and forbs such as clover and dandelion (COSEWIC, 2010c). Bobolink is an area-sensitive species, with reported lower reproductive success in small habitat fragments (COSEWIC, 2010c). Grasslands, hayfield and pastures are uncommon in this area, but may be present. Bobolink are also known to nest in Winter Wheat. Suitable habitat for this species may be present in the fields adjacent to the proposed route and will be identified during ELC and habitat assessment surveys.

10. The breeding range for Eastern Meadowlark extends throughout southern Ontario; breeding habitat requirements include open areas such as native grasslands, pastures, savannahs, hayfields, weedy meadows, grain fields, and herbaceous fencerows (COSEWIC, 2011). Optimal habitat contains abundant litter cover, a high proportion of grass species to forb, shrub and woody plant species, and a low percentage of bare ground (COSEWIC, 2011). Eastern Meadowlark is an area-sensitive species, preferring large tracts of grasslands over smaller, fragmented sites (COSEWIC, 2011). Similar to Bobolink, suitable grassland habitat may be present, and will be identified during ELC and habitat assessment surveys.

11. Eastern Small-footed Myotis is considered rare in Ontario, with only 12 known overwintering sites in the province (Humphrey, 2017). Eastern Small-footed Myotis have been found roosting singly or in small colonies in open, sunny and rocky habitats such as rock crevices and outcrops and talus slopes, as well as in manmade structures (i.e. buildings, bridges, quarries) near foraging habitat over waterbodies and in forests (Humphrey, 2017). Roosting habitat for this species may be present in

buildings; however, no buildings are proposed for removal as a result of the project. Foraging habitat for this species may be available in the open fields and along watercourses adjacent to the proposed route. This species and its habitat is not anticipated to be impacted by the proposed project.

12. Little Brown Myotis will roost in buildings, under bridges, in tree cavities, foliage, under tree bark and in rock crevices (Environment Canada, 2015). Maternity roosting habitat for Little Brown Myotis may occur in the mid-aged and mature woodlots, where tree stands have a diameter at breast height of >10 cm. Roosting habitat may be present in the two woodlots located within 120 m of the proposed pipeline location; however, no tree removal in these woodlots are anticipated. Tree removal may occur during construction activities along the roadside. A bat maternity habitat assessment will be conducted for any trees that may be removed as a result of the project.

13. Northern Myotis will roost in trees under raised bark, in tree cavities and crevices, and may also use anthropogenic structures (i.e. under shingles) (Environment Canada, 2015). Females prefer to roost in tall, large diameter trees in early- to mid-stages of decay and are often found close to waterbodies (Environment Canada, 2015). Roosting habitat may be present in the two woodlots located within 120 m of the proposed pipeline location; however, no tree removal in these woodlots are anticipated. Tree removal may occur during construction activities along the roadside. A bat maternity habitat assessment will be conducted for any trees that may be removed as a result of the project.

Potential Impacts

Due to the presence of woodlots, hedgerows, watercourses and open fields in proximity to the proposed pipeline route, field surveys are recommended before construction to confirm the presence or absence of wildlife and wildlife habitat. Recommended surveys include habitat assessments for reptiles (turtles and snakes, including a targeted Eastern Foxsnake habitat assessment), breeding birds (if suitable grassland habitat for Bobolink and Eastern Meadowlark is identified), mammals (bat habitat assessment), general wildlife habitat assessments (e.g. identification of seasonal pooling for breeding amphibians, turtle nesting habitat, seeps and springs) and considerations for SAR and associated habitat as discussed above. The results of all surveys, including any additional mitigation or protection measures, should be summarized in a report and shared with appropriate agencies and municipalities for their review and comment.

Habitat suitability for SOCC and SAR in the study area will be considered and assessed during site investigations (2018). Species at Risk and their habitats that may be present in the study area will be determined through consultation with the MNRF. Upon completion of field assessments and consultation. species specific mitigation will be developed.

Potential impacts on wildlife and wildlife habitat from construction include: direct mortality from construction vehicles, habitat destruction through vegetation removal, and habitat degradation through spills and sensory disturbance of wildlife.

Mitigation and Protective Measures

Mitigation and protective measures are outlined in Section 4.3.2 for vegetation removal and Section 6.2.2 for accidental spills.

Stantec recommends the following environmental mitigation and protective measures during construction:

- Detailed design of the proposed pipeline will be reviewed to avoid and reduce the likelihood of impact upon wildlife habitat to the extent possible, specifically, habitats of SOCC and SAR.
- Equipment and vehicles will yield the construction site to wildlife.
- Trench operations will be followed as closely as practical with backfill operations, to facilitate the movement of wildlife across the trench.
- Fencing will be erected around deep excavations to prevent wildlife entrapment.
- The contractor will inform their personnel to not threaten, harass or injure wildlife.
- If wildlife is encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site.
- Where practical, avoid construction in the vicinity of areas that are identified as potential habitat for amphibians during the amphibian breeding season (March 1 – June 30). Presence of amphibian habitat will be identified during field investigations.
- Habitat assessments and species occurrence surveys will be conducted for SAR. A report will be prepared to document results, and recommended mitigation measures. If necessary, further consultation with MNRF will be conducted to obtain authorizations and approvals prior to construction activities.
- Habitat assessments for Eastern Foxsnake will be completed, and results will be provided to MNRF to determine if any authorization under the ESA is needed and to develop appropriate mitigation prior to start of construction. Mitigation measures may include the use of timing windows, inspection of construction equipment and protection of key habitat features.
- Areas of potential bat maternity roosting habitat will be identified during field investigations. If bat maternity habitat is identified in the construction footprint, removal will be limited to the extent possible and will avoid the active season for bats (April 1 to August 31). Mitigation recommendations for SAR bats will be prepared upon consultation with MNRF.
- Construction activities with the potential to remove migratory bird habitat, such as vegetation clearing, is to be avoided during the breeding season which is generally from April 3- August 11 in southern Ontario (Environment Canada, 2017). If vegetation clearing activities are unavoidable during this window, a mitigation program will be developed, which will include measures to reduce and avoid impacts to migratory birds and their nests. This program will include preventative and mitigation measures but may also include avoidance of clearing during key sensitive periods and in key locations.
- If SAR are found along the proposed pipeline route, Union Gas will undertake consultation with the MNRF regarding the potential need for a permit under the ESA and/or species-specific mitigation.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on wildlife, wildlife habitat and SAR are anticipated.

4.4 SOCIO-ECONOMIC ENVIRONMENT

4.4.1 Employment and Business

Existing Conditions

The number of people employed in Chatham-Kent decreased from 53,140 in 2006, to 45,535 in 2011, while the unemployment rate in Chatham-Kent increased from 7.2% to 10.2% over the same period. The unemployment rate was above the provincial and national average rates of 8.3% and 7.8%, respectively, for 2011 (Table 4-5).

Table 4-5: Labour Characteristics, Chatham-Kent and Ontario, 2011

Location	Population Aged 15 years and Over	Labour Force	Employed	Participation Rate (percent)	Employment Rate (percent)	Unemployment Rate (percent)
Ontario	10,473,670	6,864,990	6,297,005	65.5	60.1	8.3
Chatham-Kent (Municipality)	84,125	50,695	45,535	60.3	54.1	10.2

Source: Statistics Canada, 2011a; 2011b.

The median family income for all census households in Chatham-Kent in 2011 was $64,670, while the median income for individuals aged 15 years and over was $26,221, both below provincial numbers (Table 4-6).

Table 4-6: Median Income, Chatham-Kent and Ontario, 2011

Location	Median Family Income	Median Income of individuals - 15 Years and Over		
		All individuals	Male	Female
Ontario	$80,987	$30,526	$36,971	$25,412
Chatham-Kent (Municipality)	$64,670	$26,221	$32,118	$22,071

Source: Statistics Canada, 2011a; 2011b.

In 2011, the main sources of employment by industry for Chatham-Kent were retail trade (12.4%), manufacturing (12.2%), and health care and social assistance (12%) (Statistics Canada, 2011a).

Agriculture is a key industry within the Municipality of Chatham-Kent, which has prime agricultural land and the necessary conditions for many agricultural operations. The industry employed 10.6% of the labour force in 2011 (Chatham-Kent Workforce Planning Board, 2011). However, between 2006 and 2011, the total number of agriculture-related jobs within the Municipality decreased from 3,270 to 2,834, a net loss of 436 (13.4%) (Chatham-Kent Workforce Planning Board, 2011; Statistics Canada, 2011a).

The major employers within Chatham-Kent include Chatham-Kent Health Alliance, the Chatham-Kent Community Health Centres, the Municipality of Chatham-Kent, Union Gas, Greenfield Ethanol, Thompsons Limited, Precismeca Manufacturing, and Dajcor Aluminum Limited (Chatham-Kent, 2016). This proposed pipeline is expected to enhance economic development in the area. It will facilitate the creation of new infrastructure such as greenhouses.

Chatham-Kent's labour force is concentrated in three main occupations: sales and services (24.5%), trades and transport (18.1%), and business, finance and administration services (12.6%) (Statistics Canada, 2011a).

Potential Impacts

During construction, the mainline pipeline labour force might peak at approximately 50 workers. Approximately 80% of the labour force could be expected to come from Ontario and other areas of Canada, while 20% would likely be local residents. The construction of this project would be expected to take place in the Spring/Summer of 2019 and take an estimated 6-8 months to complete. Union Gas could schedule shifts so that employees are working five or six days per week for 10 to 12 hours each day. Workers would be at the work site for as long as is required to complete specific construction tasks. Project demands for labour and goods and services can result in both beneficial and adverse effects. Positive effects may not be evenly distributed among populations, with some residents in a better position to receive economic benefits than others. Similarly, adverse effects may affect some residents more than others.

Residual effects on employment are related to the project's labour demand compared to the labour supply. Three types of employment are considered:

- Direct employment: labour that is hired directly for the project
- Indirect employment: labour hired by companies in order to produce and provide goods and services needed for the project
- Induced employment: labour hired by industries that produce and provide consumer items and services purchased by people who are directly or indirectly employed by the project

Labour conditions will be affected by direct, indirect and induced employment during all project phases.

The project could affect business through purchases of labour, goods and services from local businesses, including businesses owned by Indigenous peoples, and should result in increased employment income and municipal government revenue. Local businesses should likely benefit from supplying the project with goods and services. Land clearing and other project activities, primarily during construction, could adversely affect other economic activities, including agricultural productivity. The proposed pipeline is anticipated to increase the supply of local agriculture related jobs by facilitating the construction of greenhouses.

Potential adverse effects on industries, including agriculture, are impairment to the use of property, disruption of livestock production, and issues with farm machinery movement.

Mitigation and Protective Measures

It is expected that the project will generally result in positive effects on employment by employing local and Indigenous people and reducing the unemployment rate in the region. These positive effects do not require mitigation, but Union Gas should identify and implement various mechanisms to enhance project benefits.

The potential effects of the project as a result of purchasing labour, goods and services is expected to be positive during construction and operation, so no mitigation should be required. However, Union Gas has and should continue to work with local and Indigenous businesses to enhance their potential for successfully bidding on project contracts regarding the supply of goods and services, particularly for the operation phase. One initiative to help encourage further local and Indigenous content on the project is to post project purchasing requirements in advance, so that businesses can position themselves to effectively bid to supply goods and services needed for construction and operation. Increased participation of local and Indigenous businesses should enhance positive local economic effects.

With respect to potential adverse effects on business, the only known directly impacted non-agricultural business will be Babcock Supply, a concrete contractor located on Base Line. With respect to potential adverse effects on agricultural and non-agricultural businesses, Union Gas should engage with land owners to address access to the site, the portion of land that will be altered as part of site preparation, and long-term changes to agricultural and non-agricultural land.

Net Impacts

With the above initiatives to encourage local and Indigenous participation on the project, it is anticipated that the effects from project on employment and business will be positive, including creating positive economic activity through new direct, indirect, and induced employment. Project expenditures on local businesses and suppliers also have the potential to positively affect the economy of Chatham-Kent. Additionally, those who have worked on the project will gain transferrable skills and experience that could help them gain employment in other industries. Consultation with landowners, including both agricultural and non-agricultural businesses, should also address any concerns to their operations.

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on Employment and Business are anticipated.

4.4.2 Community Services & Infrastructure

Existing Conditions

Demographics

In 2011, the Municipality of Chatham-Kent had a population of 103,670 (Statistics Canada, 2011a). The largest community near the proposed project is Dresden, which had a population of 2,385 in 2011 (Statistics Canada, 2016).

Chatham-Kent has experienced a modest population decline since 2006. Between 2006 and 2011, while the total population of Ontario grew by 5.7%, Chatham-Kent experienced a population decline of 4.2%

(Table 4-7). Such declines are common in rural areas across Canada as populations shift to more urbanized locations.

Table 4-7: Population by Gender, Chatham-Kent and Province, 2011

Location	Total Population	Male*	Female*	Percent Change from 2006
Ontario	12,851,821	6,263,140	6,588,685	5.7
Chatham-Kent (Municipality)	103,670	50,435	53,235	-4.2

*Numbers are rounded by Statistics Canada and are reported herein exactly as they are reported by Statistics Canada. Totals may not necessarily add up as a result of rounding.

Source: Statistics Canada, 2007, 2011a; 2011b

The population of Ontario is aging, and this is also the case in the Municipality of Chatham-Kent. The Municipality has consistently had a median age that has been higher than the provincial average. In 2011, the median age of the population of Chatham-Kent was 43.9 years, 3.5 years higher than Ontario's median age of 40.4 (Statistics Canada, 2011a).

In 2011, nearly 3,000 residents of the Municipality of Chatham-Kent identified themselves as Indigenous. This was approximately 1% of the provincial Indigenous population (Table 4-8).

Table 4-8: Indigenous Population, Chatham-Kent and Ontario, 2011

Location	Indigenous*
Ontario	301,430
Chatham-Kent (Municipality)	2,910

*Numbers are rounded by Statistics Canada and are reported herein exactly as they are reported by Statistics Canada. Totals may not necessarily add up as a result of rounding.

Source: Statistics Canada, 2011a; 2011b.

Permanent and Temporary Accommodations

In 2011, there were 46,209 private dwellings in the Municipality of Chatham-Kent, of which 42,838 (92.7%) were occupied by usual residents (Statistics Canada, 2011a). The majority (71.2%) of homes were single-detached dwellings. The housing stock in Chatham-Kent is older than the average for the provincial stock (SHS Consulting, 2012).

There are more than 11,000 rental homes in Chatham-Kent and approximately 4,600 of these are in small apartment buildings. The 2013 vacancy rate for one-bedroom rental apartments was 6.4%, and for two-bedroom apartments was 5.8%. Vacancy rates for areas outside of Chatham and Wallaceburg were lower, at 4.9%, suggesting a tighter rental market in more rural communities (SHS Consulting, 2012).

Within the Municipality of Chatham-Kent, there are 25 hotels/motels with a total of 708 rooms, and 23 bed-and-breakfasts with a total of 60 rooms. There are also 10 cottages/cabins, with 44 rooms, and 18 camping/RV parks with 702 sites (Brain Trust Marketing and Communications, 2015).

The Municipality of Chatham-Kent is in Provincial Tourism Region 1 (Southwest Ontario). In 2012, the occupancy rate at temporary accommodations in Region 1 was 48.9%. This was down from 50.6% in 2008 (MTCS, 2015).

Municipal Services and Infrastructure

The Municipality of Chatham-Kent owns and operates eight waste transfer stations. The main landfill in the area is Ridge Landfill located in Blenheim. The Ridge Landfill has an annual maximum capacity of approximately 1.3 million tonnes of waste and received just below this maximum in 2015. It is estimated that the Ridge Landfill will reach its full capacity by 2022 (Robinet, 2015).

The Chatham-Kent Public Utilities Commission manages a utility system serving 110,000 people, operates six water treatment plants with distribution systems and eight wastewater treatment plants/collection systems (Chatham-Kent, 2013). According to the Municipality of Chatham-Kent Water and Wastewater Master Plan (Municipality of Chatham-Kent, 2012), the existing capacities of the water and wastewater treatment plants appear to be adequate for the 20-year planning period based on projections for water demand and population forecasts.

Health and Education Services and Infrastructure

The Municipality of Chatham-Kent is located within the Erie St. Clair Local Health Integration Network, which serves approximately 640,000 people in the regions of Chatham-Kent, Sarnia/Lambton, and Windsor/Essex (CIHI, 2015). Chatham-Kent Health Alliance is a community hospital system with more than 200 beds. The hospital has two campuses: one in Chatham and one in Wallaceburg. The number of family medical physicians in the Erie St. Clair Clair Local Health Integration Network increased 25.1% between 2010 and 2014, from 442 to 553 (CIHI, 2015).

The Chatham-Kent Community Health Centre's are non-profit, community-governed, multi-service facilities that provide primary health care, health promotion and community development services. There are four of these centres in Chatham-Kent, located in Chatham, Wallaceburg, Walpole Island, and Pain Court (Chatham-Kent Community Health Centre's, 2013).

There are more than 100 elementary schools and eight secondary schools in the Municipality of Chatham-Kent, which are managed by three school boards: Lambton Kent District School Board, St. Clair Catholic District School Board, and Conseil scolaire catholique Providence. Chatham-Kent also has five private schools. Elementary and secondary enrollment are on a steady decline (Lambton Kent District School Board, 2015).

Roads and Highways

Approximately 85% of roads in the Municipality of Chatham-Kent are classified as rural. The preferred pipeline route travels within the road allowance of Simpson Road for approximately 1 km and within the road allowance of Base Line for approximately 12 km, both of these are considered rural roads. Most of the rural roads in the municipality have an average annual daily traffic (AADT) of between 500 and 2,000 vehicles (Municipality of Chatham-Kent, 2014).

Policing, Fire and Emergency Response Services

The Municipality of Chatham-Kent is divided into four policing areas:

- District 1 encompasses the towns of Wallaceburg, Walpole Island, Dresden, Tupperville, Grande Pointe and Mitchell's Bay.
- District 2 is comprised of several smaller communities containing policing sub-stations where officers are assigned to report for duty.
- District 3 is divided into three patrol areas encompassing the communities of Tilbury, Wheatley, Merlin, North Buxton, South Buxton, Port Alma, and Fletcher.
- District 4 consists of the City of Chatham and some of the surrounding farm communities.

The Chatham-Kent Police Service Emergency Communication Centre answers all 911 telephone calls for Chatham-Kent, as well as the dispatching of Chatham-Kent Police and Chatham-Kent Fire Services. On average, the Emergency Communication Centre answers approximately 21,000 telephone calls, including just over 500 fire calls, per month (CKPS, 2014). In 2014, the average time-to-answer was nine seconds (CKPS, 2014).

There are 19 fire stations in the Municipality of Chatham-Kent administered by the Chatham-Kent Fire and Emergency Services (CKFES) Department (CKFES, 2014). CKFES is also responsible for the provision of Emergency Medical Services (EMS). Currently, EMS is provided by Medavie EMS, under contract to the Municipality of Chatham-Kent. CKFES manages the contract and owns all infrastructure, including buildings, fleet, and equipment. There are approximately 100 Primary Care Paramedics dispatched from six EMS bases across the Municipality.

Potential Impacts

The preferred pipeline route will be constructed within existing road allowances. Impedance to vehicle transportation is the largest potential impact to residents, businesses, and vehicles using the roadways. The presence of temporary workers in the local communities during the approximately six-month long construction period has the potential to increase the demand for housing and local community services and infrastructure.

The transportation of project goods, services and workers has the potential to lead to increased use of existing transportation infrastructure. Residents may experience a temporary disruption in the enjoyment and use of their property during pipeline construction. Short-term impacts associated with disturbance, disruption or loss of use may occur during construction as a result of noise, dust, or additional traffic volume. Increased traffic volumes along local road networks could increase travel times and reduce road safety, which might lead to increased use of local emergency services due to potential vehicle accidents and workplace accidents. In addition, the production of project-related waste could place additional stress on the capacity of local landfills.

During operation, the workforce is typically relatively small (likely requiring only 100 hours per year, or an average of approximately 2 hours per week) and localized and typically puts minimal additional demands on local services and infrastructure. Some workers might already reside in the local area; however, some might need to come from outside communities and may use local community and emergency services.

Mitigation and Protective Measures

Non-local project workers are expected to stay in temporary accommodations, including hotels, motels, and campgrounds. They may also choose to rent cottages or apartments. The short duration that the workers will reside near any one community, as well as the structure of the work shifts, should limit the need for workers to use the services and infrastructure in local communities.

Project employees might require medical attention while staying in the area. The contractor and Union Gas should have emergency response equipment and trained personnel on-site during construction. In addition, an Emergency Response Plan should be developed and implemented, which will address field health services, emergency call-out procedures and fire response plans. Safety fencing should be used where necessary to separate the work area.

Environmental mitigation, which will be contained in the project Environmental Construction Plan and its contingency and management plans, should be in place to facilitate the response to emergency events and to prepare for the management of emergency events on site. If an emergency incident were to occur, it is anticipated that the comprehensive mitigation, contingency plans, and safety strategies should result in a localized and low-intensity response.

A Traffic Management Plan should be in place for all roads affected by construction, which at a minimum outlines measures to:

- Control the movement of materials and personnel to and from the construction site
- Post signs to warn oncoming motorists of construction activity
- Control traffic at road crossings
- Reduce on-road disturbance and lane closures
- Store equipment as far from the edge of the road as practical
- Install construction barricades at road crossings

Traffic disruptions during construction should be reduced by adherence to the Traffic Management Plan. Guidelines should be developed for vehicular use and parking on the construction site and associated access roads to avoid traffic congestion and accidents. Access to existing transportation infrastructure should be addressed through standard mitigation and will be reversible once the construction phase ends.

The capacity of waste disposal sites should be considered and if project needs are not easily accommodated, alternative disposal locations should be considered.

Union Gas should provide project information to local communities and service providers so that they are prepared for any possible demand on community services and infrastructure related to a temporary population increase. Additional consultation with residents and businesses adjacent to the proposed pipeline route should be held in advance of construction commencement. Contact information for a designated Union Gas representative should be available to address questions and concerns during construction. Consultation has been initiated and should continue with municipal personnel.

Net Impacts

Community services and infrastructure appear to have additional capacity to absorb potential increased temporary demands that may result from the project. Adverse effects on traffic should be minimal because the proposed pipeline route intersects mainly rural communities where roads currently have low levels of traffic.

Given the available capacity of the local community services and infrastructure, along with the implementation of the mitigation and protective measures outlined above, no significant adverse residual impacts on community services and infrastructure are anticipated.

4.4.3 Perceived Health and Well-Being

Existing Conditions

Health Indicators

Health indicators are measures that are regularly reported and provide relevant information about a population's health or the performance of the health system. This allows for comparable information between regions and can be used to track changes over time (CIHI, n.d.).

Statistics Canada and the Canadian Institute for Health Information completed a survey of health indicators to determine the perceived health and well-being of residents within the Chatham-Kent Health Unit. This health unit is a geographical region created by Statistics Canada that spans the Municipality of Chatham-Kent, and the results represent qualitative perceptions of health and well-being from individuals living within the Municipality (Table 4-9).

Table 4-9: Health Indicators, Chatham-Kent Health Unit and Ontario, 2013

Indicators	Chatham-Kent Health Unit (%)	Ontario (%)
Perceived health, very good or excellent	53.9	60.4
Perceived mental health, very good or excellent	71.9	72.4
Perceived life stress, quite a lot (15 years and over)	18.3	22.8

Source: Statistics Canada, 2013.

In 2013, more than half of the population of Chatham-Kent perceived their health to be very good or excellent and nearly 72% of the population perceived their mental health to be very good or excellent. This is compared to 60.4% of the province's population, who believed their health to be very good or excellent and 72.4%, who believed their mental health was very good or excellent. Residents of Chatham-Kent appeared to be less stressed than the population of the province as a whole in 2013, as 18.2% perceived quite a lot of stress versus 22.8% of Ontario (Statistics Canada, 2013).

Traffic and Congestion

Existing conditions for traffic and congestion are outlined in Section 4.4.2.

Recreation

Residents of and visitors to the Municipality of Chatham-Kent have access to a variety of land- and water-based recreational activities. With Chatham-Kent situated between Lake Erie and Lake St. Clair, there is a variety of water-based recreation infrastructure, such as boat launches and public docks. There are also 12 golf courses, 11 conservation areas, two provincial parks, 16 walking/hiking trails, and eight beaches in the Municipality (Brain Trust Marketing and Communications, 2015).

Potential Impacts

Perceived health and well-being is influenced by a number of factors such as individual lifestyles, social and community networks, living conditions, general socio-economic and environmental conditions. The project has the potential to affect a number of these factors, which could change the way that residents perceive their health and well-being.

Since perceived health and well-being is influenced by improved economic conditions, the project is expected to have positive effects by creating direct, indirect, and induced employment, and through project spending within Chatham-Kent (see Section 4.4.1). There is also the potential to enhance these benefits further by selecting local and Indigenous businesses to provide services to the project, thus increasing economic activity and spin-off benefits (see Section 4.4.1). This economic stimulus could increase local spending and increase income for some residents and their families. Higher income from project employment could increase the real and perceived quality of life of some local residents.

Construction activity will temporarily affect the landscape of the construction area and could impede property access. Construction activities also have the potential to disturb the perceived aesthetic value that residents place on their property and the area in general. The potential for project activities to interfere with aesthetic value, property enjoyment, access to business, and with the production of agricultural products, could have an adverse effect on perceived health and well-being of some residents. Potential safety concerns also exist at locations where properties, residents and vehicles come in proximity to construction activities.

Potential increases in noise, dust, exhaust (see Section 4.4.5) and traffic congestion on roads could also cause stress and affect how people perceive their quality of life. Increased traffic could also impede customer access to business and access by farmers to their land.

The temporary workforce may increase demands on existing recreation facilities, including arenas and swimming pools. Since project construction is scheduled to occur during spring, summer and fall months, winter recreation activities should not be affected.

Mitigation and Protective Measures

Mitigation and protective measures for air quality and noise are outlined in Section 4.4.5.

If laneways or driveways are planned to be affected as a result of pipeline construction, the accesses should be left in place over the trench where requested by the landowner, as long as feasible. Access to residential properties and businesses should be maintained at all times to reduce stress on local

residents and safety fences should be installed at the edge of the construction site, where public safety considerations are required.

A Traffic Management Plan should be implemented to reduce effects of project-related traffic on traffic volumes, which could reduce access to businesses and farmland (see Section 4.4.2). In addition, Union Gas should work with landowners to address specific concerns they may have regarding monetary compensation and their property, such as access and tile drainage repairs.

While pipeline construction activities have the potential to temporarily affect the local landscape, restoration of the construction area should leave little evidence that a pipeline exists in the area. The valve station will permanently alter the landscape in which it is constructed.

Additional consultation with residents and businesses adjacent to the proposed pipeline route should take place in advance of construction activity. Union Gas should develop an issues resolution framework to help resolve stakeholder issues that may arise during project construction and operation, and to select the appropriate mitigation measures to resolve these issues.

Net Impacts

With planned restoration of the construction site after the proposed pipeline has been built, changes to landscapes are anticipated to be short-term. Additionally, Union Gas should undertake their standard tree replacement program. This should reduce any adverse impact that construction may have on the aesthetic value placed on the land by residents. The only residual aesthetic impact should be a new valve station. As both stations will occur in rural locations where infrastructure and commercial operations occur, the aesthetic change is not anticipated to be of a high magnitude.

In terms of economic contributions to perceived health and well-being, the effect from local economic activity is anticipated to have a positive effect on residents' perceived health and well-being.

With the implementation of the above mitigation and protective measures, the project is not anticipated to alter the lifestyles of residents. Nor should it adversely affect social and community networks or living and environmental conditions. Therefore, no significant adverse residual impacts on perceived health and well-being are anticipated.

4.4.4 Infrastructure

Existing Conditions

Infrastructure crossed by the proposed pipeline route includes roads/highways, gas pipelines and utilities. Existing conditions for roads and highways are outlined in Section 4.4.2. The proposed pipeline route crosses a gas pipeline on Simpson Road before reaching Base Line, and another gas pipeline near the intersection of Bush Line and Base Line. A variety of buried utilities such as telephone cables, low-voltage hydroelectric lines, fiber optic cables and watermains are located in road allowance.

Mapped infrastructure crossed by the proposed pipeline route is located in Appendix C, Figure 14.

Potential Impacts

The proposed pipeline has the potential to interact with roads/highways, gas pipelines, and buried and overhead utilities. Potential impacts include damage to the infrastructure and harm to personnel.

Mitigation and Protective Measures

Mitigation and protective measures for roads are outlined in Section 4.4.2.

The contractor should be responsible for locating and exposing existing pipelines and utilities on lands that will be affected by trench excavation. Machine operators should be informed where electrical transmission lines are present overhead. Lines that may interfere with the operation of construction equipment should be identified with warning poles and red flags.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on infrastructure are anticipated.

4.4.5 Air Quality and Noise

Existing Conditions

The landscape adjacent to the proposed pipeline route is almost entirely agricultural, open space and natural heritage. Agricultural operations have the potential to expel air emissions. Although the study area does not have a high population density, air emissions will be released by project related diesel-powered heavy equipment and gas-powered construction vehicles.

According to the MOECC's Environmental Noise Guideline (2016b), the landscape along the proposed pipeline route would be categorized as a Class 3 area, meaning "a rural area with an acoustical environment that is dominated by natural sounds having little or no road traffic, such as a small community; agricultural area; a rural recreational area such as a cottage or a resort area; or a wilderness area." The study area experiences a very low traffic volume that represents a minimal source of noise. Other minor noise sources within the study area include occasional sounds due to anthropogenic agricultural activities and occasional sounds due to anthropogenic domestic activities such as property maintenance and recreation.

Potential Impacts

Residential and business properties may experience noise, dust and equipment exhaust associated with construction activity. During operation, no substantial air or noise emissions are anticipated to occur.

Mitigation and Protective Measures

During construction, motorized construction equipment should be equipped with mufflers and silencers as appropriate. Company and construction personnel should avoid idling of vehicles; vehicles or equipment should be turned off when not in use unless required for operation of the vehicle or equipment. To the greatest extent practical activities that could create noise should be restricted to daylight hours and adhere to local noise by-laws. Sources of continuous noise, such as portable generators, should be

shielded or located so as to reduce disturbance to residents and businesses. Where pipeline installation will take an extended time period to complete, such as watercourse and road crossings, an assessment should be undertaken to determine the suitability and effectiveness of temporary noise barriers adjacent to residential or business properties.

The contractor should implement site practices during construction that are in line with the Environment Canada document 'Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities' (Cheminfo Services Inc., 2005), which may include:

- Maintaining equipment in compliance with regulatory requirements
- Protecting stockpiles of friable material with a barrier or windscreen in the event of dry conditions and dust
- Dust suppression of source areas
- Covering loads of friable materials during transport

Watering for dust control must not result in the formation of puddles, rutting by equipment or vehicles in the existing road allowance, the tracking of mud onto roads or the siltation of watercourses.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts from air quality and noise are anticipated.

4.4.6 Contamination

Existing Conditions

A Contamination Overview was completed for the project which considered the preferred pipeline route and activities within 250 m on either side. The overview included a search of public and private information databases for the investigated area by Environmental Risk Information Services (ERIS), and a limited site reconnaissance (i.e., a windshield-level survey which involved viewing the site and surrounding area from publicly accessible roadways) completed on March 6, 2018. A review of potential landfills was also undertaken by reviewing the MOECC's Waste Disposal Site Inventory (1991).

Potential Impacts

Based on a review of the ERIS database report and the site reconnaissance, it was determined that nine potential sources of contamination (PSOC) occur within 250 m of the proposed pipeline route. There were four PSOC's ranked as high, three ranked as moderate, and two ranked as low. The ranking depended on the distance of the potential source from the preferred route and the activity associated with the potential source. A table displaying the details of the nine sources can be found in Appendix F.

There are four closed landfills in the Dresden area, north of Base Line, with the closest closed landfill located 920m north-east of the proposed pipeline endpoint. The closest active landfill is 3.9 km north of the proposed pipeline (MOECC, 1991). Mapped locations of landfills along the proposed route are located in Appendix C, Figure 6.

The windshield survey did not permit a detailed assessment of the presence of PSOCs at private properties; therefore, it is possible that above ground or underground fuel storage may exist on-site or at adjacent properties.

Mitigation and Protective Measures

Based on the findings of the Contamination Overview Study, the following recommendations are provided:

- If excess soil is generated at the Site during construction activities that will require off-site management, or if contaminated soils are suspected (e.g., if observed material contains anthropogenic substances, petroleum hydrocarbons odours/staining, and debris/waste), representative soil samples should be collected and submitted for chemical analysis to determine management options and appropriate handling and health and safety guidelines. If excess soil is generated in areas adjacent to the identified PSOC, the soil should be analyzed for specific contaminants of concern as described in Table 1 of the MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (April 15, 2011).

- Soils that do not meet the Standards listed in Table 1 of the MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (April 15, 2011) may not be considered inert fill upon excavation, and off-site management options for excess soils that cannot be reused within the Site should be considered.

- If construction activities disturb the identified fill piles, or if other fill material of unknown origin or quality is identified during construction activities, representative soil samples should be collected and submitted for chemical analysis to determine management options for the material if off-site disposal is required or if contaminated soils are suspected.

- If water is handled at the Site during construction activities, water quality analyses should be conducted where appropriate to determine appropriate discharge methods and in coordination with a qualified person (QP) as defined by O. Reg. 153/04.

- Salt-related parameters may not be considered to be contaminants when they result from winter road maintenance under O. Reg. 153/04; however, excess soil or water from areas affected by winter road maintenance should be managed in coordination with a QP.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts from contamination are anticipated.

4.4.7 Waste Management

Potential Impacts

Improper disposal of waste material generated during construction may result in contamination to soil, groundwater, and/or surface water resources on and off the construction site. Litter generated during construction may also become a nuisance to landowners and/or surrounding residents if not contained.

Mitigation and Protective Measures

The construction contractor should implement a site-specific waste collection and disposal management plan, which may include:

- Waste materials, sanitary waste and recycling transported off-site by licensed waste contractors.
- The responsible management of fill (see Section 4.2.5).
- Labelling and storage of hazardous and liquid wastes in a secure area that would contain material in the event of a spill.
- Implementation of a waste management program consisting of reduction, reuse, and recycling of materials.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts from waste management are anticipated.

4.4.8 Land Use

Existing Conditions

The proposed pipeline route is located in the Municipality of Chatham-Kent, a single tier municipality. The Municipality of Chatham-Kent OP has been in effect since December 24, 2008 and the Municipality of Chatham-Kent's Comprehensive Zoning By-law No. 216-2009 has been in effect since December 14, 2009. According to Section 2.4.6.2.1 of the Chatham-Kent OP (Municipality of Chatham-Kent, 2016), natural gas pipelines and related facilities shall be permitted in any land-use designation, provided that the development satisfies applicable provincial and/or federal legislation. According to Section 4.37.1 (d) of the Chatham-Kent Zoning By-law No. 216-2009 (Municipality of Chatham-Kent, 2018), the facilities, buildings and structure of any gas company are permitted in all zones.

The proposed pipeline is planned to be within road allowances which is not included in the Chatham-Kent Zoning Bylaw categories. Zoned designated land use adjacent to the site includes: Agriculture (A1), Institutional (I), Rural Highway Commercial (RHC-356), Rural Industrial (MR), and Rural Residential (RR) along with Conservation Authority Regulated Areas, and Floodplain Areas. There is potential that the proposed pipeline construction will need to extend beyond the road allowance and into agricultural lands adjacent to the construction area. No impact to the other land use type areas is anticipated.

The proposed pipeline is also within Flood Prone Area (Flood Constraint Areas) and intersects a small area designated as an Active Petroleum Pool.

Potential Impacts

As noted above, natural gas pipelines are permitted facilities in the various municipal land uses, and thus no impacts to municipal land use designations should occur.

Potential impacts on agricultural land is discussed in Section 4.2.5 (soils) and 4.2.6 (agricultural tile drainage). Potential impacts on agricultural and non-agricultural businesses are discussed in Section 4.4.1. Potential impacts on uses of land will be interruption to access or use.

Mitigation and Protective Measures

Mitigation and protective measures for agricultural soils, drainage and for businesses are discussed in Sections 4.2.5, 4.2.6 and 4.4.1, respectively.

Consultation has been initiated, and should continue, with landowners along the proposed pipeline route in order to identify methods of minimizing disturbance to their property and maintaining access to their land to the extent possible. Where work is to occur within conservation authority regulated areas, permits should be obtained from the SCRCA, as per O. Reg. 171/06.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on land use are anticipated.

4.4.9 Archaeological Resources

Existing Conditions

A Stage 1 AA (Appendix F) has been conducted for the entire route evaluation study area. A copy of the completed Stage 1 AA report has been submitted to the MTCS for review and inclusion into the *Public Register of Archaeological Reports*.

Initial background research compiled information concerning any known and/or potential archaeological resources within the archaeological study area. A property inspection was completed on March 22, 2018 in accordance with Section 1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario, 2011).

An examination of the *Ontario Archaeological Sites Database*, maintained by the MTCS, identified seven previously registered archaeological sites inside or within one kilometer of the archaeological study area (Government of Ontario, 2018). Table 4-11 provides a summary of the previously registered archeological sites inside or within one kilometer of the archaeological study area. All but one of the registered archeological sites (i.e. AdHn-18) are located within the boundaries of the archaeological study area; three of which are located within 50 metres of the preliminary Preferred Route.

The archaeological study area can be seen in the Stage 1 Archaeological Assessment (Appendix F).

Potential Impacts

The Stage 1 AA has determined that the majority of the proposed pipeline route retains potential for the identification and documentation of pre-contact Indigenous, post-contact Indigenous, and Euro-Canadian/Afro Canadian archaeological resources. The Stage 1 property inspection has determined that portions of the study area, particularly focused around the proposed preliminary route, have been subject to extensive land disturbance which has removed archeological potential. The small pockets of previously surveyed lands and disturbed lands within the study area retain low to no archeological potential.

A map of archaeological potential is provided in Appendix C, Figure 16.

Mitigation and Protective Measures

Based on the findings of the Stage 1 AA, further stages of archaeological assessment (i.e., Stage 2 AA) are required, which should provide for the protection and mitigation of any relevant archaeological resources, if any are found. Wherever possible, archaeological sites should be mitigated in whole or in part by avoidance and preservation. For any sensitive First Nations sites that could be subject to impact by the project, Stage 3 and Stage 4 options should be evaluated in discussions with Union Gas and the appropriate First Nations.

In accordance with Section 1.3.2 and Section 7.7.4 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario, 2011), Stage 2 archeological assessment is not required for any portion of the Project's anticipated construction site which impacts a previously surveyed or disturbed area.

Net Effects

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on archaeological resources are anticipated.

4.4.10 Cultural Heritage Resources

Existing Conditions

A Heritage Overview was prepared by Stantec in March 2018 to identify heritage resources of cultural heritage value or interest (CHVI) within and adjacent to the Study Area. Through municipal and agency consultation and review of historic mapping, two protected heritage resources and 34 potential heritage resources were identified in vicinity of the proposed pipeline route (see Appendix C, Figure 17). Upon review of the OEB indicators of CHVI, eight indicators of CHVI were identified within the Study Area, and three indicators of CHVI were identified within the Project Location.

As a result of the findings of the Heritage Overview, a Cultural Heritage Assessment Report (CHAR) was recommended prior to Project construction. The CHAR was completed in May 2018, with a field survey of the Study Area on May 15, 2018. . The CHAR was prepared to identify heritage resources (both built heritage resources and cultural heritage landscapes) along the proposed pipeline route. A total of 41 potential heritage resources were identified within or adjacent to the proposed pipeline as listed below. Following evaluation of the potential heritage resources against Ontario Regulation 9/06, of the *Ontario Heritage Act,* 29 cultural heritage resources (CHR) with CHVI were identified. . The CHAR is included in Appendix F.

Potential Impacts

Impacts to cultural heritage resources are generally categorized as either direct (destruction or alteration) or indirect (shadows, isolation, obstruction, change in land use, and land disturbance). Along the proposed pipeline route, potential impacts to cultural heritage resources are limited to vibration damage to structural stability.

The CHAR has not identified any cultural heritage landscapes that would be impacted by the above ground valve stations.

Mitigation and Protective Measures

In order to prevent negative impacts, the 29 identified CHR's within 50 m of the proposed pipeline route should be isolated from project activities. It is recommended that site plan controls be put in place prior to construction to prevent potential impacts as a result of the project. The site plan control methods shall be determined in advance of construction by the proponent to indicate where project activities are restricted. These controls should be communicated to the construction contractor.

Three of the identified CHR's are situated within 15 metres from the proposed pipeline route. These resources are at risk for indirect impacts resulting from construction-related ground vibration. It is recommended that activities do not exceed maximum acceptable vibration levels, or peak particle velocity (PPV) levels, as determined by a qualified geotechnical engineer with previous experience working with heritage structures. Where construction activities are anticipated within the 15 metre buffer zone, the following vibration monitoring activities are proposed:

- **Pre-construction condition surveys:** Pre-construction condition survey should be carried out to review the type, age, and vulnerability of the structures and foundations of heritage resources. The pre-condition survey is used to establish the existing conditions of heritage resources prior to construction.
- **Vibration monitoring during construction:** Assessment of the acceptable peak particle velocity (PPV) limits for the heritage resources within the 15 metres buffer should be carried out prior to commencement of construction. Vibration monitoring consist of monitoring the ground-borne vibration levels, in PPV while construction activities take place. Acceptable PPV should be established for general conditions within the Study Area and in the vicinity of heritage resources identified; not necessarily on a per property basis. At appropriate points, construction within the 15 metre buffer zone should be monitored to confirm that acceptable PPV levels are not exceeded. All construction activities should cease if levels are exceeded until an acceptable solution can be identified. Equal care should be applied during decommissioning activities to safeguard heritage resources.
- **Post-construction condition survey**: Post-construction condition survey should be conducted after completion of construction. The results of the post-construction condition survey will be compared with the data collected from the pre-construction condition survey to establish the presence, or absence, of constructed related impacts.

Vibration monitoring, including pre-construction condition survey, vibration monitoring of PPV during construction, and post-construction condition survey should be carried out by a qualified building condition specialist or geotechnical engineer with previous experience working with heritage structures.

Net Impacts

With the implementation of the above mitigation and protective measures, no significant adverse residual impacts on cultural heritage resources are anticipated.

4.4.11 Indigenous Interests

Existing Conditions

Union Gas has requested input, by letter or email, from the following Indigenous communities:

- Aamjiwnaang First Nation
- Bkejwanong (Walpole Island) First Nation
- Caldwell First Nation
- Chippewas of the Thames First Nation
- Chippewas of Kettle and Stoney Point
- Oneida Nation of the Thames.

Union Gas is undertaking all direct engagement and meetings with Indigenous communities and will outline the status of such engagement in their 'Leave to Construct' application to the OEB. No comments regarding the environmental study were received from Indigenous communities at the time of writing this ER.

Potential Impacts

Although not known to occur, the project may affect traditional territories of Indigenous communities and during construction harvesting and hunting in the construction site could be impeded. Archaeological surveys could also result in the finding of Indigenous artifacts. Potential permits and approvals required for the project (see Section 1.2.5) may trigger a duty to consult.

Mitigation and Protective Measures

Union Gas has sought input into the project from Indigenous peoples and should continue engaging with Indigenous communities as the project moves forward. Union Gas should also continue to work with their respective Economic Development departments and Union Gas' contractors to find opportunities for their participation in providing goods and services during construction. An indigenous consultation report will be included as part of UGL's prefiled evidence

Mitigation and protective measures for archaeology are discussed in Section 4.4.9.

Net Impacts

By undertaking the above engagement and archaeological assessments, no significant adverse residual impacts on Indigenous interests are anticipated.

4.5 SUMMARY OF RECOMMENDATIONS

Table 4-12 provides a summary of the recommended supplemental studies, mitigation and protective measures identified in Sections 4.2-4.4.

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
PHYSICAL FEATURES		
Bedrock Geology and Drift Thickness *Section 4.2.1*	Where bedrock materials are excavated, noise, vibration, and dust may impact wildlife and residents.	Mitigation and protective measures for sensory disturbance to wildlife are outlined in Section 4.3.3 and to residents are outlined in Section 4.4.3. Should blasting occur, mitigation measures should follow those outlined in the Union Gas Blasting Specification. As blasting should not occur near watercourses, no mitigation or protective measures are required.
Surficial Geology and Physiography *Section 4.2.2*	Disturbance to the overburden along the existing road allowances may cause surface soil erosion and trench slumping during construction or post-construction at areas that may require further rehabilitation.	Where there is potential for soil erosion, the need for and location of erosion and sediment control (ESC) measures should be approved by an inspector with appropriate qualifications and installed prior to the commencement of clearing. When land is exposed, the exposure should be kept to the shortest practical period. Natural features should be preserved to the extent practical. ESC and mulching may be used to protect areas as appropriate. Where required, natural vegetation should be re-established as soon as practical. The contractor must obtain adequate quantities of materials to control erosion. Additional supplies should be maintained in a readily accessible location for maintenance and contingency purposes. ESC features should be reviewed to maintain their effectiveness through the life of construction and post-construction rehabilitation. Extreme precipitation events could result in damage to ESC measures which could lead to erosion. When site conditions permit, ESC measures should be maintained or improved on erosion susceptible surfaces. If the erosion is resulting from a construction-related activity, the activity should be halted immediately until the situation is rectified. To avoid the trench from slumping, trench walls should be sloped or shored and should be monitored during wet conditions for the potential to slump. For watercourse crossings, the requirement for and location of ESC measures should adhere to Union Gas' DFO-endorsed Generic Sediment Control Plans (see Appendix D).

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
		Slope stability should be reviewed at crossing locations. Water course banks should be seeded and stabilized immediately following crossing. ESC and stabilization measures should be maintained during construction, restoration and rehabilitation until vegetative cover is established. Where evidence of erosion exists, corrective control measures should be implemented as soon as conditions permit.
Hydrogeology *Section 4.2.3*	<u>Hydrostatic Testing and Dewatering/Sand-pointing</u> An uncontrolled discharge of water could cause downstream flooding, erosion, sedimentation, or contamination. <u>Private Water Wells</u> Depending on the proximity to wells, the depth of the well installation and the groundwater levels encountered during excavation, trench dewatering may impact water well quality or quantity at some of the overburden supply wells. <u>Municipal Water Supply</u> The proposed pipeline does not extend through any WHPAs associated with any municipal groundwater supply system but does extend through the IPZ-3 for the nearby surface water systems. The western portion of the pipeline extends through an area mapped as highly vulnerable aquifer, with a vulnerability score of 6.	<u>Hydrostatic Testing and Dewatering/Sand-pointing</u> For groundwater dewatering, the MOECC allows registration under the EASR for construction dewatering projects where takings will be greater than 50,000 L/day and less than 400,000 L/day; however, if groundwater takings exceed 400,000 L/day, a PTTW may be required from the MOECC. If surface water is used as the source water for the hydrostatic test, a PTTW application would be required and would include an assessment of the capacity of the source to provide the required water without impacting the ecosystem, and recommendations for mitigation measures such as screened water intakes to limit intake of debris and organisms and energy dissipation/erosion control measures during discharge to limit erosion and sedimentation. If municipal water is used as the source water for the hydrostatic test, approval should be obtained from the MOECC for a Class IV – Planned Spill. The request for approval would include details of proposed discharge, proposed mitigation measures and potential impacts to the receiving environment. To reduce the potential for erosion and scouring at discharge locations during construction dewatering/sand-pointing and/or hydrostatic testing, energy dissipation techniques should be used. Discharge piping should be free of leaks and should be properly anchored to prevent bouncing or snaking during surging. Protective measures may include dewatering at low velocities, dissipating water energy by discharging into a filter bag or equivalent, and utilizing protective riprap or equivalent. If energy dissipation measures are found to be inadequate, the rate of dewatering should be reduced or dewatering discontinued until satisfactory mitigation measures are in place. Discharge should be monitored to make sure that no erosion or flooding occurs. To assess the potential for introduction of contaminated water to soils or bodies of water, testing of hydrostatic and trench dewatering discharge water should be

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
		considered. Testing requirements can be influenced by the nature and quality of the source water used, any additives to the test water, the nature of the pipeline, and pipeline contents. An environmental consultant should be consulted to determine what testing is necessary for the discharge water. Private Water Wells A private well survey should take place to assess domestic groundwater use near the preferred pipeline and a private well monitoring program may be recommended for residents who rely on overburden groundwater supply for domestic use. Highly Vulnerable Aquifer Refueling of equipment should be undertaken outside of areas mapped as highly vulnerable aquifer. If required, under approval from on-site environmental personnel, special refueling procedures for sensitive areas should be undertaken that include, at a minimum, using a two-person refueling system with one worker at each end of the hose. To reduce the impact of potential contaminant spills, the contractor should implement management protocols such as secondary containment of any temporary fuel storage and preparation of a spill response plan.
Extractive Resources: Aggregates and Petroleum Pools *Section 4.2.4*	The preferred pipeline route is located within existing road allowances, and there are no aggregate extraction sites located along the route. Potential impacts to aggregate resources are not anticipated. The preferred route does encounter a designated natural gas storage area, an active natural gas pool and an abandoned natural gas pool. Due to the shallow nature of pipeline construction, no impacts to these natural gas features are anticipated.	Since potential impacts to extractive resources, natural gas storage areas or natural gas pools are not anticipated, mitigation and protective measures have not been developed.
Soil and Soil Capability *Section 4.2.5*	The proposed pipeline route is within road allowances that are adjacent to prime agricultural land. If agricultural lands are required for temporary work space, there are potential impacts to agricultural topsoil	Excess Soil If excess soil is generated from the road allowances along the proposed construction project, it is recommended that Union Gas meet the guidelines and regulations regarding the handling excess soil. If detailed information is required, it is recommended that Union retain a qualified person (QP) who is knowledgeable in

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	as a result of construction including compaction, loss of organic matter and degraded soil structure. No agricultural topsoil should be removed from the site. Excess subsoil may be removed from the site. In the event that equipment is moving from one agricultural field to another there is the potential for the spread of soil pests/diseases to previously unimpacted fields.	the current excess soils guidelines, as well as the proposed MOECC regulation, to make recommendations for the management of excess soils for this project. <u>Wet Soil Shutdown</u> To the extent feasible, construction activities are recommended to occur during drier times of the year. Lands affected by heavy rainfall events should be monitored for excessively wet soil conditions. If adjacent agricultural lands are impacted, construction activities on those lands should be temporarily halted while excessively wet soil conditions exist, as per Union Gas' standard wet soils shutdown practice. Union Gas' on-site inspection team will determine when it is appropriate for construction activities to resume. If a situation develops that necessitates construction during wet soil conditions, soil protection measures should be implemented, such as confining construction activities to the least area practical, installing surface protection measures, and using wide tracked or low ground pressure vehicles. <u>High Winds</u> During construction activities, weather should be monitored to identify the potential onset of high wind conditions and to preserve topsoil. In the event that high winds occur, the contractor should implement protective measures such as: suspend earth moving operations; apply dust suppressants or vegetate the piles; protect soil stockpiles with a barrier or windscreen. In conjunction with the above measures, all required materials and equipment should be readily accessible and available for use as required. <u>Soil Stripping</u> If construction impacts privately owned lands, Union Gas should discuss with the landowner the proposed method of handling topsoil on their property. Landowner requests, and preferences for additional stripping or no stripping, should be accommodated where practicable. If topsoil stripping is undertaken on agricultural land, topsoil and subsoil should be stripped and stockpiled separately to avoid mixing. On those agricultural lands, topsoil depth should be measured prior to stripping so that the proper depth of topsoil is removed and replaced. If clean-up is not practical during the construction year, it will be undertaken in the year following construction, starting once the soils have sufficiently dried. Interim soil protection measures should be implemented in sensitive areas to stabilize the

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Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
		construction site for over-wintering. *Soil Compaction* If agricultural lands are compacted by the construction process, an agrologist should determine where decompaction may be necessary. Compaction can be alleviated by using an agricultural subsoiler, followed by discing, chisel ploughing and cultivating, to smooth the surface, this should be considered on agricultural lands. In high traffic agricultural lands, where deep compaction persists, additional deep tillage or subsoiling may be required on a site-specific basis. Soil density and/or penetrometer measurements on and off the agricultural lands may be used as a means of assessing the relative degree of soil compaction caused by construction as well as determining that the disturbed area has been sufficiently decompacted. *Soil Pests/Diseases* In consultation with the landowner and an agrologist, Union Gas should develop and implement a soil sampling plan for any impacted agricultural lands to screen for potential pests and/or diseases that are known to the area. If the results indicate an issue or concern, in consultation with the landowner, Union Gas should work with an agrologist if necessary, to develop a best practice protocol. Additionally, any imported topsoil used for rehabilitation on agricultural lands should also have a composite sample analyzed for identified concerns before it is placed on the construction site.
Agricultural Tile Drains *Section 4.2.6*	Construction activities, including trenching and the movement of heavy machinery, have the potential to crush and/or sever agricultural tile drains.	Union Gas should undertake consultation with landowners, if agricultural fields are impacted, to confirm where systematic tile drainage is present. If tile drainage is encountered, Union Gas should develop mitigation measures as required.
Natural Hazards *Section 4.2.7*	The probability of a significant seismic activity in the area traversed by the proposed pipeline is low; therefore, no potential impacts are anticipated. A flooding event during construction could result in construction delays, soil erosion, sedimentation of a watercourse, trench slumping, and damage or loss of construction equipment and contamination	If flooding necessitates a change in the construction schedule, affected landowners and regulatory agencies should be notified and construction should continue at non-affected locations. Temporary workspaces should be located above the floodplain to the extent practical, unless necessary for watercourse crossings. All work in the floodplains will be subject to a permit under O. Reg. 171/06 from SCRCA.

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	of a watercourse as a result of equipment entering a watercourse. The nature of these impacts would depend on the spatial extent, duration, and magnitude of the flooding event.	
BIOPHYSICAL FEATURES		
Watercourses and aquatic species at risk *Section 4.3.1*	<u>Dam and Pump Crossing</u> Construction of an open cut crossing has the potential to affect fish directly through impacts on water quality (erosion, sedimentation, and accidental spills), disruption/harassment (vibration and noise) and loss of habitat. Indirect impacts include restrictions to habitat use and fish passage. Long term impacts can include changes to habitat such as substrate, increased erosion potential, loss of in-stream cover and riparian shading. <u>Horizontal Directional Drilling</u> Potential impacts that may result from HDD include the escape of drilling mud into the environment, tunnel collapse, or the inadvertent release of fluid to the surface.	Mitigation and protective measures for erosion and sediment control are outlined in Section 4.3.2 and accidental spills in Section 4.3.3. Temporary vehicle crossings and dam and pump pipeline crossings should be completed following the measures outlined in the agreement letter between Union Gas and DFO (2008) included in Appendix D. If aquatic species at risk are confirmed through agency correspondence, permits and/or additional mitigation measures should be developed. When working near aquatic features, the following mitigation measures are recommended: • ESC measures should be used adjacent to sensitive receptors when exposed soil slopes are at risk of eroding. • ESC measures should be monitored regularly and properly maintained, as required. Controls are to be removed only after the soils of the construction area has been stabilized and adequately protected until vegetation cover is re-established • All materials requiring stockpiling (e.g., fill, topsoil, etc.) should be stabilized and kept a minimum of 30 m from watercourses, natural features, drainage features and top of steep slopes. When such a distance is not possible, stockpiled materials should be appropriately contained to prevent erosion and sedimentation. • Exposed soil areas near a watercourse should be stabilized through the placement of seed, mulch, and/or erosion and sediment control measures to prevent sediment deposition in the watercourse. • Refueling of equipment should be undertaken 50 m from watercourses, to reduce potential impacts to surface water quality in the event that an accidental spill occurs. If a 50-m refueling distance is not possible, under approval from on-site environmental personnel, special refueling procedures

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
		for sensitive areas should be undertaken that include, at a minimum, using a two-person refueling system with one worker at each end of the hose. Refueling activities should be monitored, and vehicles should not be left unattended when being refueled. Containers, hoses and nozzles should be free of leaks. Fuel nozzles should be equipped with functional automatic shut-off devices. • Fueling and lubrication of equipment should be carried out in a manner that reduces the possibility of spills to the extent possible. On-site fuel tanks and generators should be situated in designated areas with secondary containment. • Bank slopes should be restored to match existing grades; however, alterations may be made to maintain slope stability and limit future erosion. Exposed banks should be re-vegetated with native shrubs and grasses to provide riparian cover and aid in erosion and sediment control. ESC measures should be removed when the site is permanently stabilized. For HDD crossings, the following additional mitigation measures are recommended: • The watercourse should be monitored for signs of inadvertent release of fluids during all phases of construction • The contractor must develop an Emergency Response and Contingency Plan for inadvertent fluid release. If in-water work is required, the following mitigation measures are recommended: • In-water work should be conducted within the appropriate construction timing window. The standard timing window for warm water streams in MNRF's southern region prohibits in-water work between March 15 and July 1 (MNR, 2013); the timing window should be confirmed with the MNRF. • Isolate temporary in-water work zones to maintain downstream flow during construction. • Transfer fish in the work area away from the construction area using capture, handling, and release techniques to reduce harm and stress. Intakes of pumping hoses should be equipped with an appropriate device to avoid entraining and impinging fish (see DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO, 2016b). • Manage all water from dewatering operations to reduce the risk of erosion and/or release of sediment laden or contaminated water to the waterbody (e.g., settling basin, filter bag, energy dispersion measures).

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
Designated Natural Areas and Vegetation *Section 4.3.2*	Where there is natural vegetation within or adjacent to the proposed pipeline route, potential impacts include the removal of native vegetation, introduction or spread of invasive species, and indirect effects such as dust, erosion, and accidental spills.	Environmental mitigation and protective measures during construction include the following: • Clearing should be minimized to the extent possible in sensitive areas such woodlots, along watercourses, along the side of the ANSI and in areas of significant groundwater recharge. • The limits of clearing should be surveyed and staked in the field, to allow for the protection of off-site natural areas and vegetation. • All brush and trees should be felled within the project footprint. • Clearing should be done during dry soil conditions to the extent practical to limit disturbance to vegetation and terrain. • A screening field program of wetlands and riparian areas should be undertaken prior to construction, to determine where precautionary measures (ex. equipment washing before site access) may be necessary to mitigate for the spread of non-native species. • If significant phragmites stands are identified during field investigations, a phragmites management plan should be developed. • A re-vegetation program should be initiated for all vegetated temporary work areas. Union Gas should consult with landowners and SCRCA to confirm replanting plans. • Union Gas should undertake their standard tree replacement program, which involves the replanting of twice the area of woodlot removed during construction, and the replacement of individual trees on a 1:1 basis. Tree replacement consists of species native to the area, and ideally the same species removed. Union Gas encourages planting of replacement trees on the same property where the trees were removed, with the goal of enhancing a natural area and its associated wildlife habitat. If a landowner is not interested in planting trees on their property, Union Gas should offer the trees to SCRCA or to a local community group. Union Gas should maintain the trees for a period of 3 years, or until the trees reach a 'free to grow' status as defined by a height of 1 metre (m) and tree of adjacent brush competition. • Seeding of the disturbed temporary work areas and permanent existing road allowance should be done with a native seed mix approved by SCRCA and the municipality. Replaced soils should contain native seed bank, facilitating successful revegetation. • One year following construction, planted vegetation should be inspected for survival; in areas of severe dieback, dead and diseased planted vegetation

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
		should be replaced. Mitigation and protective measures are outlined in Section 4.2.2 for erosion, Section 4.2.3 for accidental spills, and Section 4.4.5 for dust.
Wildlife, Wildlife Habitat and Species at Risk *Section 4.3.3*	Potential impacts on wildlife and wildlife habitat from construction include direct mortality from construction vehicles, habitat destruction through vegetation removal, habitat degradation through spills and sensory disturbance of wildlife during construction.	Mitigation and protective measures are outlined in Section 4.3.2 for vegetation removal and Section 4.2.3 for accidental spills. Environmental mitigation and protective measures during construction include the following: • Detailed design of the proposed pipeline should be reviewed to avoid and reduce the likelihood of impact upon wildlife habitat to the extent possible, and in particular habitats of endangered, rare, special concern, and threatened species. • Speed limits should be lowered along the construction site where field investigations identify specific wildlife concerns. • Equipment and vehicles should yield the construction site to wildlife. • Trench operations should be followed as closely as practical with backfill operations, to facilitate the movement of wildlife across the trench. • Gaps in stockpiles should be created, in consultation with a biologist, to allow for the potential movement of wildlife across the construction site. • Fencing should be erected around deep excavations to prevent wildlife entrapment. • The contractor should inform their personnel to not threaten, harass or injure wildlife. • If wildlife is encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site. • Where practical, avoid construction in the vicinity of areas that may provide habitat for amphibians during the amphibian breeding season (March 1 – June 30). Amphibian habitat should be identified during field investigations. • Habitat assessments and species occurrence surveys should be conducted for SAR. A report should be prepared to document results and recommend mitigation measures. • Field investigations should be undertaken to identify potential habitat for Eastern Foxsnake, which is known to occur in the area. Mitigation recommendations should be prepared upon consultation with MNRF and should include the use of timing windows, inspection of construction equipment

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
		and protection of key habitat features. Mesh or netting type stabilization material should not be used for erosion control due to risk of entanglement. • Areas of potential bat maternity roosting habitat should be identified during field investigations. Tree removal in identified areas should be limited to the extent possible and should avoid the active season for bats (mid-April to mid-September). Mitigation recommendations for SAR bats should be prepared based upon consultation with MNRF. • Construction activities with the potential to remove migratory bird habitat, such as vegetation clearing, should be avoided during the breeding season which is generally from April 1- August 31 in southern Ontario (Environment Canada, 2017). Should vegetation clearing activities be unavoidable during this window, a mitigation program should be developed, which includes measures to reduce and avoid impacts to migratory birds and their nests. This program should include preventative and mitigation measures but may also include avoidance of clearing during key sensitive periods and in key locations. • If SAR are found along the proposed pipeline route Union Gas should undertake consultation with the MNRF regarding the potential need for a permit under the ESA and/or species-specific mitigation
SOCIO-ECONOMIC ENVIRONMENT		
Employment and Business *Section 4.4.1*	Project demands for labour and goods and services can result in both beneficial and adverse effects. Positive effects may not be evenly distributed among populations, with some residents in a better position to receive economic benefits than others. Similarly, adverse effects may affect some residents more than others. Labour conditions should be affected by direct, indirect and induced employment during all project phases. The project could affect business through purchases of labour, goods and services from local businesses, including businesses owned by Indigenous peoples, and should result in increased employment income and	Union Gas has and should continue to work with local and Indigenous businesses to enhance their potential for successfully bidding on project contracts regarding the supply of goods and services, particularly for the operation phase. One initiative to help encourage further local and Indigenous content on the project is to post project purchasing requirements in advance, so that businesses can position themselves to effectively bid to supply goods and services needed for construction and operation. Increased participation of local and Indigenous businesses should enhance positive local economic effects. With respect to potential adverse effects on agricultural and non-agricultural businesses, Union Gas should engage with land owners to address access to the project area, the portion of land that should be altered as part of site preparation, and long-term changes to agricultural and non-agricultural land.

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	municipal government revenue. Local businesses should likely benefit from supplying the project with goods and services. Land clearing and other project activities, primarily during construction, could adversely affect other economic activities, including agricultural productivity. Potential adverse effects on industries, including agriculture, are impairment to the use of property, disruption of livestock production, and issues with farm machinery movement.	
Community Services and Infrastructure *Section 4.4.2*	The presence of temporary workers in the local communities during the approximately six-month long construction period has the potential to increase the demand for housing and local community services and infrastructure. The transportation of project goods, services and workers has the potential to lead to increased use of existing transportation infrastructure. Also, increased traffic volumes along local road networks could increase travel times and reduce road safety, which might lead to increased use of local emergency services due to potential vehicle accidents and workplace accidents. In addition, the production of project-related waste could place additional stress on the capacity of local landfills. Some operation workers might already reside in the local area; however, some might need to come from outside communities and may use local community	Non-local project workers are expected to stay in temporary accommodations, including hotels, motels, and campgrounds. They may also choose to rent cottages or apartments. The short duration that the workers will reside near any one community, as well as the structure of the work shifts, should limit the need for workers to use the services and infrastructure in local communities. Project employees might require medical attention while staying in the area. The contractor and Union Gas should have emergency response equipment and trained personnel on-site during construction. In addition, an Emergency Response Plan should be developed and implemented, which should address field health services, emergency call-out procedures and fire response plans. Safety fencing should be used where necessary to separate the work area. Environmental mitigation, which should be contained in the project Environmental Protection Plan and its contingency and management plans, should be in place to reduce the likelihood of emergency events and to prepare for the management of emergency events on site. If an emergency incident were to occur, it is anticipated that the comprehensive mitigation, contingency plans, and safety strategies should result in a localized and low-intensity response. A Traffic Management Plan should be in place for all roads affected by construction, which at a minimum outlines measures to: • Control the movement of materials and personnel to and from the construction site

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	and emergency services.	• Post signs to warn oncoming motorists of construction activity • Control traffic at road crossings • Reduce on-road disturbance and land closures • Store equipment as far from the edge of the road as practical • Install construction barricades at road crossings. Traffic disruptions during construction should be reduced by adherence to the Traffic Management Plan. Guidelines should be developed for vehicular use on the construction site and associated access roads to avoid traffic congestion and accidents. Access to existing transportation infrastructure should be addressed through standard mitigation and should be reversible once the construction phase ends. The capacity of waste disposal sites should be considered and if project needs are not easily accommodated, alternative disposal locations should be considered. Union Gas should provide project information to local communities and service providers so that they are prepared for any possible demand on community services and infrastructure related to a temporary population increase. Additional consultation with residents and businesses adjacent to the proposed pipeline route should be held in advance of construction commencement. Contact information for a designated Union Gas representative should be available to address questions and concerns during construction. Consultation has been initiated and should continue with municipal personnel.
Perceived Health and Well-Being *Section 4.4.3*	Perceived health and well-being is influenced by a number of factors such as individual lifestyles, social and community networks, living conditions, general socio-economic and environmental conditions. The project has the potential to affect a number of these factors, which could change the way that local residents perceive their health and well-being. During public consultation for the project, comments were raised regarding monetary compensation by residents for loss of crops, business, enjoyment of property, as well as	Mitigation and protective measures for air quality and noise are outlined in Section 4.4.5. If laneways or driveways are affected as a result of pipeline construction, they should be left in place over the trench where requested by the landowner, as long as feasible. Access to residential properties and businesses should be maintained at all times to reduce stress on local residents and safety fences should be installed at the edge of the construction right of way, where public safety considerations are required. A Traffic Management Plan should be implemented to reduce effects of project-related traffic on traffic volumes, which could reduce access to businesses and farmland (see Section 4.4.2). In addition, Union Gas should work with landowners to address specific concerns they may have regarding monetary compensation and

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	safety of the proposed pipeline near residential homes. Since perceived health and well-being is influenced by improved economic conditions, the project is expected to have positive effects by creating direct, indirect, and induced employment, and through project spending within Chatham-Kent (see Section 4.4.1). There is also the potential to enhance these benefits further by selecting local and Indigenous businesses to provide services to the project, thus increasing economic activity and spin-off benefits (see Section 4.4.1). This economic stimulus could increase local spending and increase income for some residents and their families. Higher income from project employment could increase the real and perceived quality of life of some local residents. Construction activity should temporarily affect the landscape of the construction area and could impede property access. Construction activities also have the potential to disturb the perceived aesthetic value that residents place on their property and the area in general. The potential for project activities to interfere with aesthetic value, property enjoyment, access to business, and with the production of agricultural products, could have an adverse effect on perceived health and well-being of some residents. Potential safety concerns also exist at locations where properties, residents and vehicles	their property, such as access and tile drainage repairs. While pipeline construction activities have the potential to temporarily affect the local landscape, restoration of the construction area should leave little evidence that a pipeline exists in the area. Vegetative buffers at watercourses and road crossings should be implemented and be compliant with applicable permits and regulations. The two valve stations should permanently alter the landscape in which they are constructed. Additional consultation with residents and businesses adjacent to the proposed pipeline route should take place in advance of construction activity. Union Gas should develop an issues resolution framework to help resolve stakeholder issues that may arise during project construction and operation, and to select the appropriate mitigation measures to resolve these issues.

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	come in proximity to construction activities. Potential increases in noise, dust, exhaust (see Section 4.4.5) and traffic congestion on roads could also cause stress and affect how people perceive their quality of life. Increased traffic could also impede customer access to business and access by farmers to their land. The temporary workforce may increase demands on existing recreation facilities, including arenas and swimming pools. Since project construction is scheduled to occur during spring, summer and fall months, winter recreation activities should not be affected.	
Infrastructure *Section 4.4.4*	Potential impacts include damage to the infrastructure and harm to personnel.	Mitigation and protective measures for roads and railways are outlined in Section 4.4.2. The contractor should be responsible for locating and exposing existing pipelines and utilities on lands that should be affected by trench excavation. Machine operators should be informed where electrical transmission lines are present overhead. Lines that may interfere with the operation of construction equipment should be identified with warning poles and red flags.
Air Quality and Noise *Section 4.4.5*	Residential and business properties may experience noise, dust and equipment exhaust associated with construction activity. During operation, no substantial air or noise emissions are anticipated to occur.	During construction, motorized construction equipment should be equipped with mufflers and silencers as available. Company and construction personnel should avoid idling of vehicles; vehicles or equipment should be turned off when not in use unless required for operation of the vehicle or equipment. To the greatest extent practical activities that could create noise should be restricted to daylight hours and adhere to local noise by-laws. Sources of continuous noise, such as portable generators, should be shielded or located so as to reduce disturbance to residents and businesses. Where pipeline installation will take an extended time period to complete, such as watercourse and road crossings, an assessment should be undertaken to determine the suitability and effectiveness of temporary noise barriers adjacent to residential or business properties.

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
		The contractor should implement site practices during construction that are in line with the Environment Canada document 'Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities' (Cheminfo Services Inc., 2005), which may include: • Maintaining equipment in compliance with regulatory requirements • Protecting stockpiles of friable material with a barrier or windscreen in the event of dry conditions and dust • Dust suppression of source areas • Covering loads of friable materials during transport Watering for dust control must not result in the formation of puddles, rutting by equipment or vehicles, the tracking of mud onto roads or the siltation of watercourses.
Contamination *4.4.6*	The fill quality within the road allowances likely had fill materials imported for road construction. The environmental quality of the imported fill is unknown, and represents a PSOC throughout the site; however, unless the fill material is removed from the site, the potential for the PSOC is low. The windshield survey did not permit a detailed assessment of the presence of PSOCs at private properties; therefore, it is possible that above ground or underground fuel storage may exist on-site or at adjacent residential, industrial, or commercial properties that were not observed from adjacent roadways.	Should excess soil be generated at the Site during future construction activities that will require off-site management, or contaminated soils be suspected (e.g., if observed material contains anthropogenic substances, petroleum hydrocarbons odours/staining, and debris/waste), representative soil samples should be collected and submitted for chemical analysis to determine management options and appropriate handling and health and safety guidelines. If excess soil is generated in areas adjacent to the identified PSOC, the soil should be analyzed for specific contaminants of concern as described in Table 1. Soils that do not meet the Standards listed in Table 1 of the MOECC *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (April 15, 2011) may not be considered inert fill upon excavation, and off-site management options for excess soils that cannot be reused within the Site should be considered. Should construction activities disturb the identified fill piles, or if other fill material of unknown origin or quality is identified during construction activities, representative soil samples should be collected and submitted for chemical analysis to determine management options for the material if off-site disposal is required or if contaminated soils are suspected. Should water be generated at the Site during construction activities, water quality analyses should be conducted to determine appropriate discharge methods and in coordination with a QP, as defined by Ontario Regulation 153/04. Salt-related parameters may not be considered to be contaminants when they result from winter road maintenance under Ontario Regulation 153/04; however,

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
		excess soil or water from areas affected by winter road maintenance should be managed in coordination with a QP.
Waste Management *Section 4.4.7*	Improper disposal of waste material generated during construction may result in contamination to soil, groundwater, and/or surface water resources on and off the construction site. Litter generated during construction may also become a nuisance to landowners and/or surrounding residents if not contained.	The construction contractor should implement a site-specific waste collection and disposal management plan, which may include: • Waste materials, sanitary waste and recycling transported off-site by licensed waste contractors. • The responsible management of fill (see Section 4.2.5). • Labelling and storage of hazardous and liquid wastes in a secure area that would contain material in the event of a spill. • Implementation of a waste management program consisting of reduction, reuse, and recycling of materials.
Land Use *Section 4.4.8*	Natural gas pipelines are permitted facilities in the various municipal land uses, and thus no impacts to municipal land use designations should occur. Potential impacts on agricultural land is discussed in Section 4.2.5 (soils) and 4.2.6 (agricultural tile drainage). Potential impacts on agricultural and non-agricultural businesses are discussed in Section 4.4.1. Potential impacts on uses of land could be interruption to access or use.	Mitigation and protective measures for agricultural soils, drainage and for businesses are discussed in Sections 4.2.5, 4.2.6 and 4.4.1, respectively. Consultation has been initiated, and should continue, with landowners along the proposed pipeline route in order to identify methods of minimizing disturbance to their property and maintaining access to their land to the extent possible. Where work is to occur within conservation authority regulated areas, permits should be obtained from the SCRCA as per O. Reg. 171/06.
Archaeological Resources *Section 4.4.9*	The Stage 1 AA has determined that the majority of the proposed pipeline route retains potential for the identification and documentation of pre-contact Indigenous, post-contact Indigenous, and Euro-Canadian/Afro Canadian archaeological resources. The Stage 1 property inspection has determined that portions of the study area, particularly focused around the proposed preliminary route, have been subject to extensive land disturbance which has	Based on the findings of the Stage 1 AA, further necessary stages of archaeological assessment (i.e., Stage 2 AA) are required, which should provide protection and mitigation of any relevant archaeological resources, if any are found. Wherever possible, archaeological sites that are determined to have cultural heritage value and interest should be mitigated in whole or in part by avoidance and preservation. For any sensitive First Nations sites that could be subject to impact by the project, Stage 3 and Stage 4 options should be evaluated in discussions with the appropriate First Nations.

Table 4-10: Summary of Potential Impacts and Recommended Mitigation and Protective Measures

Environmental Feature(s)	Potential Impact(s)	Mitigation and Protective Measures
	removed archeological potential.	
Cultural Heritage Resources *Section 4.4.10*	Along the proposed pipeline route, potential indirect impacts to cultural heritage resources (CHR) are limited to vibration damage to structural stability. The cultural heritage assessment report (CHAR) is ongoing and has not identified to date any cultural heritage landscapes that would be impacted by the above ground valve stations.	In order to prevent negative impacts, the 29 identified CHR's within 50 m of the proposed pipeline route should be isolated from project activities. It is recommended that site plan controls be put in place prior to construction to prevent potential impacts as a result of the project. The site plan control methods shall be determined in advance of construction by the proponent to indicate where project activities are restricted. These controls should be communicated to the construction contractor. Three of the identified CHR's are situated within 15 metres from the proposed pipeline route. These resources are at risk for indirect impacts resulting from construction-related ground vibration. It is recommended that activities do not exceed maximum acceptable vibration levels, or peak particle velocity (PPV) levels, as determined by a qualified geotechnical engineer with previous experience working with heritage structures. Vibration monitoring, including pre-construction condition survey, vibration monitoring of PPV during construction, and post-construction condition survey should be carried out by a qualified building condition specialist or geotechnical engineer with previous experience working with heritage structures.
Indigenous Interests *Section 4.4.11*	Although not known to occur, the project may affect traditional territories of Indigenous communities and during construction harvesting and hunting in the construction site could be impeded. Archaeological surveys could also result in the finding of Indigenous artifacts. Potential permits and approvals required for the project (see Section 1.2.5) may trigger a duty to consult.	Union Gas has sought input into the project from Indigenous peoples and should continue engaging with Indigenous communities as the project moves forward. Union Gas should also continue to work with their respective Economic Development departments and Union Gas' contractors to find opportunities for their participation in providing goods and services during construction. Information on the current state of Indigenous engagement should be provided in the application to the OEB. Mitigation and protective measures for archaeology are discussed in Section 4.4.9.

5.0 CUMULATIVE EFFECTS ASSESSMENT

The recognition of cumulative effects assessment as a best practice is reflected in many regulatory and guidance documents. With regard to development of hydrocarbon pipelines in Ontario, the *OEB Environmental Guidelines* (2016) note that cumulative effects should be identified and discussed in the ER. The cumulative effects assessment refers to the potential effects associated with the project.

Building upon the intent of the *OEB Environmental Guidelines* (2016), the OEB has specified that only those effects that are additive or interact with the effects that have already been identified as resulting from the project are to be considered under cumulative effects. In such cases, it will be necessary to determine whether these effects warrant mitigation measures. The cumulative effects assessment has been prepared with consideration of this direction from the OEB.

5.1 METHODOLOGY

The cumulative effects assessment describes the potential cumulative effects resulting from the interaction of residual effects of constructing and operating the proposed pipeline with the effects of other unrelated projects. The other projects assessed are those that are either existing or approved and that have a high likelihood of proceeding.

Cumulative effects include the temporal and spatial accumulations of change that occur within an area or system due to past, present, and future activities. Change can accumulate within systems by either an additive (i.e., cumulative) or interactive (i.e., synergistic) manner. Positive residual effects have not been assessed in the cumulative effects assessment.

By applying the principles of avoidance, minimization, and compensation to limit project-specific effects, potential adverse residual effects on environmental and socio-economic features have been greatly limited before accounting for the effects of other unrelated projects.

The cumulative effects assessment methodology is designed to evaluate and manage the additive and interactive effects from the following sources:

- Existing infrastructure, facilities, and activities as determined from available data sets
- The proposed pipeline
- Future activities where the undertaking will proceed, or has a high probability of proceeding

Although rare in occurrence, it is plausible that accidents or emergency events may arise due to an unforeseen chain of events during the project's construction or operational life. Due to the rarity and magnitude of such events, they have not been assessed here, as they are extreme in nature when compared to the effects of normal construction and operation activities and require separate response plans. The decommissioning and abandonment of the proposed 8-inch pipeline is another event that is

beyond the temporal boundaries of the cumulative effects assessment and therefore has not been assessed.

5.2 STUDY BOUNDARIES

Spatial

To make assumptions about the magnitude and probability of effects, an approximate 100m boundary around the proposed pipeline route was used for the cumulative effects assessment. The 100m boundary has been found, through previous experience with pipeline construction, to be appropriate for the most commonly encountered net effects.

Temporal

The temporal boundaries for the cumulative effects assessment reflect the nature and timing of project activities, and the availability of information surrounding future projects with a high probability of proceeding. The project schedule identifies three key milestone activities:

1. ER and technical design – 2018
2. Construction – 2019
3. Operation and Maintenance – 2019 to 2069*

**Fifty years of operation is used as an assumption, although the pipeline may be operational beyond fifty years.*

Based upon these milestone activities, two time periods were selected for evaluation: 2019 and 2024. The year 2019 was selected to represent the construction period, and the year 2024 was selected to represent the operation and maintenance period. Forecasting beyond 2024 increases the uncertainty in predicting whether projects will proceed, and the effects associated with these projects.

5.3 ANALYSIS OF CUMULATIVE EFFECTS

Sections 4.2-4.4 of the ER consider the potential impacts of the project on specific features and conditions and propose mitigation and protective measures to eliminate or reduce the potential impacts. The cumulative effects assessment evaluates the significance of residual impacts (after mitigation) of the project along with the effects of other unrelated projects.

5.3.1 Construction – Year 2019

Nearby sections of Highway 401, a main transportation route of commercial and private vehicles in the area, are scheduled for reconstruction, bridge rehabilitation and culvert rehabilitation in MTO's 2017-2021 Southern Highways Program. The location and timing of construction is not certain; however, it is anticipated to occur between 2018-2021.

The Municipality of Chatham-Kent websites were reviewed for municipal works projects and no projects were identified that would occur within 100m of the proposed pipeline that may proceed between 2019 and 2021. It is assumed, however, that improvements to municipal infrastructure such as bridges, culverts, drains or roads could occur.

Residual project impacts which may occur during project construction are outlined in Sections 4.2-4.4. To consider the additive and interactive effects at their maximum intensity, the cumulative effects assessment assumes that construction of other unrelated projects and the proposed pipeline construction will occur concurrently.

Potential cumulative effects resulting from the proposed pipeline construction and the concurrent projects are additive effects on soil, vegetation, wildlife and wildlife habitat, air quality and the acoustic environment.

Soil

Soil erosion and reduced soil stability are potential residual effects associated with construction of the project. Mitigation and protective measures for soil is outlined in Section 4.2.2. Provided that concurrent projects follow mitigation measures similar to those outlined in this report, the probability of erosion control failure occurring concurrently is low and based on the nature of the proposed projects the magnitude of such an event would be low. As such, adverse cumulative residual effects on the natural environment from erosion are not anticipated to be significant, and cumulative effects on soil stability are not anticipated to occur.

Vegetation

Where there is vegetation within or adjacent to the proposed pipeline route, potential impacts include the removal of native vegetation, and indirect effects such as dust, erosion, and accidental spills. However, with the implementation of the mitigation and protective measures outlined in this report, such as 2:1 replanting of significant trees, and provided that concurrent projects follow mitigation measures similar to those outlined in this report, adverse cumulative residual effects on vegetation are not anticipated to be significant.

Wildlife and Wildlife Habitat

Potential residual effects on wildlife and wildlife habitat associated with construction of the project are accidental direct mortality, habitat removal and sensory disturbance. Mitigation and protective measures for wildlife and wildlife habitat are outlined in Section 4.3.3. In the event of project-related wildlife deaths, the MNRF should be contacted. If mortality occurs between concurrent projects for similar species, the

Ministry should be able to note the occurrences and coordinate with Union Gas to adjust construction activities. Potential cumulative effects resulting from sensory disturbance (i.e., noise, air pollution and dust) are discussed below.

Provided that the above measures are undertaken, and provided that concurrent projects follow mitigation measures like those outlined in this report, adverse cumulative residual effects on wildlife and wildlife habitat should be of low probability and should be mitigated as coordinated through the MNRF, and therefore are not anticipated to be significant.

Air Quality and Acoustic Environment

Potential residual effects on air quality associated with construction of the project and concurrent projects are an increase in noise and air pollutants from operation of vehicles and equipment, and an increase in dust from construction activities. Mitigation and protective measures for air quality and the acoustic environment are outlined in Section 4.4.5. Provided that the concurrent projects follow mitigation measures similar to those outlined in this report, cumulative effects should be of low magnitude and reversible. Therefore, adverse residual cumulative effects on air quality and the acoustic environment are not anticipated to be significant.

5.3.2 Operation and Maintenance – Year 2024

Union Gas received government grants for the proposed project to support potential development in the Dresden area. Once construction is complete, the proposed transmission pipeline as well as supporting distribution mains and individual customer stations are planned to immediately connect five local agricultural businesses, while establishing infrastructure that can help to meet growing energy demand within the local agri-food cluster. It is expected that this proposed pipeline will spur future economic development which will result in construction of additional greenhouses and other commercial developments.

Development and maintenance activities which have a probability of proceeding during operation and maintenance of the project include:

- Road works: Future road rehabilitation and resurfacing
- Water works: Future installation of water and wastewater pipelines
- Greenhouse operations
- Various local agricultural businesses
- Pipeline construction and maintenance: Future pipeline construction and maintenance of existing hydrocarbon pipelines

Operation and maintenance activities undertaken by Union Gas should be completed with the co-ordination of the Union Gas Environmental Planning Team and should consider potential impacts on natural heritage and socio-economic environment. Appropriate mitigation measures should be developed and implemented based on the proposed maintenance work. Union Gas should obtain all necessary agency permits and approvals, as required. Given the limited scale of impact of any potential operation

and maintenance activities, it is anticipated that residual impacts should be minimal and that should any interaction occur with other projects, significant adverse residual effects are not anticipated to be significant.

5.4 SUMMARY OF CUMULATIVE EFFECTS

The potential cumulative effects of the project were assessed by considering development that has a high probability of proceeding just prior to or concurrent with construction of the project. A 100m boundary around the project site was used to assess the potential for additive and interactive effects of the project and other developments on environmental and socio-economic features.

Although Highway 401 is located approximately 20 km from the proposed pipeline route, the highway serves as a major transportation route for the area. Sections of Highway 401 are planned to be re-constructed along with bridge and culvert replacement work, which may impact construction related activities such as transportation of construction equipment and materials. Numerous municipal projects may also occur concurrently. Improvements to municipal infrastructure such as bridges, culverts, drains or roads may occur during the operational phase of the project. The cumulative effects assessment determined that, provided the mitigation and protective measures outlined in this report are implemented and that concurrent projects implement similar mitigation and protective measures, potential cumulative effects are not anticipated to occur, or if they do occur are not anticipated to be significant.

6.0 MONITORING AND CONTINGENCY PLANS

6.1 MONITORING

The primary objective of compliance and effects monitoring is to check that mitigation and protective measures are effectively implemented and to measure the impacts of activities associated with construction on environmental and socio-economic features. Ultimately, the knowledge gained from monitoring is used to avoid or reduce issues which may arise during construction of subsequent pipeline projects.

Previous pipeline construction experience, and a review of post-construction monitoring reports from other projects, indicates that impacts from pipeline construction are for the most part temporary. The mitigation and protective measures to eliminate or reduce impacts are well known and have been shown to be effective. Union Gas should adhere to the following general monitoring practices:

- Trained personnel should be on-site to monitor construction and should be responsible for checking that the mitigation and protective measures and monitoring requirements within the ER are executed. Union Gas should implement an orientation program for inspectors and contractor personnel to provide information regarding Union Gas' environmental program and commitments, as well as safety measures;
- Recommendations and commitments made in this ER and other applicable permits and reports should be incorporated into an Environmental Construction Plan (ECP) detailing clearing and construction activities. The ECP should also include site and feature specific mitigation. The ECP should become part of the contract specification with the contractor selected to construct the project, as noted in section 5.8.4 of the *OEB Environmental Guidelines* (2016);
- A walking inspection of the entire pipeline route should be done approximately one year after construction to determine whether areas require further rehabilitation. Additional rehabilitation measures should be completed as necessary, and additional follow-up monitoring should be conducted.

The following sections list specific environmental monitoring activities recommended for the project.

6.1.1 Exposed Soils

The proposed construction project is within existing road allowances. The land uses adjacent to the road allowances consist of residential front yards, driveways, and agricultural lands. Where soils are exposed for construction activities, potential effects may include surface soil erosion, trench slumping, and sedimentation of road ditches and identified water features. If adjacent agricultural lands are impacted by the project, the topsoil should be monitored to protect against erosion and compaction. Improperly discharging pumped water can lead to erosion, sedimentation or flooding. Monitoring of potential effects on exposed soils should occur during construction by Union Gas' on-site inspection team. Restored bank slopes should be inspected one year after construction for erosion, and restoration measures should occur as necessary.

6.1.2 Water Wells

Before construction, a private well survey should take place to assess domestic groundwater use near the proposed pipeline route and determine the need for a well monitoring program, as outlined in Section 4.3.3.

6.1.3 Watercourse Crossings

Watercourse crossings have the potential to affect fish, fish habitat, and water quality. Union Gas' on-site inspection team should oversee all watercourse crossings and confirm that work is conducted as outlined in Sections 4.3.1, and as per the conditions of relevant permits (see Section 1.2.5).

6.1.4 Vegetation and Wetlands

For at least one year after construction, planted vegetation should be inspected for survival. Dead and diseased vegetation should be replaced in areas of severe dieback or in areas with important environmental functions (e.g. riparian or slope cover).

6.1.5 Species at Risk

Should SAR be identified during vegetation, wildlife, and/or wildlife habitat field surveys, construction monitoring may need to be undertaken. The exact nature of monitoring should be determined in consultation with the MNRF and should depend on the species present.

6.1.6 Cultural Heritage Resources

Any cultural heritage resources within 50m of the proposed pipeline route should require site plan controls that will need monitoring. In addition, vibration levels should be monitored where construction activities occur within 15m of a cultural heritage resource. Further details are provided in Section 4.4.10.

6.1.7 Residents and Businesses

Construction activities will impact directly affected landowners and surrounding residents and businesses. During construction, a designated Union Gas representative should be available to monitor and respond to requests and concerns voiced by residents and business owners. Landowners affected by construction should be notified in advance of construction activities in their area, as feasible. The notification should provide the contact information for a designated Union Gas representative.

Union Gas' on-site inspection team should also monitor the contractors' implementation of the Traffic Management Plan, to see that site access to residences and businesses has been maintained and that traffic is not being unnecessarily interrupted.

While efforts should be undertaken to reduce impacts, a comment tracking system should also be implemented. A Union Gas representative should record the time and date of calls, the nature of the concern, the corrective action taken, and the time and date of follow-up contact.

Following completion of construction, Union Gas should contact residents and businesses along the existing road allowance to continue ongoing communications where necessary. During the first two years, particular attention should be paid to monitoring and documenting impacts associated with construction of the proposed pipeline.

6.1.8 Municipal Roads

Union Gas should conduct pre-construction and post-construction road assessments. Municipal roads affected by pipeline construction should be restored to their pre-construction condition as per applicable permits and/or agreements. One year after construction (i.e., first year of operation), roads should be monitored following spring thaw to check if erosion, bank slumping, road subsidence or rutting has occurred as a result of construction activities. Affected roadside ditches and drains should also be monitored to check that they are functioning properly. Other restoration activities that occurred should be monitored as appropriate.

6.2 CONTINGENCY

Contingency planning is necessary to prevent a delayed or ineffective response to unexpected events or conditions that may occur during construction of the proposed pipeline. An essential element of contingency planning is the preparation of plans and procedures that can be implemented if unexpected events occur. The absence of contingency plans may result in short or long term environmental or socio-economic impacts and possibly threaten public safety.

The following unexpected events require contingency planning during construction: adverse weather causing watercourse sedimentation, human error causing accidental spills, subsurface conditions causing a release of drilling fluids, and the discovery of unexpected finds to be implemented in the case that they would arise. Although unexpected problems are not anticipated to occur during construction, Union Gas and the pipeline contractor should be prepared to act when unexpected events occur. Construction personnel should be made aware of and know how to implement contingency measures.

6.2.1 Watercourse Sedimentation

Even with properly installed erosion and sedimentation control measures, extreme runoff events could result in the collapse of silt fencing, overflow or bypass of barriers, slope or trench failures, and other events which could lead to sedimentation of watercourses.

If sedimentation of a watercourse occurs, immediate action should be taken under the direction of on-site environmental personnel to install temporary measures that should contain the erosion as quickly and effectively as practical. Notification should occur to SCRCA regarding the incident and the corrective actions being implemented.

When site conditions permit, permanent protection measures should be reinstalled on erosion susceptible surfaces. If the erosion and sedimentation results from a construction-related activity, the activity should be halted immediately until the situation is rectified.

6.2.2 Accidental Spills

During construction, accidental spill of fluids may occur. The impact of the spill will depend upon the type of fluid, the magnitude and extent of the spill, and the environmental and socio-economic conditions in which it takes place. Upon release of a hydrocarbon-based construction fluid, Union Gas should ensure that the magnitude and extent of the spill are quickly determined and that measures are rapidly taken to contain it. Release of sediment should also be treated as a potential spill depending on the magnitude and extent. All spills should be immediately reported to Union Gas' on-site inspection team. If necessary, the MOECC Spills Action Center should be notified at 1-800-268-6060.

A Spills Response Plan should be developed by the contractor, reviewed with personnel, and posted in site trailers. Spill containment equipment should be readily available, especially near watercourses. Personnel should be trained in the use of spill containment equipment.

6.2.3 Inadvertent Fluid Release during Horizontal Directional Drillings

Should watercourses be crossed by HDD, operations should be monitored continuously by qualified personnel. An emergency response and contingency plan for inadvertent fluid release should be developed and implemented. At the very least, the plan should address containment, clean-up and remediation, alternative drilling/crossing plans, disposal of waste materials, monitoring and reporting.

6.2.4 Unexpected Finds

Should previously unknown archaeological or heritage resources be uncovered or suspected of being uncovered during construction, ground disturbance in the find location should cease immediately. The MTCS and an archaeologist licensed in the Province of Ontario should be notified immediately. A site-specific response plan should then be employed following further investigation of the specific find. The response plan would indicate under which conditions the ground disturbance activity in the find location may resume.

In the event that human remains are uncovered or suspected of being uncovered during ground disturbance, the above measures should be implemented along with notifying local police, the coroner’s office, and the Cemeteries Regulation Unit of the Ontario Ministry of Government and Consumer Services (1-800-889-9768).

In the event that previously unknown materials or contaminated soils are uncovered or suspected of being uncovered, construction in the find location should cease immediately. In such an instance, Union Gas should retain expert advice on assessing and developing a plan to include soil sampling, handling, disposal and remediation.

7.0 CONCLUSION

The environmental study investigated data on the physical, biophysical, and socio-economic environment along the proposed pipeline route. In the opinion of Stantec, the recommended program of supplemental studies, mitigation and protective measures, and contingency measures are considered appropriate to protect the features encountered. Monitoring should assess whether mitigation and protective measures were effective in both the short and long term.

With the implementation of the recommendations in this report, on-going communication and consultation, and adherence to permit, regulatory and legislative requirements, potential adverse residual environmental and socio-economic impacts of the project are not anticipated to be significant.

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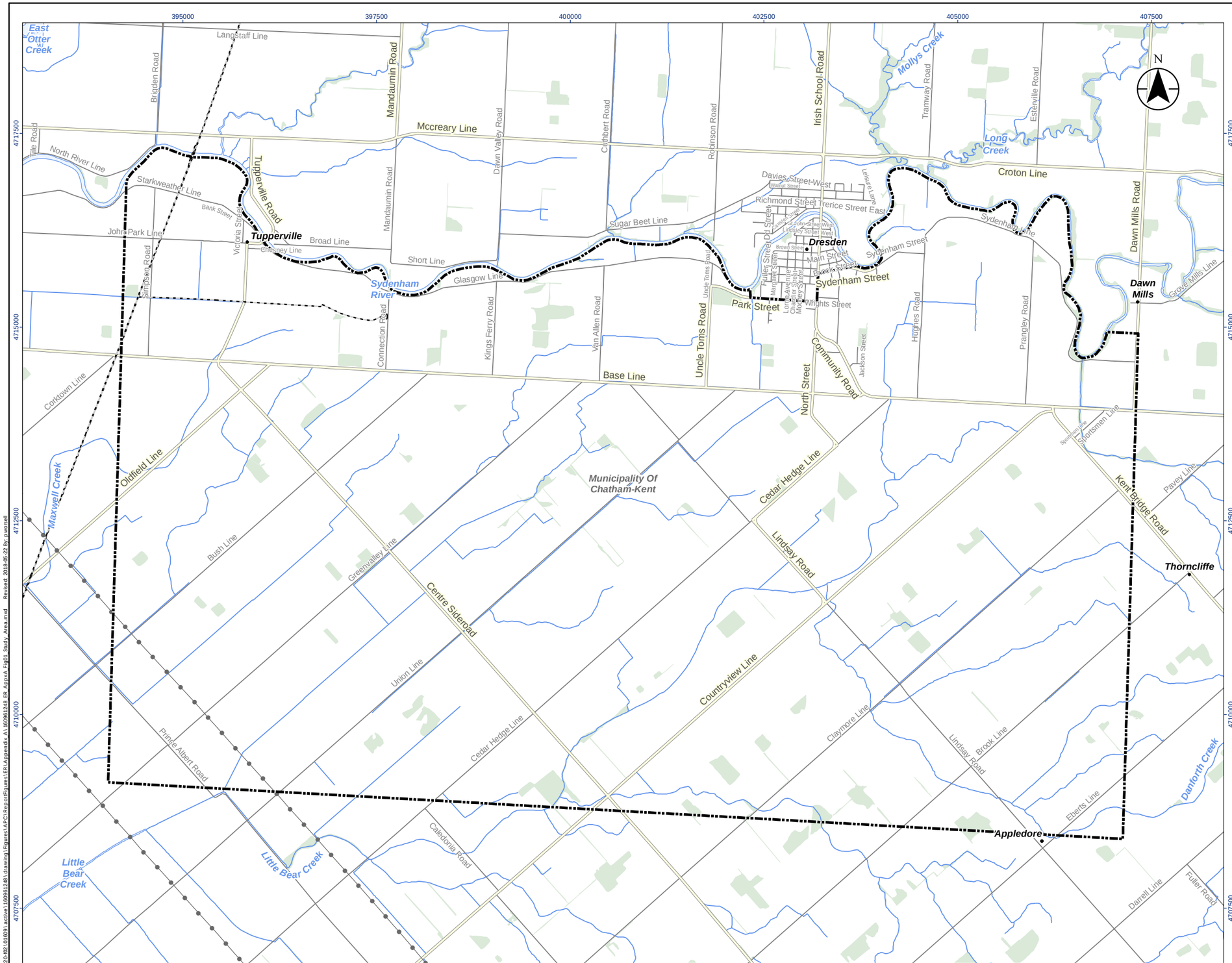
APPENDIX A:
FIGURES



Stantec

Legend

- Study Area

Existing Features

- Existing Union Gas Pipeline
- Hydro Line
- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody
- Wooded Area

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Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.



Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
1

Title
Study Area

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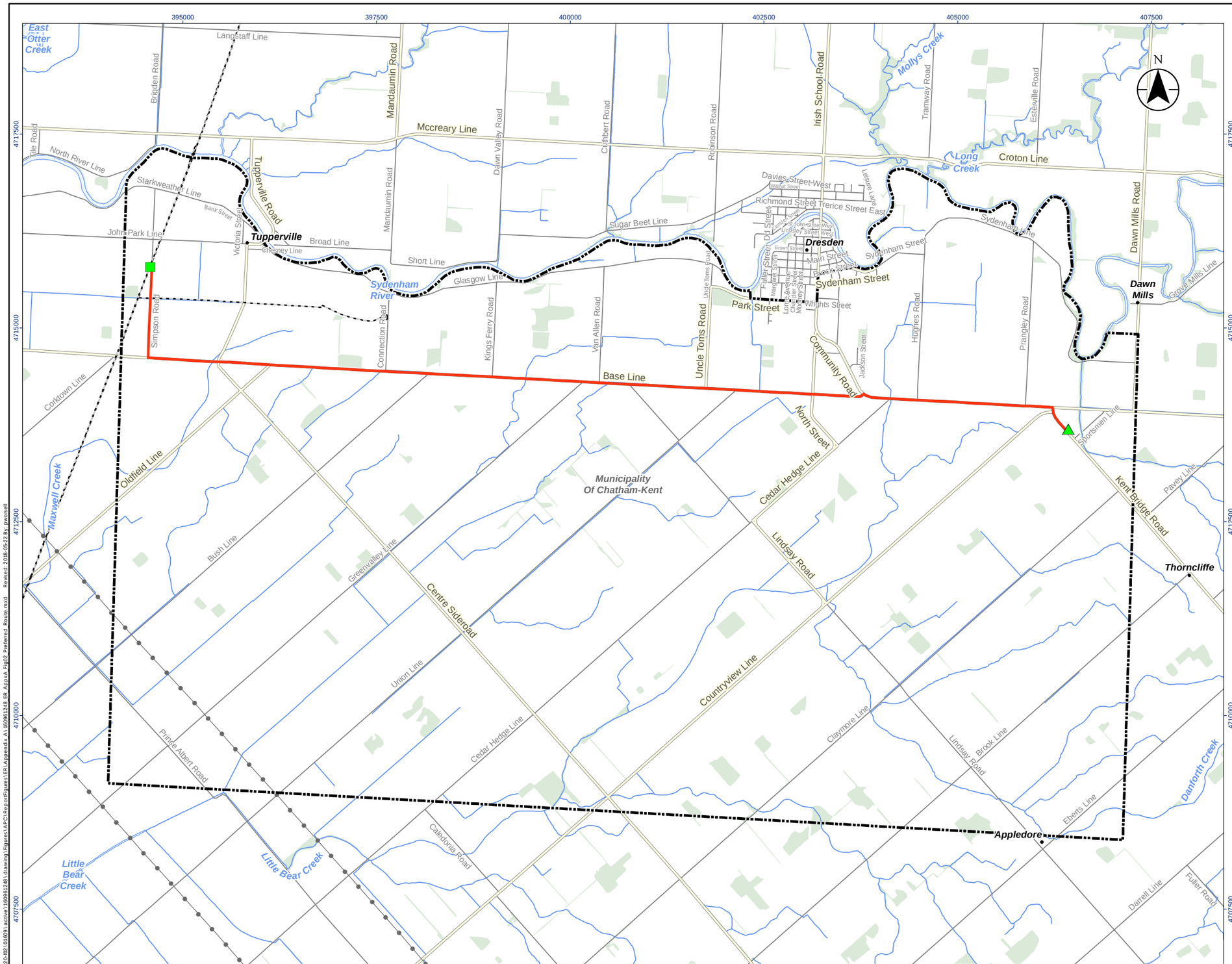

Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Existing Union Gas Pipeline
- Hydro Line
- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody
- Wooded Area

0 1 2 km

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Prepared by PW on 2018-05-22
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Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
2

Title
Preferred Route

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APPENDIX B: CONSULTATION

APPENDIX B1: PROJECT SUMMARY AND CONTACT LIST

UNION GAS – CHATHAM-KENT RURAL PIPELINE EXPANSION PROJECT

Agency Contact List

Title	First Name	Last Name	Agency	Department	Position	Address	City	Prov.	Postal	Phone	Fax	Email
Provincial Agencies and Authorities												
Mr.	David	Cooper	Ministry of Agriculture, Food and Rural Affairs	Environmental and Land Use Policy	Manager	1 Stone Rd West, 3rd Floor	Guelph	ON	N1G 4Y2	519 826 3117	519 826 3109	david.cooper@ontario.ca
Ms.	Michele	Doncaster	Ministry of Agriculture, Food, and Rural Affairs	Environmental and Land Use Policy	Policy Advisor	1 Stone Rd West, 3rd Floor	Guelph	ON	N1G 4Y2	519 826 4369	519 826 3109	michele.doncaster@ontario.ca
Mr.	Drew	Crinklaw	Ministry of Agriculture, Food, and Rural Affairs	Environmental and Land Use Policy	Rural Planner, Southwestern Ontario	667 Exeter Road	London	ON	N6E 1L3	519 873 4085	--	drew.crinklaw@ontario.ca
Mr.	Mitch	Wilson	Ministry of Natural Resources and Forestry	Aylmer District	District Manager	615 John Street North	Aylmer	ON	N5H 2S8	519 773 4710	--	mitch.wilson@ontario.ca
Ms.	Laura	Warner	Ministry of Natural Resources and Forestry	Aylmer District	Planning Intern	615 John Street North	Aylmer	ON	N5H 2S8	519 773 4741	--	laura.warner@ontario.ca
Ms.	Brooke	Herczeg	Ministry of Tourism, Culture & Sports	Heritage	Heritage Planner	401 Bay Street	Toronto	ON	M7A 0A7	416 314 7133	--	brooke.herczeg@ontario.ca
Ms.	Crystal	Lafrance	Ministry of the Environment and Climate Change	Air, Pesticides and Environmental Planning	Supervisor	733 Exeter Road	London	ON	N6E 1L3	519 873 5055	--	crystal.lafrance@ontario.ca
Ms.	Patty	Hayman	St. Clair Region Conservation Authority	Planning & Regulations	Director of Planning	205 Mill Pond Crescent	Strathroy	ON	N7G 3P9	519 245 3710 x225	--	phayman@scrca.on.ca
Municipal												
Mr.	Bruce	McAllister	Municipality of Chatham-Kent	Planning Services	Director	315 King Street West, PO Box 640	Chatham	ON	N7M 5K8	--	519 436 3240	--
Mr.	Thomas	Kelly	Municipality of Chatham-Kent	Infrastructure and Engineering	General Manager	315 King Street West, PO Box 640	Chatham	ON	N7M 5K8	--	519 436 3240	--
Mr.	Don	Shropshire	Municipality of Chatham-Kent	--	Chief Administrative Officer	315 King Street West, PO Box 640	Chatham	ON	N7M 5K8	519 352 8401 x3010	519 436 3240	dons@chatham-kent.ca
Ms.	Judy	Smith	Municipality of Chatham-Kent	--	Municipal Governance/Clerk	315 King Street West, PO Box 640	Chatham	ON	N7M 5K8	519 360 1998 x3200	519 436 3240	ckclerk@chatham-kent.ca
Interest Groups												
Mr.	Roman	Dorfman	Hydro One Networks Inc.	Real Estate Management	Real Estate Coordinator	185 Clegg Road	Markham	ON	L6G 1B7	905 946 6243	905 946 6242	roman.dorfman@hydroone.com

UNION GAS – CHATHAM-KENT RURAL PIPELINE EXPANSION PROJECT

Indigenous Contact List

Title	First Name	Last Name	Nation	Position	Address	City	Prov.	Postal	Phone	Fax	Email
Indigenous											
Chief	Joanne	Rogers	Aamjiwnaang First Nation	--	978 Tashmoo Avenue	Sarnia	ON	N7T 7H5	519 336 8410 x220	519 336 0382	chief@aamjiwnaang.ca
Ms.	Sharilyn	Johnston	Aamjiwnaang First Nation	Environment Coordinator	978 Tashmoo Avenue	Sarnia	ON	N7T 7H5	519 336 8410 x245	519 336 0382	sjohnston@aamjiwnaang.ca
Chief	Dan	Miskokomon	Walpole Island First Nation	--	RR3	Walpole Island	ON	N8A 4K9	--	--	dan.miskokomon@wifn.org
Dr.	Dean	Jacobs	Walpole Island First Nation	Consultation Manager	RR3	Walpole Island	ON	N8A 4K9	519 627 1475 x104	519 627 1530	dean.jacobs@wifn.org
Ms.	Janet	Macbeth	Walpole Island First Nation	Project Review Coordinator	RR3	Walpole Island	ON	N8A 4K9	519 627 1475 x108	519 627 1530	janet.macbeth@wifn.org
Chief	Mary	Duckworth	Caldwell First Nation	--	14 Orange Street	Leamington	ON	N8H 1P5	--	--	mary.duckworth@caldwellfirstnation.ca
Ms.	April	Colby	Caldwell First Nation	Chief's Assistant	14 Orange Street	Leamington	ON	N8H 1P5	--	--	april.colby@caldwellfirstnation.ca
Chief	Henry	Myeengun	Chippewas of the Thames First Nation	--	320 Chippewa Road RR1	Muncey	ON	N0L 1Y0	--	--	myeengun@cottfn.com
Ms.	Kelly	Riley	Chippewas of the Thames First Nation	Lands and Environment Director	320 Chippewa Road RR1	Muncey	ON	N0L 1Y0	519 289 5555 x249	--	kriley@cottfn.com
Chief	Thomas	Bressette	Chippewas of Kettle and Stony Point	--	6247 Indian Lane	Kettle Point	ON	N0N 2G0	--	--	thomas.bressette@kettlepoint.org
Ms.	Valerie	George	Chippewas of Kettle and Stony Point	Consultation Coordinator	6247 Indian Lane	Kettle Point	OM	N0N 2G0	519 786 2125	--	valerie.george@kettlepoint.org
Chief	Randall	Phillips	Oneida Nation of the Thames	--	2210 Elm Avenue	Southwold	ON	N0L 2G0	227 926 8973	--	randall.phillips@oneida.on.ca

UNION GAS – CHATHAM-KENT RURAL PIPELINE EXPANSION PROJECT

OPCC Members Contact List

Title	First Name	Last Name	Agency	Department	Position	Address	City	Prov.	Postal	Phone	Fax	Email
OPCC Members												
Ms.	Zora	Crnojacki	Ontario Energy Board	Applications Policy & Climate Change	Project Advisor	2300 Yonge Street, Suite 2700	Toronto	ON	M4P 1E4	416 440 8104	416 440 7656	zora.crnojacki@oeb.ca
Ms.	Linda	Pim	Ministry of Agriculture, Food and Rural Affairs	--	--	1 Stone Road West, 3rd floor	Guelph	ON	N1G 4Y2	519 826 3380	--	linda.pim@ontario.ca
Ms.	Carla	Barboza	Ministry of Tourism, Culture and Sports	Heritage	Team Lead	401 Bay Street	Toronto	ON	M7A 0A7	416 314 7120	--	carla.barboza@ontario.ca
Mr.	Tony	Difabio	Ministry of Transportation	--	--	301 St. Paul Street, 2nd floor	St. Catharines	ON	L2R 7R4	905 704 2656	--	tony.difabio@ontario.ca
Mr.	Kourosh	Manouchehri	Technical Standards and Safety Authority	--	--	345 Carlingview Drive	Toronto	ON	M9W 6N9	416 734 3539	416 231 7525	kmanouchehri@tssa.org
Ms.	Sally	Renwick	Ministry of Natural Resources and Forestry	Land Use and Environmental Planning Section, Policy and Planning Coordination Branch	Team Lead	300 Water Street	Peterborough	ON	K9J 8M5	705 755 5195	705 755 1971	sally.renwick@ontario.ca
Mr.	Scott	Oliver	Ministry of Municipal Affairs and Housing	Western Municipal Services Office	--	659 Exeter Road, 2nd floor	London	ON	N6E 1L3	519 873 4033	--	scott.oliver@ontario.ca
Ms.	Michelle	Schlag	Ministry of Energy	Indigenous Energy Policy	Senior Advisor	77 Grenville Street, 6th floor	Toronto	ON	M7A 2C1	416 327 7158	--	michelle.schlag@ontario.ca
Ms.	Marlo	Spence Lair	Ministry of Energy	Regulatory and Agency Policy Unit	Senior Policy Advisor	77 Grenville Street, 6th floor	Toronto	ON	M7A 2C1	416 212 7489	--	marlo.spencelair@ontario.ca
Mr.	Joseph	Vecchiolla	Ministry of Economic Development, Employment and Infrastructure	Realty Policy Branch	Policy Lead	777 Bay Street, 4th floor, suite 425	Toronto	ON	M5G 2E5	416 325 1561	416 212 4941	joseph.veccjiolla@ontario.ca
Ms.	Crystal	Lafrance	Ministry of the Environment and Climate Change	Air, Pesticides and Environmental Planning	Supervisor	733 Exeter Road	London	ON	N6E 1L3	519 873 5055	--	crystal.lafrance@ontario.ca
Mr.	Patrick	Grace	Infrastructure Ontario	Lands Transactions – Hydro Corridor & Public Works	Director	1 Dundas Street West, Suite 2000	Toronto	ON	M5G 1Z3	416 327 2959	--	patrick.grace@ontario.ca

APPENDIX B2: NEWSPAPER NOTICES

Heavy floods hit U.S.

Emergency crews rescue use boats to rescue residents as waters rise



BEN MIKESELL/THE ASSOCIATED PRESS

Goshen, Ind., firefighters pull a boat containing three women who were rescued after heavy flooding.

ELKHART, Ind. — Shelters were open Thursday to assist people forced from their homes by flooding in the Midwest, as rivers swollen by heavy rain and melting snow continue to rise in Indiana, Michigan and other states.

Flood warnings were in effect across a wide swath of the central and southern U.S., from Wisconsin, Illinois and Ohio to Texas and Louisiana. The American Red Cross said it has opened eight shelters in northern Indiana, where crews used boats to help residents evacuate their homes.

In Elkhart, Ind., and nearby Goshen, local officials declared a state of emergency and asked that traffic be limited to first responders and emergency personnel. Indiana University-South Bend cancelled Thursday classes, and residents of a student apartment complex were encouraged to leave.

"I ended up grabbing my favourite blanket and stuffed animals," 15-year-old Madison Schmidt, who was evacuated from her home in Elkhart to a shelter at a church, told The Elkhart Truth newspaper. "I got into the boat. Seeing what happened, just almost made me cry."

Other parts of the Midwest were under winter weather advisories on Thursday, with Kansas school districts and universities cancelling classes and many state employees being told to stay home.

In Michigan, states of emergency were declared in the Lansing area as officials recommended the evacuations of several neighbourhoods. City officials said anyone living in the possible flood areas should temporarily leave their home by midday Thursday.

"While the rain has stopped, we are expecting significant flooding," Lansing Mayor Andy Schor said.

Flooding also hit nearby Michigan State University, where some roads, parking lots and athletic fields were covered by water from the Red Cedar River that runs through its East Lansing campus. Classes in several buildings have been relocated and the school put up sandfilled barriers in an attempt to curb flooding.

"Be careful if you're trying to come to campus," Schor said Wednesday, noting that the river was at its highest levels since 1975. "Changing conditions are affecting not only the roads but sidewalks and walkways."

The National Weather Service predicted the Grand River in Lansing would crest by late Thursday at 4.5 metres, nearly a metre above flood stage. The Red Cedar River was forecast to crest at 3.14 metres. The storm system started pushing heavy rain, snow and ice into the region this week, affecting roads and other lowlying areas. The weather was been blamed for hundreds of car crashes and several deaths, including a crash that killed four people along a slippery interstate in Nebraska.

In central Michigan's Fairplain Township, a one-year-old girl was found dead Wednesday in standing water from rains and snowmelt in her backyard. In Oklahoma, authorities said 53-year-old Victor French of Stilwell drowned Wednesday when he drove onto a flooded bridge near Stilwell and was swept off the roadway.

Homes and streets also were flooded in the South Bend area of Indiana, and forecasters predicted that the swollen St. Joseph River wouldn't crest until Thursday. Firefighters in Lake Station, Indiana, about 50 km southeast of Chicago, evacuated some residents Wednesday after 15 to 20 homes were surrounded by about half- to 1 metre of water.

In Illinois, authorities issued an evacuation order Wednesday for residents in the city of Marseilles who live near the Illinois River.

The Associated Press

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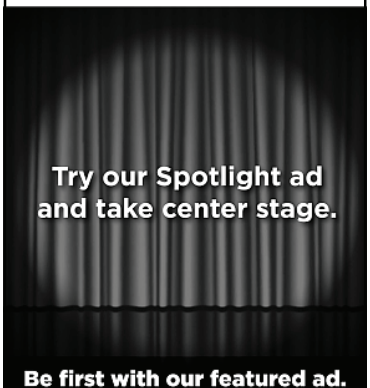

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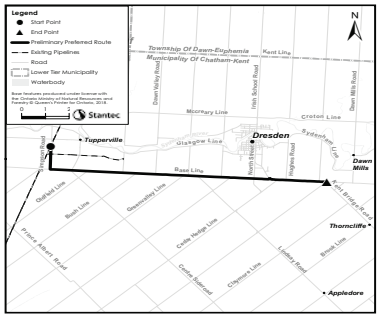
NOTICE OF INFORMATION SESSION

Chatham-Kent Rural Expansion Project

To increase capacity and accommodate additional demand for natural gas, Union Gas is proposing to construct a new natural gas pipeline in the Municipality of Chatham-Kent. The proposed pipeline will meet the growing agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent and surrounding areas, including in the fast-growing greenhouse market.

The proposed new 8-inch diameter pipeline will be approximately 13 km in length and is named the Chatham-Kent Rural Expansion Project. It will begin at Union Gas' existing Simpson Road Station (near the community of Tupperville) and proceed south and east within the road allowance of Base Line Road to an end point in the vicinity of the intersection of Base Line and Kent Bridge Road.

A preliminary preferred route for the proposed pipeline has been determined (please refer to the image below). A route selection process is currently being conducted to evaluate alternative corridors.



An information session is being held to seek feedback on the preliminary preferred route and the alternative corridors.

The information session will be conducted as a drop-in centre, and representatives from both Union Gas Ltd. and Stantec Consulting Ltd. will be available to answer questions.

The information session will be held on:

Tuesday March 6, 2018
5 pm to 8 pm
The Old Czech Hall
116 St. John Street East
Dresden ON

If you cannot attend the information session but would like to provide feedback or learn more about the project, please contact:

Mark Knight, MA, MCIP, RPP
Senior Environmental Planner
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Phone: (519) 585-7430
Email: Mark.Knight@stantec.com

For additional information, please visit Union Gas' website for this project:
www.uniongas.com/Projects

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Chatham-Kent

REQUEST FOR QUOTATION

Chatham-Kent Municipal Airport Agricultural Land Lease

Quotations sealed in an envelope which shall be clearly marked as to contents, will be received by the Purchasing Officer, Municipality of Chatham-Kent, First Floor, Civic Centre, 315 King Street West, Chatham, Ontario until 1330 h (Local Time) on Thursday, **March 1, 2018**.

THE MAJOR ITEMS CONSIST OF:

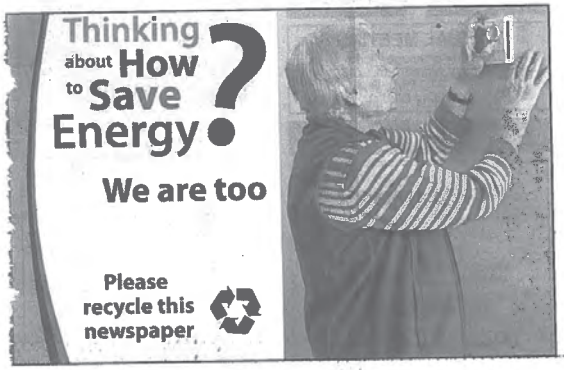
Quotations for the lease of approximately 329.53 acres of property at the Chatham-Kent Municipal Airport to be used for agricultural purposes. The Municipality intends to enter into a three year lease agreement with the selected bidder with an option for two additional one year renewals, based on the needs of the Municipality.

All offers are to be presented on the specific forms provided for this quotation and are subject to specific conditions, both of which are available by contacting the Chatham-Kent Public Works Department by phone at 519.360.1998, or by email at ckpw@chatham-kent.ca.

More information is available on the Chatham-Kent website at: www.chatham-kent.ca/airportlease.

The Corporation reserves the right to reject any or all quotations if the Corporation's funding is insufficient or becomes unavailable for any reason.

Purchasing Officer
Municipality of Chatham-Kent
315 King Street West, PO Box 640
Chatham, ON N7M 5K8
www.chatham-kent.ca



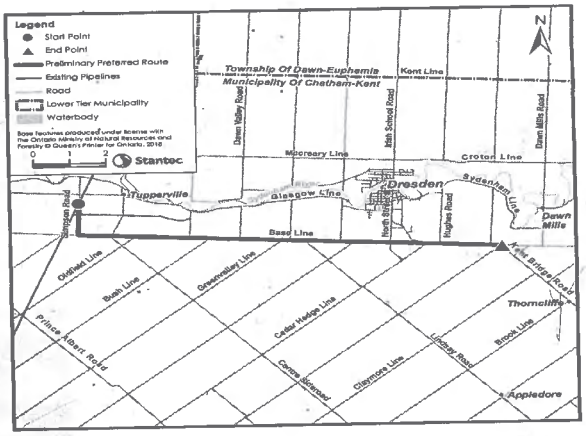
NOTICE OF INFORMATION SESSION

Chatham-Kent Rural Expansion Project

To increase capacity and accommodate additional demand for natural gas, Union Gas is proposing to construct a new natural gas pipeline in the Municipality of Chatham-Kent. The proposed pipeline will meet the growing agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent and surrounding areas, including in the fast-growing greenhouse market.

The proposed new 8-inch diameter pipeline will be approximately 13 km in length and is named the Chatham-Kent Rural Expansion Project. It will begin at Union Gas' existing Simpson Road Station (near the community of Tupperville) and proceed south and east within the road allowance of Base Line Road to an end point in the vicinity of the intersection of Base Line and Kent Bridge Road.

A preliminary preferred route for the proposed pipeline has been determined (please refer to the image below). A route selection process is currently being conducted to evaluate alternative corridors.



An information session is being held to seek feedback on the preliminary preferred route and the alternative corridors.

The information session will be conducted as a drop-in centre, and representatives from both Union Gas Ltd. and Stantec Consulting Ltd. will be available to answer questions.

The information session will be held on:

Tuesday March 6, 2018
5 pm to 8 pm
The Old Czech Hall
116 St. John Street East
Dresden ON

If you cannot attend the information session but would like to provide feedback or learn more about the project, please contact:

Mark Knight, MA, MCIP, RPP
Senior Environmental Planner
Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4
Phone: (519) 585-7430
Email: Mark.Knight@stantec.com

For additional information, please visit Union Gas' website for this project:
www.uniongas.com/Projects

APPENDIX B3: LETTERS

February 20, 2018
File: 160961248

Attention: «Title» «First_Name» «Last_Name», «Position»
«First_Nation_or_Metis_Nation»
«Address»
«City», «Prov» «Postal»

Dear «Title» «Last_Name»,

Reference: Union Gas Limited Pipeline Project – Chatham-Kent Rural Pipeline Expansion Project: Notice of Project Commencement and Information Session

To meet the growing demand for natural gas, Union Gas is proposing to construct a new 8-inch natural gas pipeline in the Municipality of Chatham-Kent. The proposed pipeline will meet the growing agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent and surrounding areas, including in the fast-growing greenhouse market.

The proposed pipeline will be approximately 13 km in length and will begin at Union Gas' existing Simpson Road Station (near the community of Tupperville) and proceed south and east within the road allowance of Base Line Rd.to an end point near the corner of Base Line Road and Kent Bridge Road east of Dresden.

A preliminary preferred route for the proposed pipeline has been determined. A route selection process is currently being conducted to evaluate alternative corridors. Attached please find a newspaper notice, which includes a map of the study area.

As an integral part of this project, Union Gas has hired Stantec Consulting Ltd. to undertake an environmental study of the construction and operation of the proposed pipeline and related facilities. The environmental study will fulfill the requirements of the Ontario Energy Boards' (OEB) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario (2016).*

The environmental study process will include consultation and engagement with landowners, municipalities, agencies, Indigenous communities, and other interested parties through notices, mailouts, meetings and an information session. The Stantec-authored Environmental Report will accompany the Union Gas application to the OEB, whose review and approval is needed before the project can proceed. If approved, construction could begin as early as Spring/Summer 2019.

The information session will be held as follows:

Tuesday March 6, 2018
5:00 pm to 8:00 pm
The Old Czech Hall 116
St John Street East
Dresden, ON

Reference: Union Gas Limited Pipeline Project – Chatham-Kent Rural Expansion Project: Notice of Project Commencement

<<Community>> is invited to provide comments regarding the proposed project. Specifically, Stantec is seeking information about any adverse impacts that the project may have on constitutionally protected aboriginal or treaty rights and any measures for mitigating those adverse impacts. Stantec is also seeking background environmental and socio-economic information that may be useful in compiling an inventory.

For additional information, please visit Union Gas' website for this project: www.uniongas.com/Projects. If you have any questions or comments regarding the environmental study process for the proposed project please do not hesitate to contact the undersigned.

Sincerely,

Ken McCorkle

Ken McCorkle
Manager, Indigenous Affairs
Union Gas Limited
50 Keil Drive North
Chatham, ON N7M 5M1
Phone: 519-436-4600 ext. 5002243
Email: kmccorkle@uniongas.com

Attachment: Newspaper Notice

c. Steve Thurtell, Stantec Consulting Ltd.

Stantec Consulting Ltd.
1-70 Southgate Drive, Guelph ON N1G 4P5

February 16, 2018
File: 160961248

Attention: «Title» «First_Name» «Last_Name», «Position»
«Agency»
«Address»
«City», «Prov» «Postal»

Dear «Title» «Last_Name»,

Reference: Union Gas Limited Pipeline Project – Chatham-Kent Rural Pipeline Expansion Project: Notice of Project Commencement and Information Session

To meet the growing demand for natural gas, Union Gas is proposing to construct a new 8-inch natural gas pipeline in the Municipality of Chatham-Kent. The proposed pipeline will meet the growing agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent and surrounding areas, including in the fast-growing greenhouse market.

A preliminary preferred route for the proposed pipeline has been determined. The proposed pipeline will be approximately 13 km in length and will begin at Union Gas' existing Simpson Road Station, (near the community of Tupperville) and proceed south and east within the road allowance of Base Line Rd. to an endpoint near the corner of Base Line Road and Kent Bridge Road east of Dresden A route selection process is currently being conducted to evaluate alternative corridors.

Attached, please find a newspaper notice, which includes a map of the study area.

As an integral part of this project, Union Gas has hired Stantec Consulting Ltd. to undertake an environmental study of the construction and operation of the proposed pipeline and related facilities. The environmental study will fulfill the requirements of the Ontario Energy Boards' (OEB) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario* (2016).

Stantec is presently compiling an environmental and socio-economic inventory. As a stakeholder with authority or a potential interest in the developments in the study area you are invited to provide comments regarding the proposed project. Specifically, Stantec is seeking information that may affect construction and operation of the proposed pipeline, including: background environmental and socioeconomic information, planning principles or guidelines which fall under your authority and other proposed developments to assess potential cumulative effects. Please feel free to contact us to discuss the most efficient way to obtain this information.

The environmental study process will include consultation and engagement with landowners, municipalities, agencies, Indigenous communities, and other interested parties through notices, mailout, meetings and a public information session. A Stantec-authored Environmental Report will accompany the Union Gas

Reference: Union Gas Limited Pipeline Project – Chatham-Kent Rural Expansion Project: Notice of Project Commencement

application to the Ontario Energy Board (OEB) whose review and approval is needed before the project can proceed. If approved, construction could begin as early as Spring/Summer 2019.

The public information session will be held as follows:

Tuesday March 6, 2018
5:00 pm to 8:00 pm
The Old Czech Hall 116
St John Street East
Dresden, ON

For additional information, please visit Union Gas' website for this project: www.uniongas.com/Projects

If you have any questions or comments regarding the environmental study process or the project, please do not hesitate to contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Steve Thurtell
Senior Environmental Scientist
Phone: (519) 780-8108
steve.thurtell@stantec.com

Attachment: Newspaper Notice

c. Norm Dumouchelle, Union Gas

Stantec Consulting Ltd.
1-70 Southgate Drive, Guelph ON N1G 4P5

February 23, 2018
File: 160961248

Attention: Ms. Patty Hayman, Director of Planning
St.Clair Region Conservation Authority, Planning & Regulations
205 Mill Pond Crescent
Strathroy ON N7G 3P9

Dear Ms. Hayman,

Reference: Union Gas Limited Pipeline Project – Chatham-Kent Rural Pipeline Expansion Project: Notice of Project Commencement and Information Session

To meet the growing demand for natural gas, Union Gas is proposing to construct a new 8-inch natural gas pipeline in the Municipality of Chatham-Kent. The proposed pipeline will meet the growing agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent and surrounding areas, including in the fast-growing greenhouse market.

A preliminary preferred route for the proposed pipeline has been determined. The proposed pipeline will be approximately 13 km in length and will begin at Union Gas' existing Simpson Road Station, (near the community of Tupperville) and proceed south and east within the road allowance of Base Line Rd. to an endpoint near the corner of Base Line Road and Kent Bridge Road east of Dresden A route selection process is currently being conducted to evaluate alternative corridors.

Attached, please find a newspaper notice, which includes a map of the study area.

As an integral part of this project, Union Gas has hired Stantec Consulting Ltd. to undertake an environmental study of the construction and operation of the proposed pipeline and related facilities. The environmental study will fulfill the requirements of the Ontario Energy Boards' (OEB) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario* (2016).

Stantec is presently compiling an environmental and socio-economic inventory. As a stakeholder with authority or a potential interest in the developments in the study area you are invited to provide comments regarding the proposed project. Specifically, Stantec is seeking information that may affect construction and operation of the proposed pipeline, including: background environmental and socioeconomic information, planning principles or guidelines which fall under your authority and other proposed developments to assess potential cumulative effects. Please feel free to contact us to discuss the most efficient way to obtain this information.

The environmental study process will include consultation and engagement with landowners, municipalities, agencies, Indigenous communities, and other interested parties through notices, mailout, meetings and a

Reference: Union Gas Limited Pipeline Project – Chatham-Kent Rural Expansion Project: Notice of Project Commencement

public information session. A Stantec-authored Environmental Report will accompany the Union Gas application to the Ontario Energy Board (OEB) whose review and approval is needed before the project can proceed. If approved, construction could begin as early as Spring/Summer 2019.

The public information session will be held as follows:

Tuesday March 6, 2018
5:00 pm to 8:00 pm
The Old Czech Hall 116
St John Street East
Dresden, ON

For additional information, please visit Union Gas' website for this project: www.uniongas.com/Projects

If you have any questions or comments regarding the environmental study process or the project, please do not hesitate to contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Steve Thurtell
Senior Environmental Scientist
Phone: (519) 780-8108
steve.thurtell@stantec.com

Attachment: Newspaper Notice

c. Norm Dumouchelle, Union Gas

Stantec Consulting Ltd.
1-70 Southgate Drive, Guelph ON N1E 4P5

February 16, 2018
File: 160961248

Attention: «Name1» and «Name2»
«Address1»
«Address2»
«City» «Prov» «Postal»

Dear «Name1» and «Name2»,

Reference: Union Gas Limited Pipeline Project – Chatham-Kent Rural Pipeline Expansion Project: Notice of Commencement and Information Session

To meet the growing demand for natural gas, Union Gas is proposing to construct a new 8-inch natural gas pipeline in the Municipality of Chatham-Kent. The proposed pipeline will meet the growing agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent and surrounding areas, including in the fast-growing greenhouse market.

A preliminary preferred route for the proposed pipeline has been determined. The proposed pipeline will be approximately 13 km in length and will begin at Union Gas' existing Simpson Road Station, (near the community of Tupperville) and proceed south and east within the road allowance of Base Line Rd to an endpoint near the corner of Base Line Road and Kent Bridge Road east of Dresden. A route selection process is currently being conducted to evaluate alternative corridors.

You have received this letter as you own property that may be in the vicinity of the preliminary preferred route for the proposed pipeline. Please feel free to share this letter with your neighbours. If applicable, it would also be appreciated if this letter could be shared with your tenants.

Union Gas is committed to developing and operating facilities and pipelines in an environmentally responsible manner. As an integral part of this project, Union Gas has hired Stantec Consulting Ltd. to undertake an environmental study of the construction and operation of the proposed pipeline and related facilities. The environmental study will fulfill the requirements of the Ontario Energy Boards' (OEB) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario (2016).* The environmental study process includes consultation and engagement with landowners, municipalities, agencies, Indigenous communities, and other interested parties through notices, mailouts, meetings and a public information session.

An Environmental Report, summarizing the results of the environmental study, will accompany Union Gas' application to the OEB, whose review and approval is required before the proposed project can proceed. The Environmental Report for the proposed project is anticipated to be completed and submitted to the OEB as early as the Spring of 2018. If approved by the OEB, construction of the proposed expansion project is planned to begin as early as Spring/Summer 2019 with an in-service date approximately six months after construction begins.

Reference: Union Gas Limited Pipeline Project – Chatham-Kent Rural Expansion Project: Notice of Project Commencement and Information Session

A public information session is planned to seek feedback on the project in general and the alternative corridors within which a preferred pipeline route will be determined. The information session will be conducted as a drop-in centre, and representatives from both Union Gas and Stantec Consulting Ltd. will be available to answer questions.

The public information session will be held as follows:

Tuesday March 6, 2018
5:00 pm to 8:00 pm
The Old Czech Hall 116
St John Street East
Dresden, ON

For additional information, please visit Union Gas' website for this project: www.uniongas.com/Projects

If you cannot attend the information session but would like to provide feedback or learn more about the project, please contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Steve Thurtell
Senior Environmental Scientist
Phone: (519) 780-8108
steve.thurtell@stantec.com

Attachment: Newspaper Notice

c. Norm Dumouchelle, Union Gas

APPENDIX B4: DISPLAY BOARDS, NEWSLETTER AND EXIT QUESTIONNAIRE

Chatham-Kent Rural Pipeline Expansion Project

Information Session – Questionnaire
March 6th, 2018

Please read the newsletter and look over the displays, and then take a few moments to answer the following questions. Your comments are appreciated. If you require any assistance or clarification while completing the questionnaire please speak with a Union Gas or Stantec representative. Completed questionnaires can be dropped off at the front table in the comment box.

1. What is your interest in this project?

   ☐ Directly affected landowner
   ☐ Surrounding landowner
   ☐ Interested citizen
   ☐ Member of interest group
   ☐ Government official
   ☐ Other: _____

2. Please indicate if the project will have any impacts to you, your property or your business.

3. Please identify any features along the Preliminary Preferred Route that you feel are important to consider during the environmental study.

4. Do you have any questions or comments about this project that you would like to bring to our attention?

Information Session – Questionnaire
March 6th, 2018

5. Did the content provided at this Information Session meet your needs?

_____

_____

_____

_____

_____

_____

Thank you for completing this questionnaire. If you have a question about the project that has not been addressed or for which you would like more information, please provide us with your full contact information so that we can respond to you.

Please Print Clearly

Name: _____

Address: _____

Email: _____

Phone: (_____)_____

Information will be collected and used in accordance with the Freedom of Information and Protection of Privacy Act. This information will be used to assist Union Gas in meeting applicable approval requirements. This material will be maintained on file for use during the study and may be included in project documentation. Unless indicated otherwise, personal information and all comments will become part of the public record and may be publicly released as part of project documentation.

MARCH 2018

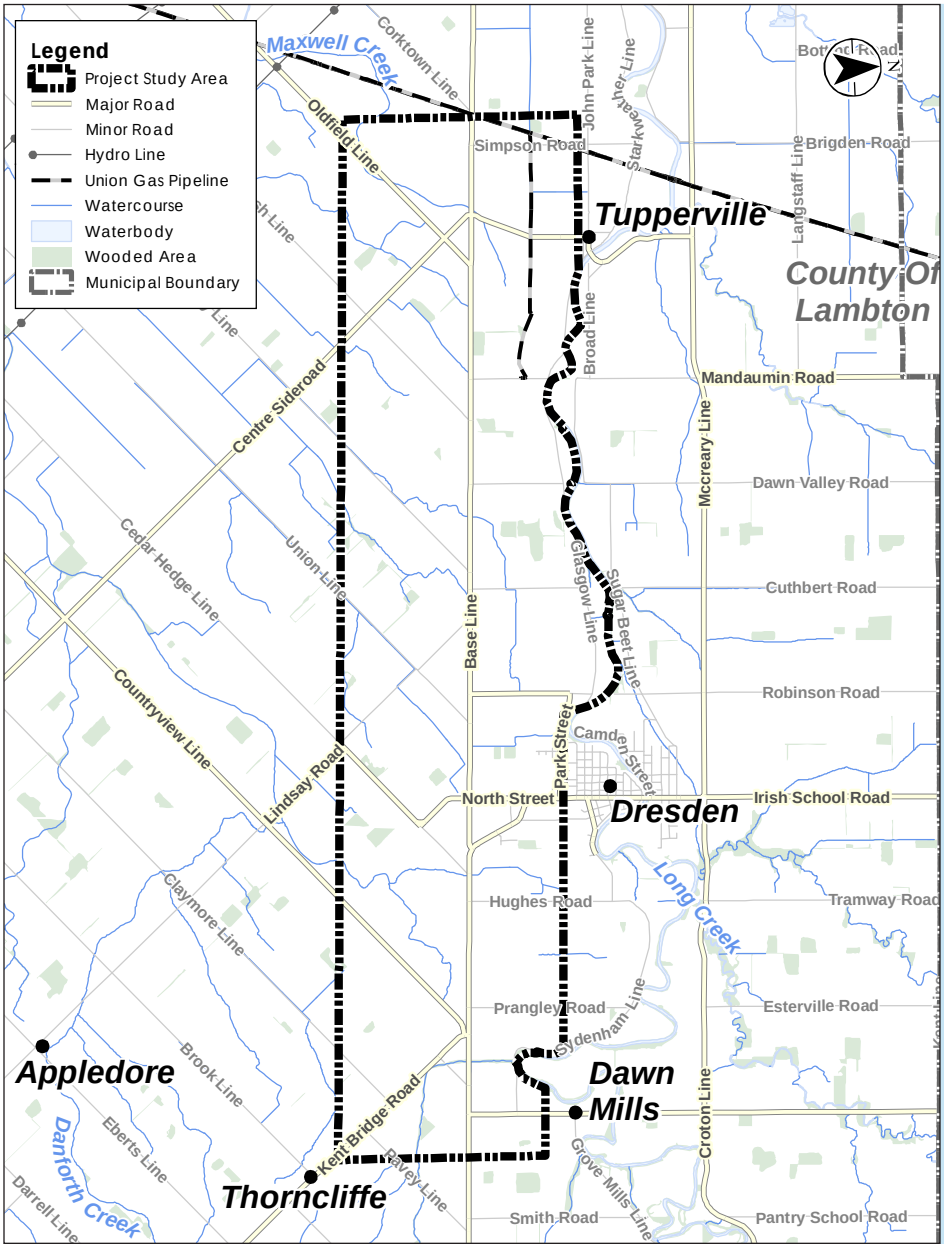
Union Gas Limited
Chatham-Kent Rural Pipeline Expansion Project
Information Newsletter

Project Overview

Union Gas is proposing to construct the Chatham-Kent Rural Pipeline Expansion Project, it contains two pipeline sections:

- A new 13-kilometre, 8-inch diameter pipeline (Base Line Section) commencing from Union Gas' existing Panhandle Natural Gas Transmission System at the Simpson Road Station (west of Tupperville) to the intersection of Base Line Road and Kent Bridge Road, east of Dresden.
- A new 500-metre, 12-inch diameter pipeline (Bear Line Section) near Dover Centre.

If approved by the Ontario Energy Board, construction is planned to begin as early as Spring/Summer 2019 with an in-service date six months after construction begins.



Why is Union Gas Undertaking this Project?

Union Gas is undertaking the proposed project to:

- Increase capacity and accommodate additional demand for natural gas in the Municipality of Chatham-Kent.
- Meet the growing agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent, including in the fast-growing greenhouse market to support local jobs and economic growth in the coming years.



Ontario Energy Board Review and Approval Process

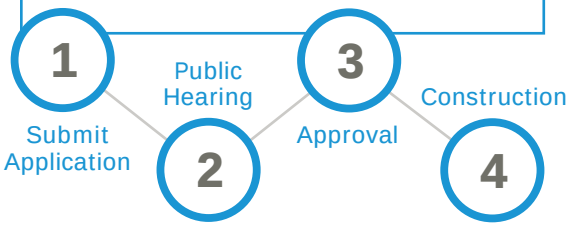
The Ontario Energy Board (OEB) is the body that regulates the natural gas industry in Ontario, in the public interest. The OEB's approval is required before this pipeline can be constructed.

Union Gas plans to submit an application for this project to the OEB, whose review and approval is needed before this project can proceed. This application will include comprehensive information on the project including: the need for the project, facility alternatives, project costs and economics, pipeline design and construction, environmental mitigation measures, land requirements, and consultation with First Nations and the Métis Nation of Ontario.

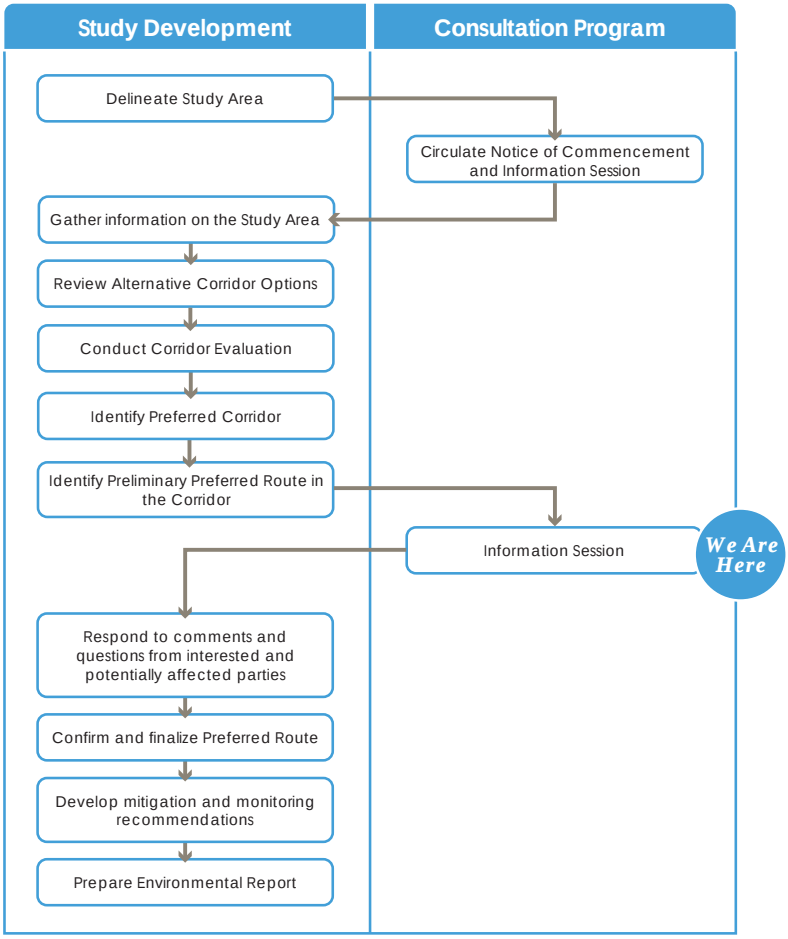
The OEB will then hold a public hearing to review the project. This will include notices in local newspapers, letters to directly affected landowners, the opportunity for the general public and landowners to submit questions regarding the project, a formal hearing, and a written decision regarding the project.

If after this review the OEB determines that the project is in the public's interest it will approve construction of the project. The OEB normally attaches conditions to the approval which Union Gas will comply with during the construction and restoration process.

Additional information about the OEB process and information about how to participate in the OEB hearing process can be found at: www.ontarioenergyboard.ca



Environmental Study Process





Thank You!

On behalf of the Project Team, thank you for your interest in this project. We appreciate your involvement.

If you have any comments or questions please contact:

Steve Thurtell, M.Sc., P.Ag., CAN-CISEC
Senior Environmental Scientist
Stantec Consulting Ltd.
Phone: (519) 780-8108
Email: Steve.Thurtell@stantec.com

Or visit our project webpage: **www.uniongas.com/projects**

uniongas
An Enbridge Company

Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

Please read the newsletter and look over the displays, and then take a few moments to answer the following questions. Your comments are appreciated. If you require any assistance or clarification while completing the questionnaire please speak with a Union Gas or Stantec representative. Completed questionnaires can be dropped off at the front table in the comment box.

1. What is your interest in this project?

   ☑ Directly affected landowner
   ☐ Surrounding landowner
   ☐ Interested citizen
   ☐ Member of interest group
   ☐ Government official
   ☐ Other: _____

2. Please indicate if the project will have any impacts to you, your property or your business.

   N/A

3. Please identify any features along the Preliminary Preferred Route that you feel are important to consider during the environmental study.

   N/A

4. Do you have any questions or comments about this project that you would like to bring to our attention?

   N/A

uniongas
An Enbridge Company

Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

5. Did the content provided at this Information Session meet your needs?

Yes.

Thank you for completing this questionnaire. If you have a question about the project that has not been addressed or for which you would like more information, please provide us with your full contact information so that we can respond to you.

Please Print Clearly

Name: [redacted]

Address: [redacted]

Email: _____

Phone: [redacted]

Information will be collected and used in accordance with the Freedom of Information and Protection of Privacy Act. This information will be used to assist Union Gas in meeting applicable approval requirements. This material will be maintained on file for use during the study and may be included in project documentation. Unless indicated otherwise, personal information and all comments will become part of the public record and may be publicly released as part of project documentation.

uniongas
An Enbridge Company

Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

Please read the newsletter and look over the displays, and then take a few moments to answer the following questions. Your comments are appreciated. If you require any assistance or clarification while completing the questionnaire please speak with a Union Gas or Stantec representative. Completed questionnaires can be dropped off at the front table in the comment box.

1. What is your interest in this project?

   ☐ Directly affected landowner
   ☑ Surrounding landowner – in front of house
   ☐ Interested citizen
   ☐ Member of interest group
   ☐ Government official
   ☐ Other: _____

2. Please indicate if the project will have any impacts to you, your property or your business.

   Not directly if placed on south side

   North side – has existing gas line – local Bell – Fiber optics

3. Please identify any features along the Preliminary Preferred Route that you feel are important to consider during the environmental study.

   if put in along south side of Baseline. The line will be away from the drainage ditch on the north side.

4. Do you have any questions or comments about this project that you would like to bring to our attention?

uniongas
An Enbridge Company

Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

5. Did the content provided at this Information Session meet your needs?

Yes

Thank you for completing this questionnaire. If you have a question about the project that has not been addressed or for which you would like more information, please provide us with your full contact information so that we can respond to you.

Please Print Clearly

Name: [redacted]

Address: [redacted]

Email: [redacted]

Phone: [redacted]

Information will be collected and used in accordance with the Freedom of Information and Protection of Privacy Act. This information will be used to assist Union Gas in meeting applicable approval requirements. This material will be maintained on file for use during the study and may be included in project documentation. Unless indicated otherwise, personal information and all comments will become part of the public record and may be publicly released as part of project documentation.

uniongas
An Enbridge Company

Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

Please read the newsletter and look over the displays, and then take a few moments to answer the following questions. Your comments are appreciated. If you require any assistance or clarification while completing the questionnaire please speak with a Union Gas or Stantec representative. Completed questionnaires can be dropped off at the front table in the comment box.

1. What is your interest in this project?

   ☑ Directly affected landowner
   ☐ Surrounding landowner
   ☐ Interested citizen
   ☐ Member of interest group
   ☐ Government official
   ☐ Other: _____

2. Please indicate if the project will have any impacts to you, your property or your business.

   We don't feel that there will be any impact

3. Please identify any features along the Preliminary Preferred Route that you feel are important to consider during the environmental study.

   None

4. Do you have any questions or comments about this project that you would like to bring to our attention?

   Not at the present time.

uniongas
An Enbridge Company

Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

5. Did the content provided at this Information Session meet your needs?

Yes. Thank you for all the information and all the friendliness you showed us

Thank you for completing this questionnaire. If you have a question about the project that has not been addressed or for which you would like more information, please provide us with your full contact information so that we can respond to you.

Please Print Clearly

Name: [redacted]

Address: [redacted]

Email: _____

Phone: [redacted]

Information will be collected and used in accordance with the Freedom of Information and Protection of Privacy Act. This information will be used to assist Union Gas in meeting applicable approval requirements. This material will be maintained on file for use during the study and may be included in project documentation. Unless indicated otherwise, personal information and all comments will become part of the public record and may be publicly released as part of project documentation.

Welcome

to the

Chatham-Kent Rural Pipeline Expansion Project

Information Session

A Union Gas Pipeline Project

Stantec Consulting Ltd. has been retained by Union Gas Limited to complete environmental services for the Chatham-Kent Rural Pipeline Expansion Project.

Thank You for Joining Us

We invite you to view the display boards, speak to members of Union Gas or Stantec, and complete a questionnaire providing your feedback.

Please sign up at the front desk to receive future updates.



Purpose of the Information Session

The purpose of this Information Session is to:

- Provide details on project activities, including the corridor and route selection process.
- Gather feedback on the Preferred Corridor and Preliminary Preferred Route, to assist in the selection of a final Preferred Route.
- Discuss project details such as access and land requirements, pre-construction activities, and construction activities with landowners on the Preliminary Preferred Route.



Project Overview

To meet the growing demands for natural gas, Union Gas is proposing to construct two new pipelines. Known as the Chatham-Kent Rural Pipeline Expansion Project, it contains the following pipeline sections:

- A new 13-kilometre, 8-inch diameter pipeline commencing from Union Gas' existing Panhandle Natural Gas Transmission System at the Simpson Road Station (west of Tupperville) to the intersection of Base Line Road and Kent Bridge Road, east of Dresden (Base Line Section).

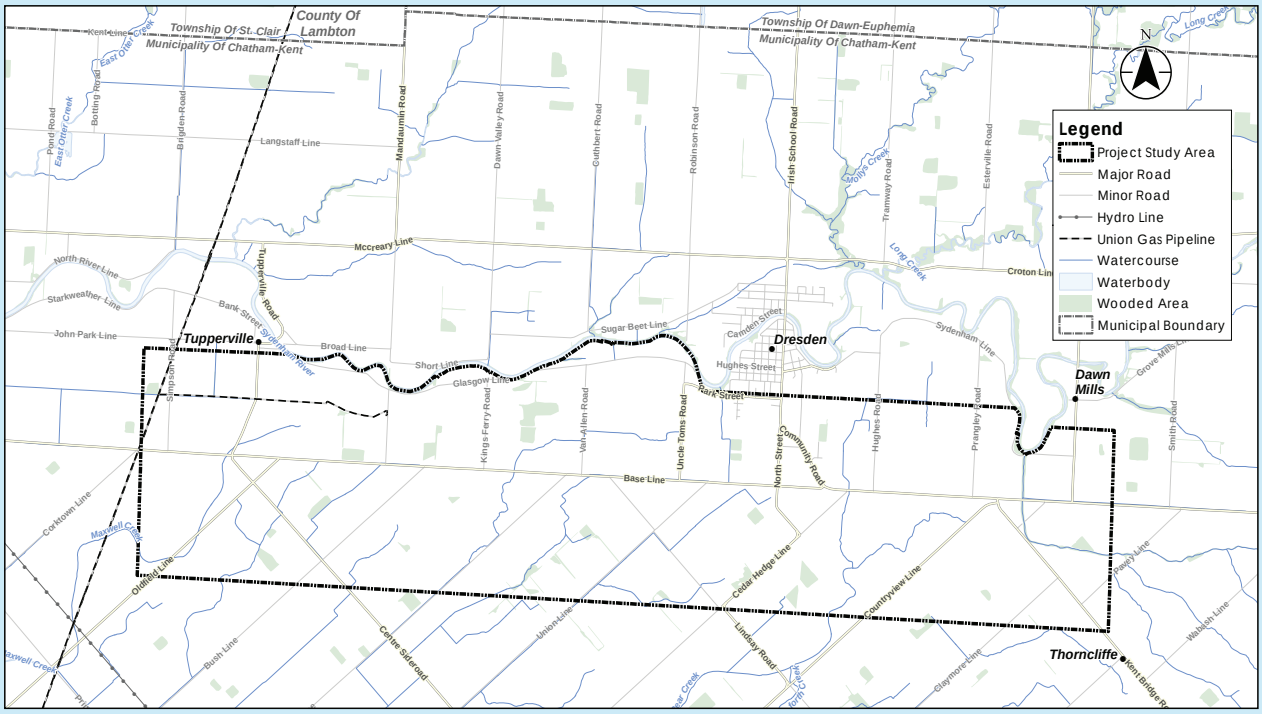
- A new 500-metre, 12-inch diameter pipeline near Dover Centre (Bear Line Section).

If approved by the Ontario Energy Board, construction is planned to begin as early as Spring/Summer 2019 with an in-service date six months after construction begins.

Because the Bear Line section's Environmental Protection Plan has been completed and did not identify any significant issues or concerns for this section of pipeline, this information session will focus primarily on the 13 kilometre Base Line section of the project.

Base Line Section

The proposed new 8-inch diameter pipeline will be approximately 13 km in length. It will begin at Union Gas' existing Simpson Road Station (near the community of Tupperville) and proceed south in the road allowance of Simpson Road and then east within the road allowance of Base Line Road to an end point in the vicinity of the intersection of Base Line and Kent Bridge Road. The Project Study Area is shown below.



uniongas
An Enbridge Company

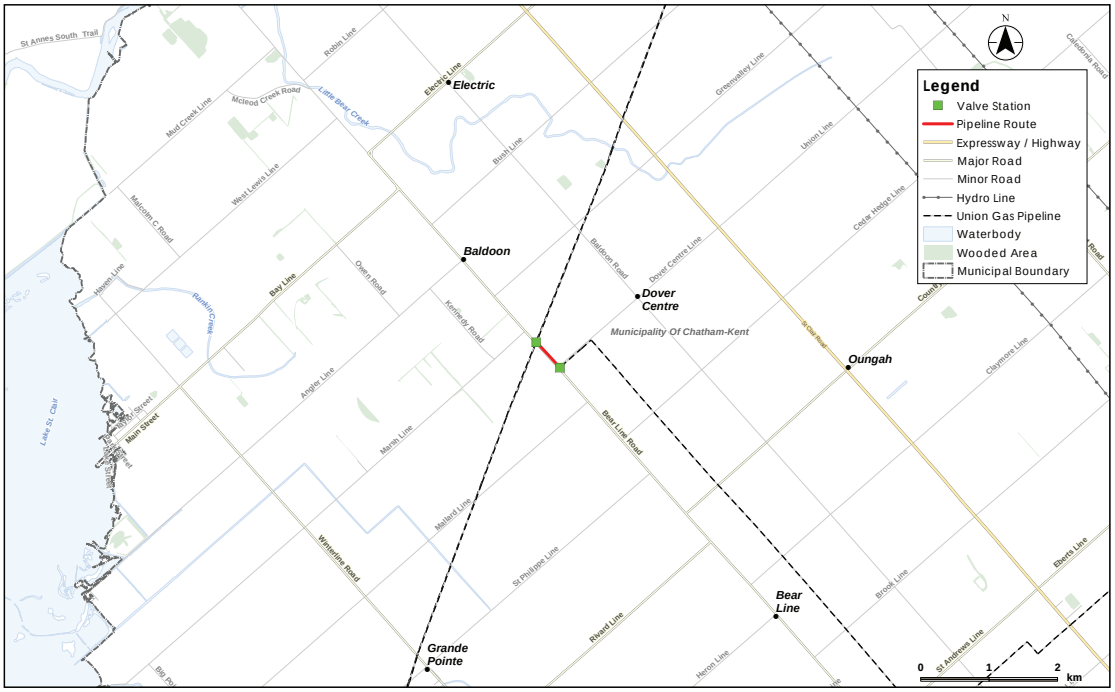
Stantec

Bear Line Section

Union Gas is proposing to construct a 500-metre, 12-inch diameter pipeline section along Bear Line Road north of Dover Centre Line, near the community of Dover Centre.

This section would be within road allowance and would provide a second connection between Union Gas' existing Panhandle Natural Gas Transmission Pipeline and the Chatham-East pipeline.

The Environmental Protection Plan for this section has been completed. The Environmental Protection Plan did not identify any significant issues or concerns for this section of the pipeline.



uniongas
An Enbridge Company

Stantec

Why is Union Gas Undertaking this Project?

Union Gas is undertaking the proposed project to:

- Increase capacity and accommodate additional demand for natural gas in the Municipality of Chatham-Kent.
- Meet the growing agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent, including in the fast-growing greenhouse market to support local jobs and economic growth in the coming years.



Environmental Study Process

The environmental study and subsequent Environmental Report for the project will be completed as per the Ontario Energy Board's (OEB) "Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario (2016)."

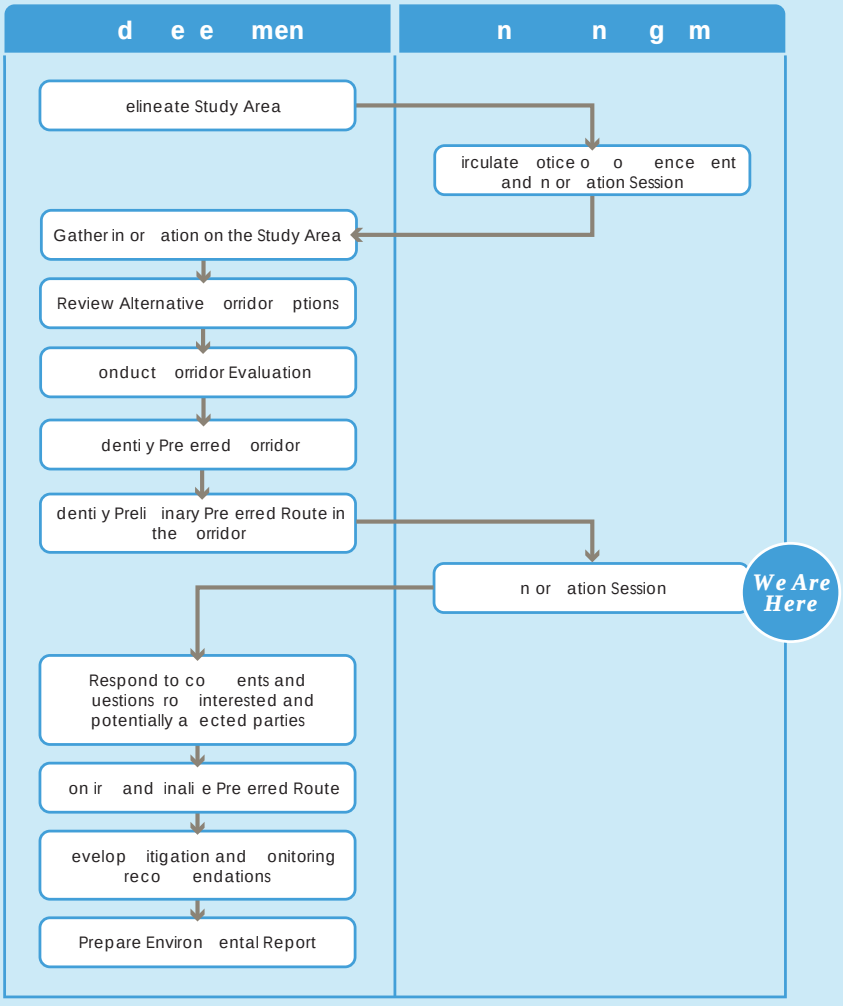


The study will:

- Undertake consultation to understand the views of interested and potentially affected parties
- Consult with Indigenous communities to understand interests and potential impacts
- Be conducted during the earliest phase of the project
- Identify a route for the pipeline
- Identify potential impacts of the project
- Develop mitigation and protective measures to avoid or minimize potential impacts
- Develop an appropriate inspection, monitoring and follow-up program

Chatham-Kent Rural Pipeline Expansion Project
Information Session

Environmental Study Process



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Ontario Energy Board Review and Approval Process

The Ontario Energy Board (OEB) is the body that regulates the natural gas industry in Ontario, in the public interest.

Union Gas plans to submit an application for this project to the OEB. This application will include comprehensive information on the project including:

- The need for the project
- Facility alternatives
- Project costs and economics
- Pipeline design and construction
- Consultation with Indigenous communities
- Environmental mitigation measures
- Land requirements

The OEB will then hold a public hearing to review the project.

If after this review the OEB determines that the project is in the public interest it will approve construction of the project.

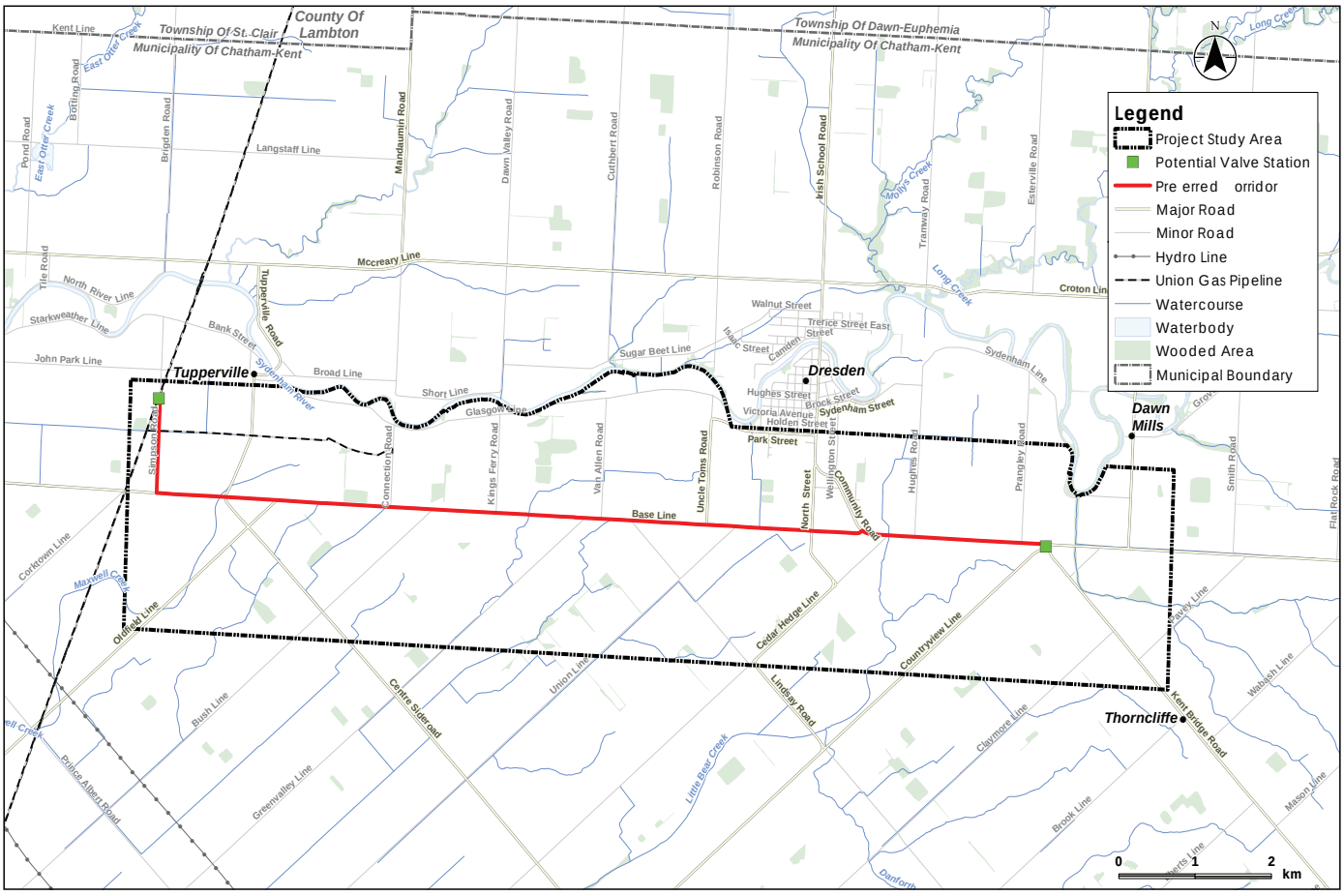
Additional information about the OEB process can be found on the project newsletter and at: www.ontarioenergyboard.ca

Submit application > Public hearing > Approval > Construction

Chatham-Kent Rural Pipeline Expansion Project
Information Session

Preliminary Preferred Route

The quantitative comparative evaluation identified that the Preliminary Preferred Route was environmentally acceptable. To avoid disecting land parcels and severing fields, the Preliminary Preferred Route is an accessible corridor that is within existing road allowances.



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Access and Land Requirements

Union Gas will work with directly affected landowners along the pipeline route to obtain the land rights necessary to construct the pipeline. Union Gas will continue discussions if appropriate land rights for the construction of the pipeline are necessary.

These land rights may consist of permanent easements and/or temporary easements. The temporary rights are only required during construction activities.

Union Gas will ensure that a Land Relations Agent (LRA) is available to each Landowner during the entire pipeline construction process. The LRA will continue to communicate to all landowners around the project progress and assist with any concerns that may arise as a result of the construction activities.

Socio-Economic Features

The project will be constructed mainly in existing road allowances, as well as private business (including agriculture) and residential land.

Potential Effects

- Temporary increases in noise, dust and air emissions
- Increased construction traffic volumes
- Temporary impairment of the use and enjoyment of property
- Vegetation clearing along the pipeline easement (if needed)



Example Mitigation Measures

- Provide access across the construction area
- Restrict construction to daylight hours, and adhere to applicable noise by-laws
- Develop and implement a Traffic Control Plan
- Place fencing at appropriate locations for safety
- Implement a water well monitoring program
- Make contact information for a designated Union Gas representative available prior to and throughout construction

Aquatic Resources

Union Gas understands the importance of protecting wildlife during construction and therefore will implement recognized mitigation measures to minimize possible environmental effects.

The pipeline crosses 8 known watercourses.

Potential Effects

- Disruption and alteration to aquatic species and habitat and/or nuisance effects
- Increased erosion, sedimentation, and turbidity resulting from removal of vegetation



Example Mitigation Measures

- Conduct surveys of waterbodies
- Secure all permits from St. Clair Region Conservation Authority
- Limit in-channel construction, where possible, and conform to fish timing window guidelines
- For in-channel construction, protect aquatic species and manage sedimentation and turbidity
- Restore and seed areas to establish habitat and reduce erosion
- Replace riparian vegetation

Cultural Heritage Resources

During the course of construction, cultural heritage features such as archaeological finds, buildings, fences and landscapes may be encountered. Detailed field surveys will be conducted by independent, third-party archaeologists and cultural heritage professionals.

Potential Effects

- Damage or destruction of archaeological, paleontological or historical resources



Example Mitigation Measures

- Archaeological assessment of the construction right-of-way, with review and comment from the Ministry of Tourism, Culture and Sport (MTCS)
- Cultural heritage assessment (for built heritage features and cultural heritage landscapes) of the construction right-of-way, with review and comment from the MTCS
- Reporting of any previously unknown archaeological, paleontological or historical resources uncovered, or suspected of being uncovered, during excavation

Terrestrial Resources

During the course of construction, natural heritage features such as wildlife habitat and wooded areas will need to be crossed.

Potential Effects

- Damage or removal of vegetation and wildlife habitat adjacent to the construction area
- Disturbance and/or mortality to local wildlife



Example Mitigation Measures

- Conduct surveys (including Species at Risk surveys) in advance of construction to determine opportunities for wildlife habitat to exist
- Clearly mark the construction area to avoid accidental damage
- Restore and seed areas to establish habitat and reduce erosion
- Secure any necessary permits, and follow any conditions of approval

Agricultural Soils

The Preliminary Preferred Route is in existing road allowances; however, agricultural lands adjacent to the road right-of-way may be impacted along the route to facilitate the construction process.

Union Gas has established and tested measures to preserve the integrity of agricultural lands throughout the construction phase:

- A sampling program for Soybean Cyst Nematodes will be implemented where appropriate.
- If work occurs on agricultural lands, a third-party soils specialist will determine topsoil depth prior to stripping and supervise all activities so that the proper depth of topsoil is removed and replaced.
- Union Gas will implement a wet soil shutdown protocol on agricultural lands to minimize soil structure damage.
- If work occurs on agricultural lands, Union Gas will implement appropriate cleanup and restoration.
- Any agricultural drainage systems impacted by construction will be repaired.



Project Schedule

Serving more than 400 communities in Ontario, we consider ourselves strong community partners who believe in and are committed to public consultation.

During the planning stages for this project, we have consulted and will continue to consult with local landowners, Indigenous communities, government agencies and other interested parties that could be impacted by the project.

KEY MILESTONES:

WINTER 2018	SPRING 2018	SUMMER/FALL 2018	SPRING 2019	FALL 2019	FALL 2019 / SPRING 2020
Start the environmental planning process	Host Information Session Complete Environmental Report Complete OEB Application Filing	Complete Permitting, Pipeline Design, and Construction Plans Receive OEB approval	Begin construction	Conclude construction Pipeline in service	Site clean up and restoration, and post-construction monitoring
1	2	3	4	5	6

Chatham-Kent Rural Pipeline Expansion Project
Information Session

Union Gas - Who We Are & What We Do

What to look for when choosing a natural gas provider

Proven safety record with over 100 years of experience

Deliver affordable, safe and reliable natural gas to 1.5 million homes and businesses with approximately 20,000 new customers each year



Excellent customer service with Customer and Billing Centres in Ontario

Deliver the lowest natural gas rates in Ontario

Ontario-based natural gas company providing service to over 400 communities across Ontario

One of Canada's Top 100 Employers for 7 years in a row

Highly trained, committed and knowledgeable experts

Understands rural and Indigenous communities in Ontario

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Chatham-Kent Rural Pipeline Expansion Project
Information Session

Safety is Our #1 Priority

We are dedicated to the safe operation of our facilities and to the protection of our employees and the public.

ABOVE ALL ELSE
WE KEEP OURSELVES, OUR TEAMS AND OUR COMMUNITIES
SAFE



- Over 100 years of proven safety experience
- Pipeline and facilities are:
  - Constructed using well-established best practices
  - Designed and maintained to strict safety standards
  - Monitored 24/7 by 2 gas control centres
- Highly trained industry experts
- Ongoing public safety awareness programs
- Support for community based safety programs such as school programs and children's safety villages

Past winner of the prestigious American Gas Association Safety Achievement Awards in fleet safety

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Chatham-Kent Rural Pipeline Expansion Project
Information Session

Being a Good Neighbour is Important to Us

We live and work in over 400 communities across Ontario and it's our goal to be a good neighbour in each one.

- Consult with landowners, stakeholders, and Indigenous communities to learn what is important when determining new facilities locations
- Conduct municipal meetings, as well as public information sessions about our projects
- Involve communities in decision making to help address environmental or cultural sensitivities
- Invest in relationships and training with emergency first responders
- Develop community safety and emergency preparedness programs
- Support community initiatives through donations for charitable organizations, sponsorships, in-kind contributions and volunteerism



"It's been a pleasure working with Union Gas. They were very professional, and I'm very happy with the overall experience. I've never seen a construction project go that smoothly. With good communication and proper information, they did what they said they would do, and then some. They're just great to work with."

– Jim Louzon, Louzon Farms, talking about his experience as a landowner on the 2017 Union Gas Panhandle Reinforcement Project in Chatham-Kent.



"I'm so impressed with the lengths they have gone in order to ensure safety, the respect they have taken with farmers' land, and their protection of the environment."

– Councillor Carmen McGregor, Municipality of Chatham-Kent, talking about Union Gas' 2017 Panhandle Reinforcement Project.

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APPENDIX B5: PROJECT CORRESPONDENCE

Ministry of Tourism, Culture and Sport

Heritage Program Unit
Programs and Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Tel: 416 731 7133
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 7133
Téléc: 416 212 1802

March 20, 1018 (EMAIL ONLY)

Steve Thurtell, Senior Environmental Scientist
Stantec Consulting Ltd.
1-70 Southgate Drive
Guelph, ON N1G4P6
E: steve.thurtell@stantec.com

RE: MTCS file #: 0008432
Proponent: Union Gas
Subject: Notice of Commencement
Pipeline Project – Chatham-Kent Rural Pipeline Expansion Project
Location: Municipality of Chatham-Kent, Ontario

Dear Mr. Thurtell:

Thank you for providing the Ministry of Tourism, Culture and Sport (MTCS) with the Notice of Commencement for your project. 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.

Under the EA process, the proponent is required to determine a project's potential impact on cultural heritage resources.

While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation. Aboriginal communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Aboriginal communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Municipal Heritage Committees, historical societies and other local heritage organizations may also have knowledge that contributes to the identification of cultural heritage resources.

Archaeological Resources
Your EA project may impact archaeological resources and you should screen the project with the MTCS *Criteria for Evaluating Archaeological Potential* to determine if an archaeological assessment is needed. MTCS archaeological sites data are available at *archaeology@ontario.ca*. If your EA project area exhibits archaeological potential, then an archaeological assessment (AA) should be undertaken by an archaeologist licenced under the *OHA*, who is responsible for submitting the report directly to MTCS for review.

Built Heritage and Cultural Heritage Landscapes
The MTCS *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* should be completed to help determine whether your EA project may impact cultural heritage resources. The Clerk/s for the municipality of Chatham-Kent can provide information on property registered or designated under the *Ontario Heritage Act*. Municipal Heritage Planners can also provide information that will assist you in completing the checklist.
If potential or known heritage resources exist, MTCS recommends that a Heritage Impact Assessment (HIA), prepared by a qualified consultant, should be completed to assess potential project impacts. Our

Ministry's *Info Sheet #5: Heritage Impact Assessments and Conservation Plans* outlines the scope of HIAs. Please send the HIA to MTCS and the municipality of Chatham-Kent for review, and make it available to local organizations or individuals who have expressed interest in review.

Environmental Assessment Reporting
All technical heritage studies and their recommendations are to be addressed and incorporated into EA projects. Please advise MTCS whether any technical heritage studies will be completed for your EA project, and provide them to MTCS before issuing a Notice of Completion. If your screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file.

Thank-you for consulting MTCS on this project: please continue to do so through the EA process, and contact me for any questions or clarification.

Sincerely,

Brooke Herczeg
Heritage Planner
Brooke.Herczeg@Ontario.ca

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.

From: Dan McFadden <danmcfaddenconst@gmail.com>
Sent: Thursday, February 22, 2018 9:27:52 PM
To: Knight, Mark
Subject: Chatham-Kent pipeline

Hey how are you? I live at 10200 oldfield line right beside the pipeline. I am wondering if we are able to hook into the pipeline as it goes by and if so how much would it cost?
Thanks Dan Mcfadden

From: Thurtell, Steve
To: "danmcfaddenconst@gmail.com"
Subject: Pipeline access
Date: Friday, February 23, 2018 10:32:00 AM

Hello,
The proposed pipeline is planned to interconnect with the existing natural gas transmission infrastructure in your area. These systems operate at higher pressures than the distribution systems you would be enquiring about. Unfortunately, at this point Union Gas Ltd. is not planning for this project to include 'take-off' infrastructure to allow for the connection to individual households.
I thank you for your input to the project. The Union Gas representatives and I would look forward to meeting you at the Information Session.

Steve Thurtell
M.Sc., P.Ag., CAN-CISEC
Senior Environmental Scientist

Direct: (519)780-8108
Mobile: (519)820-4237
Fax: (519)836-2493

Stantec Consulting Ltd.
1-70 Southgate Drive
Guelph ON N1G 4P5 CA

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Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

Please read the newsletter and look over the displays, and then take a few moments to answer the following questions. Your comments are appreciated. If you require any assistance or clarification while completing the questionnaire please speak with a Union Gas or Stantec representative. Completed questionnaires can be dropped off at the front table in the comment box.

1. What is your interest in this project?

   ☑ Directly affected landowner
   ☐ Surrounding landowner
   ☐ Interested citizen
   ☐ Member of interest group
   ☐ Government official
   ☐ Other: _____

2. Please indicate if the project will have any impacts to you, your property or your business.

   N/A

3. Please identify any features along the Preliminary Preferred Route that you feel are important to consider during the environmental study.

   N/A

4. Do you have any questions or comments about this project that you would like to bring to our attention?

   N/A

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Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

5. Did the content provided at this Information Session meet your needs?

Yes.

Thank you for completing this questionnaire. If you have a question about the project that has not been addressed or for which you would like more information, please provide us with your full contact information so that we can respond to you.

Please Print Clearly

Name: Laurie Lassaline

Address: RR#2 Oil Springs ON
NON 1P0

Email:

Phone: (519) 834-2142.

Information will be collected and used in accordance with the Freedom of Information and Protection of Privacy Act. This information will be used to assist Union Gas in meeting applicable approval requirements. This material will be maintained on file for use during the study and may be included in project documentation. Unless indicated otherwise, personal information and all comments will become part of the public record and may be publicly released as part of project documentation.

Chatham-Kent Rural Pipeline Expansion Project

Information Session – Questionnaire
March 6th, 2018

Please read the newsletter and look over the displays, and then take a few moments to answer the following questions. Your comments are appreciated. If you require any assistance or clarification while completing the questionnaire please speak with a Union Gas or Stantec representative. Completed questionnaires can be dropped off at the front table in the comment box.

1. What is your interest in this project?

   ☐ Directly affected landowner
   ☑ Surrounding landowner – in front of house
   ☐ Interested citizen
   ☐ Member of interest group
   ☐ Government official
   ☐ Other: _____

2. Please indicate if the project will have any impacts to you, your property or your business.

   Not directly if placed on south side

   North side - has existing gas line - local Bell - Fiber optics

3. Please identify any features along the Preliminary Preferred Route that you feel are important to consider during the environmental study.

   if put in along south side of Baseline. The line will be away from the drainage ditch on the north side.

4. Do you have any questions or comments about this project that you would like to bring to our attention?

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Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

5. Did the content provided at this Information Session meet your needs?

Yes.

Thank you for completing this questionnaire. If you have a question about the project that has not been addressed or for which you would like more information, please provide us with your full contact information so that we can respond to you.

Please Print Clearly

Name: Neil XMarchand

Address: 10211 Base Line

Email: nsmarchand@hotmail.com

Phone: (519) 683-6345

Information will be collected and used in accordance with the Freedom of Information and Protection of Privacy Act. This information will be used to assist Union Gas in meeting applicable approval requirements. This material will be maintained on file for use during the study and may be included in project documentation. Unless indicated otherwise, personal information and all comments will become part of the public record and may be publicly released as part of project documentation.

Chatham-Kent Rural Pipeline Expansion Project

Information Session – Questionnaire
March 6th, 2018

Please read the newsletter and look over the displays, and then take a few moments to answer the following questions. Your comments are appreciated. If you require any assistance or clarification while completing the questionnaire please speak with a Union Gas or Stantec representative. Completed questionnaires can be dropped off at the front table in the comment box.

1. What is your interest in this project?

   - ☑ Directly affected landowner
   - ☐ Surrounding landowner
   - ☐ Interested citizen
   - ☐ Member of interest group
   - ☐ Government official
   - ☐ Other: _____

2. Please indicate if the project will have any impacts to you, your property or your business.

   We don't feel that there will be any impact

3. Please identify any features along the Preliminary Preferred Route that you feel are important to consider during the environmental study.

   None

4. Do you have any questions or comments about this project that you would like to bring to our attention?

   Not at the present time.

uniongas
An Enbridge Company

Chatham-Kent Rural Pipeline Expansion Project

Stantec

Information Session – Questionnaire
March 6th, 2018

5. Did the content provided at this Information Session meet your needs?

Yes. Thank you for all the information and all the people you showed us

Thank you for completing this questionnaire. If you have a question about the project that has not been addressed or for which you would like more information, please provide us with your full contact information so that we can respond to you.

Please Print Clearly

Name: Robert + Marilyn Handsor

Address: 25287 Prince ALBERT RD
R.R#6, Dresden, ONT, N0P1M0

Email: _____

Phone: (519) 352-8558

Information will be collected and used in accordance with the Freedom of Information and Protection of Privacy Act. This information will be used to assist Union Gas in meeting applicable approval requirements. This material will be maintained on file for use during the study and may be included in project documentation. Unless indicated otherwise, personal information and all comments will become part of the public record and may be publicly released as part of project documentation.

From: Chris Pincombe [mailto:Chris.Pincombe@enbridge.com]
Sent: Wednesday, February 28, 2018 3:46 PM
To: Knight, Mark <Mark.Knight@stantec.com>
Cc: Jay Moore <Jay.Moore@enbridge.com>
Subject: Chatham-Kent Rural Pipeline Expansion Project

Hi Mark,

This is in response to your *Notice of Information Session* regarding the *Chatham-Kent Rural Pipeline Expansion Project* (notice attached).

Enbridge Gas Distribution Inc. operates a NPS 10 Natural Gas pipeline through the proposed route. Enbridge has no objections to the proposed pipeline providing the following conditions are adhered to:

- Any proposed crossings are permitted in accordance with the regulations of the *Third Party Requirements in the Vicinity of Natural Gas Facilities* and subject to approval by Enbridge. The applicant will be required to sign Enbridge's Standard Crossing Agreement prior to the commencement of work over Enbridge's pipeline(s). A copy of *Third Party Requirements in the Vicinity of Natural Gas Facilities* is attached. The Guidelines contains information on separation requirements for facility and road construction;
- No work shall take place within 30m of the Enbridge pipeline(s) without the presence of an Enbridge inspector;
- No heavy machinery will be permitted to cross Enbridge's pipeline without prior approval from Enbridge. Please make an application for temporary equipment crossing including timeframe, type and weight of equipment per axle and name of company, address, and contact name for company that will sign the agreement;
- Please provide notification to our Utility Operators 3 business days in advance of the intended work and have an inspector onsite during any construction activity within 30m of Enbridge Gas Distribution Inc.'s pipelines. An inspector can be scheduled by contacting their office directly at 519-312-0176. A valid Ontario One Call locate ticket must also be on site during construction by calling 1-800-400-2255 or visiting their website www.on1call.com. Locate tickets are valid for 30 days from the date of issue.

Please submit any requests for any construction or work within 30 m of a pipeline to chris.pincombe@enbridge.com.

If you have any questions, please contact me.

Regards,

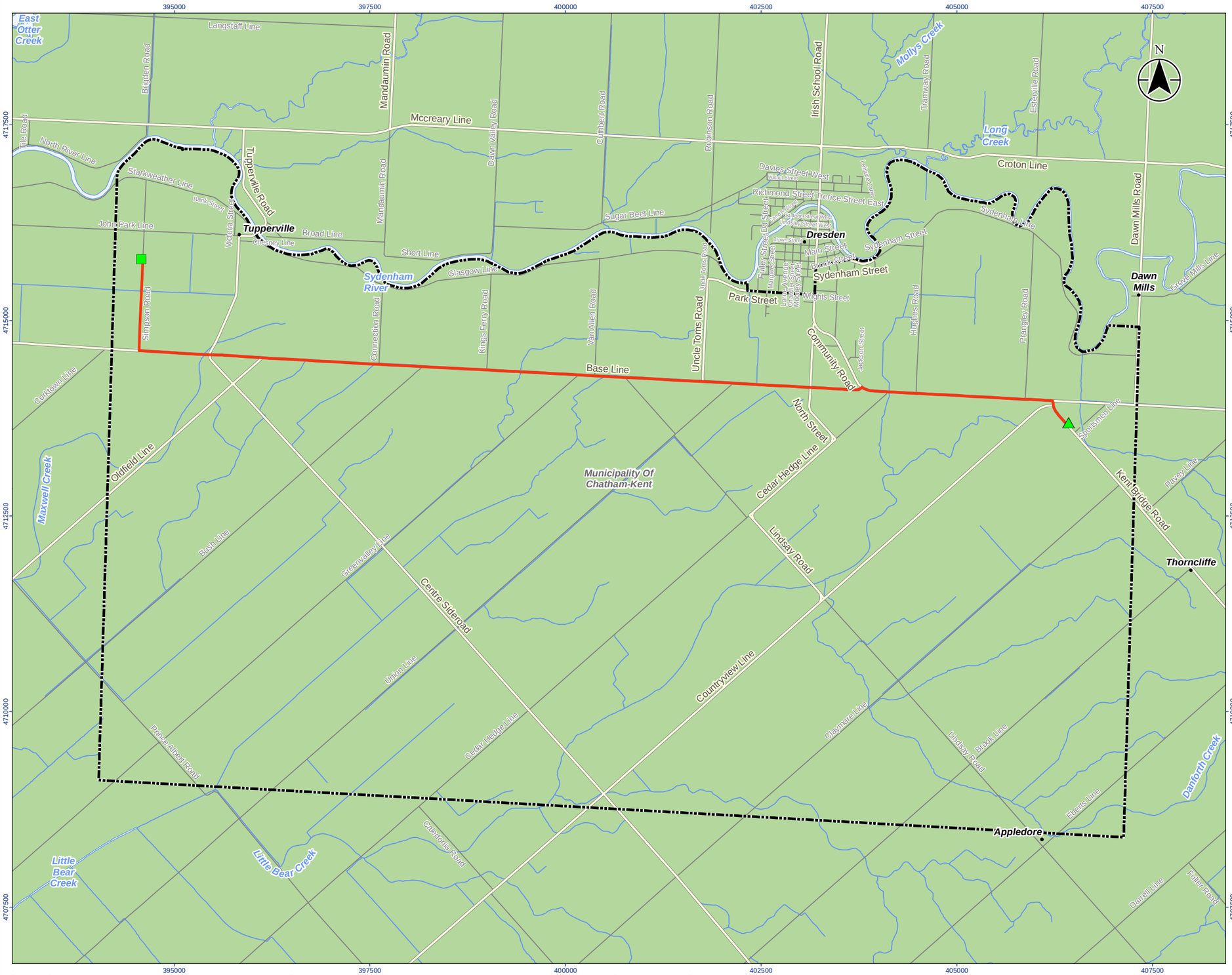
Chris Pincombe C.E.T. Land
Contracts & Services Advisor

ENBRIDGE GAS DISTRIBUTION INC.
TEL: 519-862-6092 | CELL: 519-381-1408
3501 Tecumseh Road, Mooretown, Ontario NON 1MO

enbridge.com
Integrity. Safety. Respect.



APPENDIX C:
EXISTING CONDITIONS FIGURES



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Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody

Bedrock Geology [3]

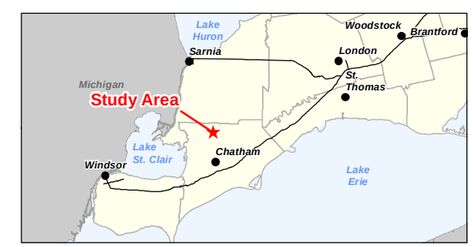
- 60a: Kettle Point Formation

0 1 2 km

1:50,000 (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 and Forestry © Queen's Printer for Ontario, 2018.
3. Ontario Geological Survey 2011. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release-Data 126-Revision 1. ISBN 978-1-4435-5704-7 (CD) ISBN 978-1-4435-5705-4



Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
1

Title
Bedrock Geology

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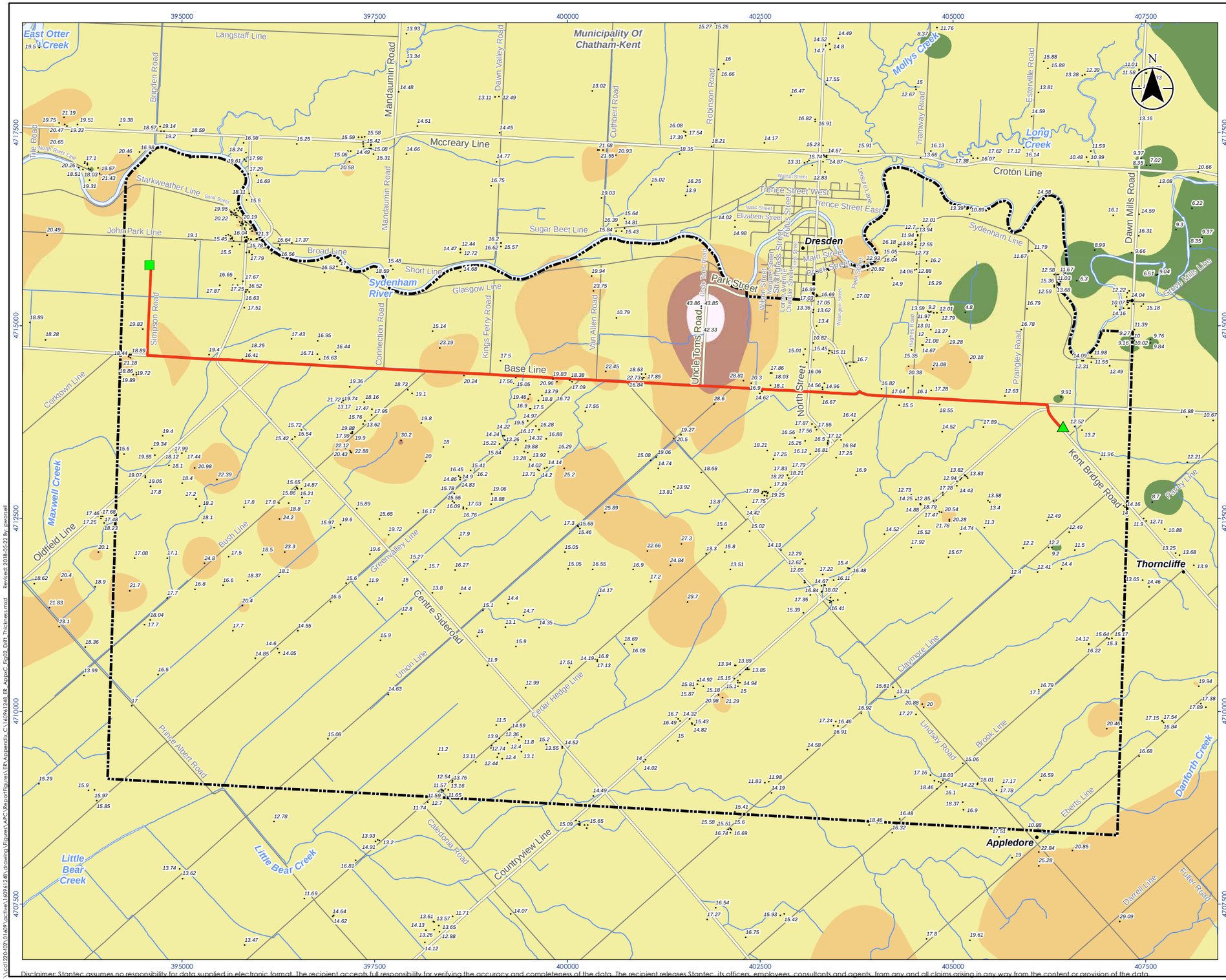
395000
397500
400000
402500
405000
407500
4717500
4715000
4712500
4710000
4707500
East Otter Creek
Municipality Of Chatham-Kent
Langstaff Line
Brigden Road
Mandaumin Road
Dawn Valley Road
Cumbert Road
Robinson Road
Molly's Creek
Tramway Road
Esterville Road
Long Creek
Dawn Mills Road
Grove Mills Line
Mccreary Line
Croton Line
Starkweather Line
John Park Line
Broad Line
Short Line
Glasgow Line
Sugar Beet Line
Sydenham River
Dresden
Main Street
Park Street
Uncle Toms Road
Base Line
North Street
Sydenham Line
Pratt Line
Pratt Siding
Pratt Lane
Pratt Road
Pratt Cemetery
Pratt Church
Pratt Hall
Pratt Store
Pratt Mill
Pratt Dam
Pratt Bridge
Pratt Creek
Pratt Valley
Pratt Hill
Pratt Farm
Pratt House
Pratt Barn
Pratt Shed
Pratt Garage
Pratt Office
Pratt Warehouse
Pratt Yard
Pratt Parking
Pratt Entrance
Pratt Exit
Pratt Gate
Pratt Fence
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Pratt Roof
Pratt Window
Pratt Door
Pratt Floor
Pratt Ceiling
Pratt Basement
Pratt Attic
Pratt Chimney
Pratt Foundation
Pratt Landscaping
Pratt Trees
Pratt Shrubs
Pratt Flowers
Pratt Grass
Pratt Soil
Pratt Water
Pratt Sewer
Pratt Electricity
Pratt Gas
Pratt Telephone
Pratt Internet
Pratt Cable
Pratt Satellite
Pratt Antenna
Pratt Solar
Pratt Wind
Pratt Geothermal
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Pratt Coal
Pratt Oil
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Pratt Gasoline
Pratt Kerosene
Pratt Jet Fuel
Pratt Aviation Fuel
Pratt Marine Fuel
Pratt Rail Fuel
Pratt Road Fuel
Pratt Off-Road Fuel
Pratt Heating Oil
Pratt Lubricating Oil
Pratt Hydraulic Oil
Pratt Transformer Oil
Pratt Cutting Oil
Pratt Engine Oil
Pratt Gear Oil
Pratt Brake Fluid
Pratt Coolant
Pratt Antifreeze
Pratt Windshield Washer Fluid
Pratt Battery Acid
Pratt Battery Electrolyte
Pratt Battery Separator
Pratt Battery Plate
Pratt Battery Terminal
Pratt Battery Cable
Pratt Battery Charger
Pratt Battery Tester
Pratt Battery Hydrometer
Pratt Battery Thermometer
Pratt Battery Voltmeter
Pratt Battery Ammeter
Pratt Battery Ohmmeter
Pratt Battery Multimeter
Pratt Battery Oscilloscope
Pratt Battery Spectrum Analyzer
Pratt Battery Network Analyzer
Pratt Battery Logic Analyzer
Pratt Battery Protocol Analyzer
Pratt Battery Signal Generator
Pratt Battery Function Generator
Pratt Battery Pulse Generator
Pratt Battery Arbitrary Waveform Generator
Pratt Battery Frequency Counter
Pratt Battery Time Interval Counter
Pratt Battery Period Counter
Pratt Battery Phase Meter
Pratt Battery Power Meter
Pratt Battery Energy Meter
Pratt Battery Demand Meter
Pratt Battery Power Factor Meter
Pratt Battery Harmonic Analyzer
Pratt Battery Power Quality Analyzer
Pratt Battery Transient Analyzer
Pratt Battery Fault Analyzer
Pratt Battery Protection Relay
Pratt Battery Circuit Breaker
Pratt Battery Fuse
Pratt Battery Disconnect Switch
Pratt Battery Load Break Switch
Pratt Battery Transfer Switch
Pratt Battery Automatic Transfer Switch
Pratt Battery Manual Transfer Switch
Pratt Battery Bypass Switch
Pratt Battery Isolation Switch
Pratt Battery Grounding Switch
Pratt Battery Surge Arrester
Pratt Battery Lightning Arrester
Pratt Battery Surge Protector
Pratt Battery Lightning Protector
Pratt Battery Surge Suppressor
Pratt Battery Lightning Suppressor
Pratt Battery Surge Capacitor
Pratt Battery Lightning Capacitor
Pratt Battery Surge Inductor
Pratt Battery Lightning Inductor
Pratt Battery Surge Resistor
Pratt Battery Lightning Resistor
Pratt Battery Surge Diode
Pratt Battery Lightning Diode
Pratt Battery Surge Transistor
Pratt Battery Lightning Transistor
Pratt Battery Surge Thyristor
Pratt Battery Lightning Thyristor
Pratt Battery Surge Triac
Pratt Battery Lightning Triac
Pratt Battery Surge Diac
Pratt Battery Lightning Diac
Pratt Battery Surge Varistor
Pratt Battery Lightning Varistor
Pratt Battery Surge Thermistor
Pratt Battery Lightning Thermistor
Pratt Battery Surge Photoresistor
Pratt Battery Lightning Photoresistor
Pratt Battery Surge Photodiode
Pratt Battery Lightning Photodiode
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Pratt Battery Surge Photothyristor
Pratt Battery Lightning Photothyristor
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Pratt Battery Lightning Photocoupler
Pratt Battery Surge Optocoupler
Pratt Battery Lightning Optocoupler
Pratt Battery Surge Isolator
Pratt Battery Lightning Isolator
Pratt Battery Surge Amplifier
Pratt Battery Lightning Amplifier
Pratt Battery Surge Operational Amplifier
Pratt Battery Lightning Operational Amplifier
Pratt Battery Surge Instrumentation Amplifier
Pratt Battery Lightning Instrumentation Amplifier
Pratt Battery Surge Isolation Amplifier
Pratt Battery Lightning Isolation Amplifier
Pratt Battery Surge Power Amplifier
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Pratt Battery Surge RF Amplifier
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Pratt Battery Surge Microwave Amplifier
Pratt Battery Lightning Microwave Amplifier
Pratt Battery Surge Millimeter Wave Amplifier
Pratt Battery Lightning Millimeter Wave Amplifier
Pratt Battery Surge Terahertz Amplifier
Pratt Battery Lightning Terahertz Amplifier
Pratt Battery Surge Infrared Amplifier
Pratt Battery Lightning Infrared Amplifier
Pratt Battery Surge Visible Light Amplifier
Pratt Battery Lightning Visible Light Amplifier
Pratt Battery Surge Ultraviolet Amplifier
Pratt Battery Lightning Ultraviolet Amplifier
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Pratt Battery Surge Graviton Amplifier
Pratt Battery Lightning Graviton Amplifier
Pratt Battery Surge Higgs Boson Amplifier
Pratt Battery Lightning Higgs Boson Amplifier
Pratt Battery Surge Supersymmetric Particle Amplifier
Pratt Battery Lightning Supersymmetric Particle Amplifier
Pratt Battery Surge Dark Matter Amplifier
Pratt Battery Lightning Dark Matter Amplifier
Pratt Battery Surge Dark Energy Amplifier
Pratt Battery Lightning Dark Energy Amplifier
Pratt Battery Surge Cosmological Constant Amplifier
Pratt Battery Lightning Cosmological Constant Amplifier
Pratt Battery Surge Inflaton Amplifier
Pratt Battery Lightning Inflaton Amplifier
Pratt Battery Surge Multiverse Amplifier
Pratt Battery Lightning Multiverse Amplifier
Pratt Battery Surge Parallel Universe Amplifier
Pratt Battery Lightning Parallel Universe Amplifier
Pratt Battery Surge Alternate Reality Amplifier
Pratt Battery Lightning Alternate Reality Amplifier
Pratt Battery Surge Simulation Amplifier
Pratt Battery Lightning Simulation Amplifier
Pratt Battery Surge Virtual Reality Amplifier
Pratt Battery Lightning Virtual Reality Amplifier
Pratt Battery Surge Augmented Reality Amplifier
Pratt Battery Lightning Augmented Reality Amplifier
Pratt Battery Surge Mixed Reality Amplifier
Pratt Battery Lightning Mixed Reality Amplifier
Pratt Battery Surge Extended Reality Amplifier
Pratt Battery Lightning Extended Reality Amplifier
Pratt Battery Surge Holographic Amplifier
Pratt Battery Lightning Holographic Amplifier
Pratt Battery Surge Volumetric Amplifier
Pratt Battery Lightning Volumetric Amplifier
Pratt Battery Surge Light Field Amplifier
Pratt Battery Lightning Light Field Amplifier
Pratt Battery Surge Plenoptic Amplifier
Pratt Battery Lightning Plenoptic Amplifier
Pratt Battery Surge Lightfield Amplifier
Pratt Battery Lightning Lightfield Amplifier
Pratt Battery Surge Radiance Field Amplifier
Pratt Battery Lightning Radiance Field Amplifier
Pratt Battery Surge Neural Radiance Field Amplifier
Pratt Battery Lightning Neural Radiance Field Amplifier
Pratt Battery Surge NeRF Amplifier
Pratt Battery Lightning NeRF Amplifier
Pratt Battery Surge Instant NeRF Amplifier
Pratt Battery Lightning Instant NeRF Amplifier
Pratt Battery Surge Plenoxels Amplifier
Pratt Battery Lightning Plenoxels Amplifier
Pratt Battery Surge Mip-NeRF Amplifier
Pratt Battery Lightning Mip-NeRF Amplifier
Pratt Battery Surge Mip-NeRF 360 Amplifier
Pratt Battery Lightning Mip-NeRF 360 Amplifier
Pratt Battery Surge Mip-NeRF RawNeRF Amplifier
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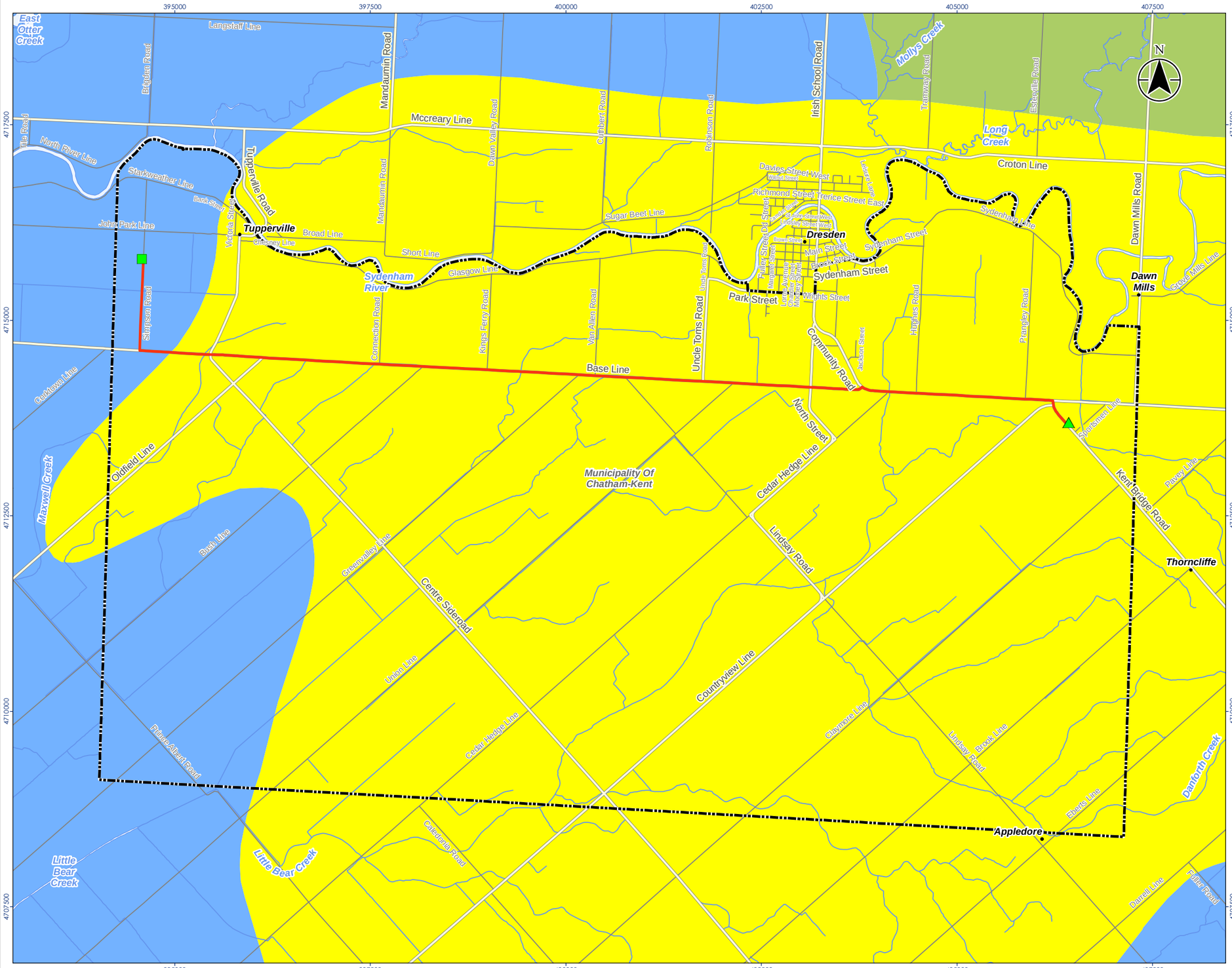
Pratt Battery Surge Mip-NeRF Unbounded Amplifier
Pratt Battery Lightning Mip-NeRF Unbounded



Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody

Physiography [3]

- 8: Bevelled Till Plains
- 11: Sand Plains
- 12: Clay Plains

0 1 2 km

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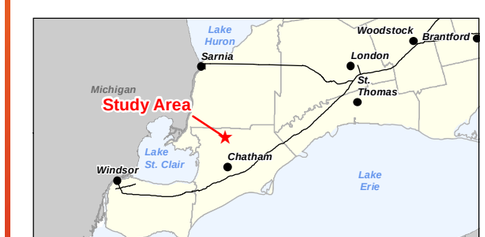
Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Physiography data source: Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.



Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
3

Title
Physiography

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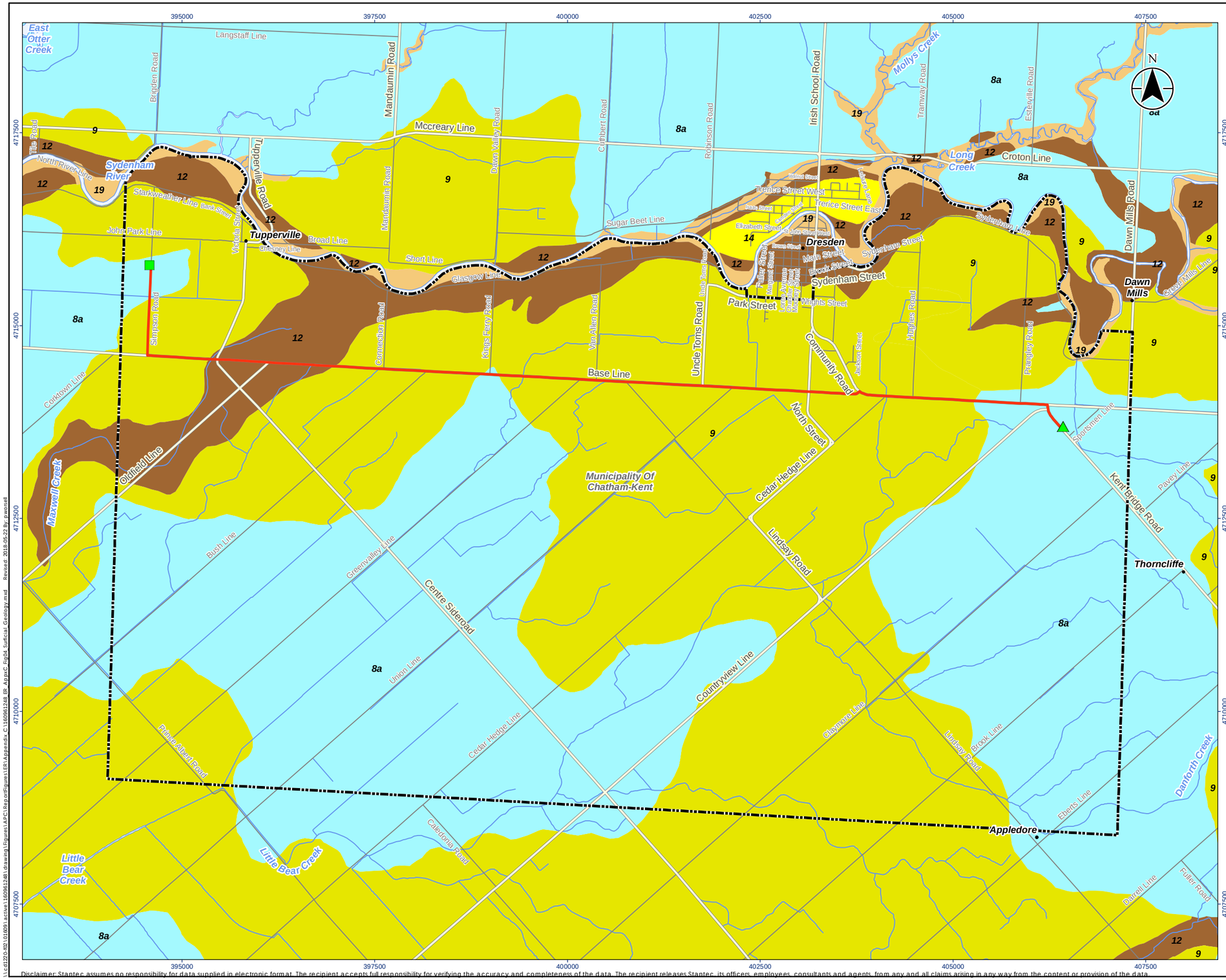

Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody

Surficial Geology [3]

- 8a: Fine-textured glaciolacustrine deposits (Massive-well laminated)
- 9: Coarse-textured glaciolacustrine deposits
- 12: Older alluvial deposits
- 14: Coarse-textured lacustrine deposits
- 19: Modern alluvial deposits

0 1 2 km

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Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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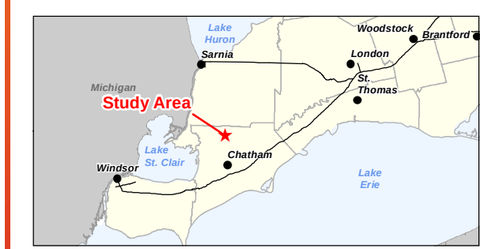
3. Ontario Geological Survey 2010. Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV ISBN 978-1-4435-2483-4



Project Location
Municipality of Chatham-Kent

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Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
4

Title
Surficial Geology

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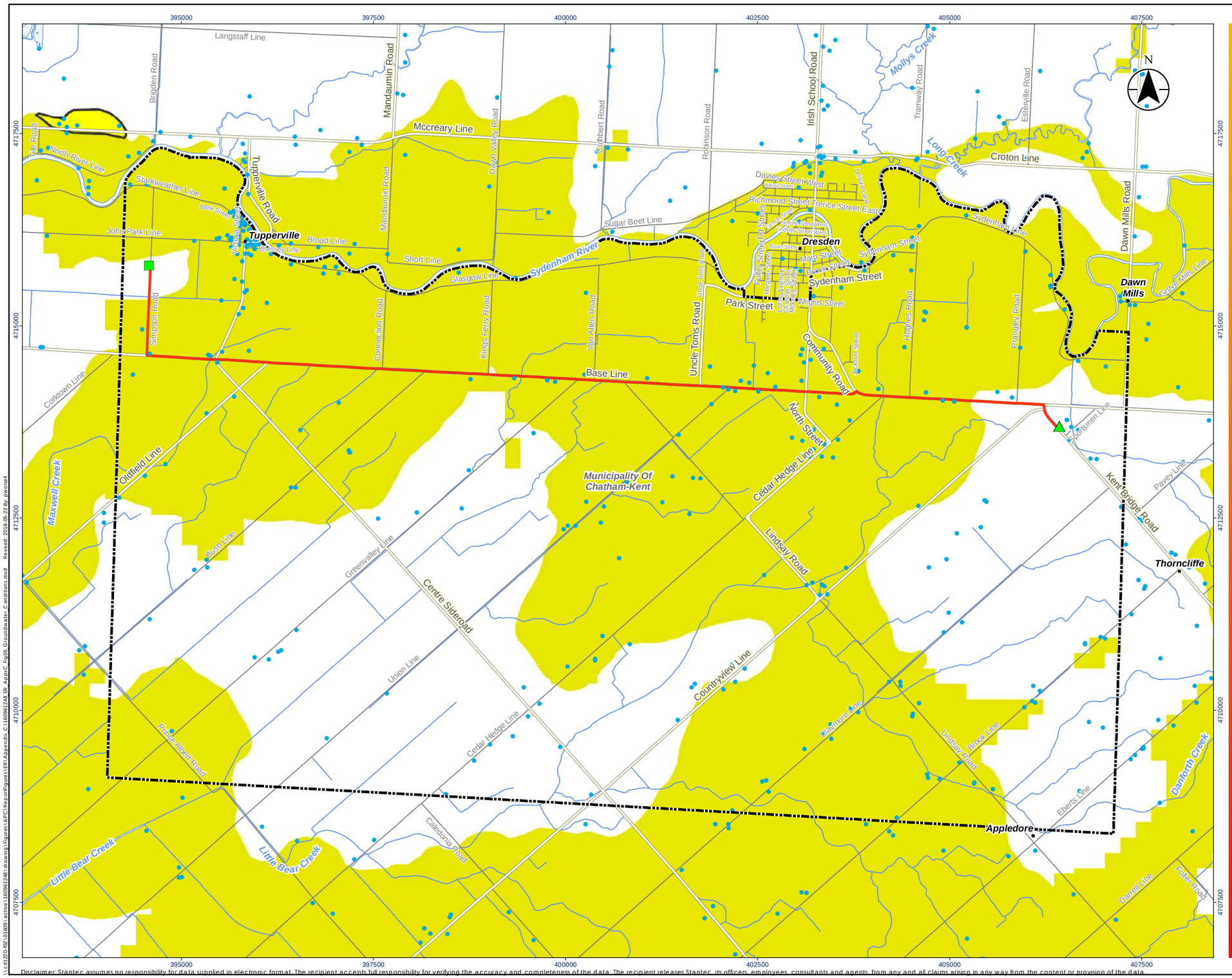

Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Active Registered Water Well (MOECC) [3]
- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody
- Highly Vulnerable Aquifer

0 1 2 km

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Notes

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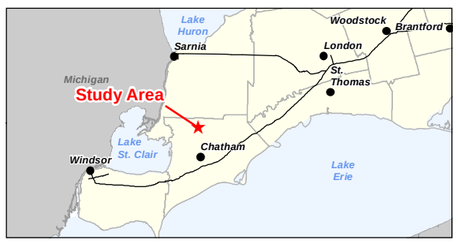
3. Water well data provided by the Ontario Ministry of Environment and Climate Change © Queen's Printer for Ontario, 2018. Version 2.10 - updated on June 30, 2017.



Project Location
Municipality of Chatham-Kent

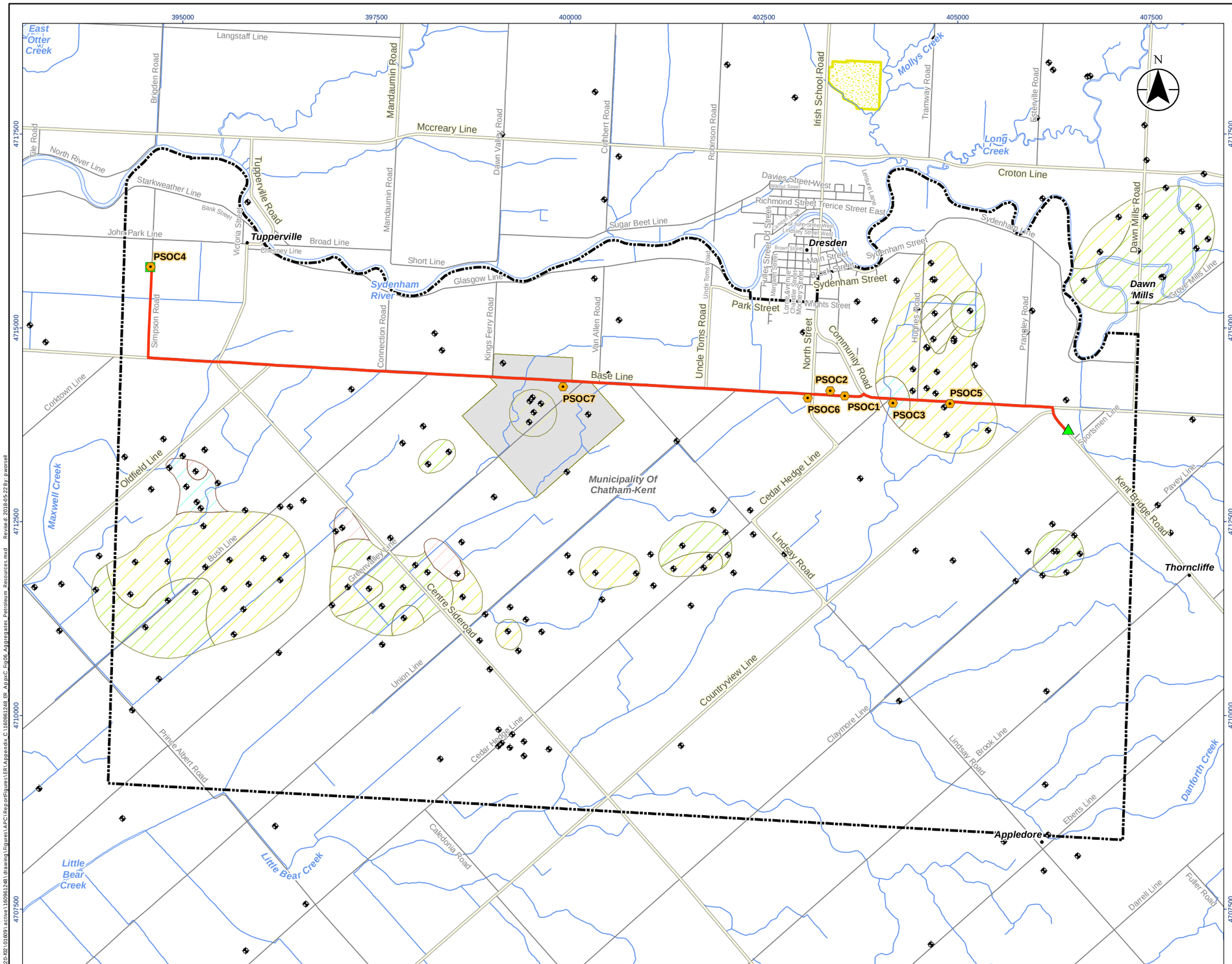
160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
5

Title
Groundwater Conditions

\\cd1220-f02\01691\active\160961248\drawing\Figures\APC\Report\Figures\ER\Appendix C\160961248-ER-AppC-Fig05-Groundwater-Conditions.mxd Revised: 2018-05-22 By: pwonsell



Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Major Road
- Minor Road
- Watercourse
- Aggregate Site - Active
- Municipal Boundary, Single/Lower Tier
- Waterbody
- Potential Source of Contamination (ERIS)
- Petroleum Well
- Designated Gas Storage Area

Petroleum Pool

- Natural Gas Storage Pool - Active
- Natural Gas Pool - Active
- Natural Gas Pool - Abandoned
- Natural Gas Pool - Suspended
- Oil Pool - Active
- Oil Pool - Abandoned

0 1 2 km

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Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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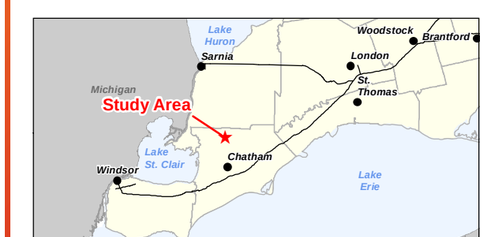

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
6

Title
Aggregates and Petroleum Resources

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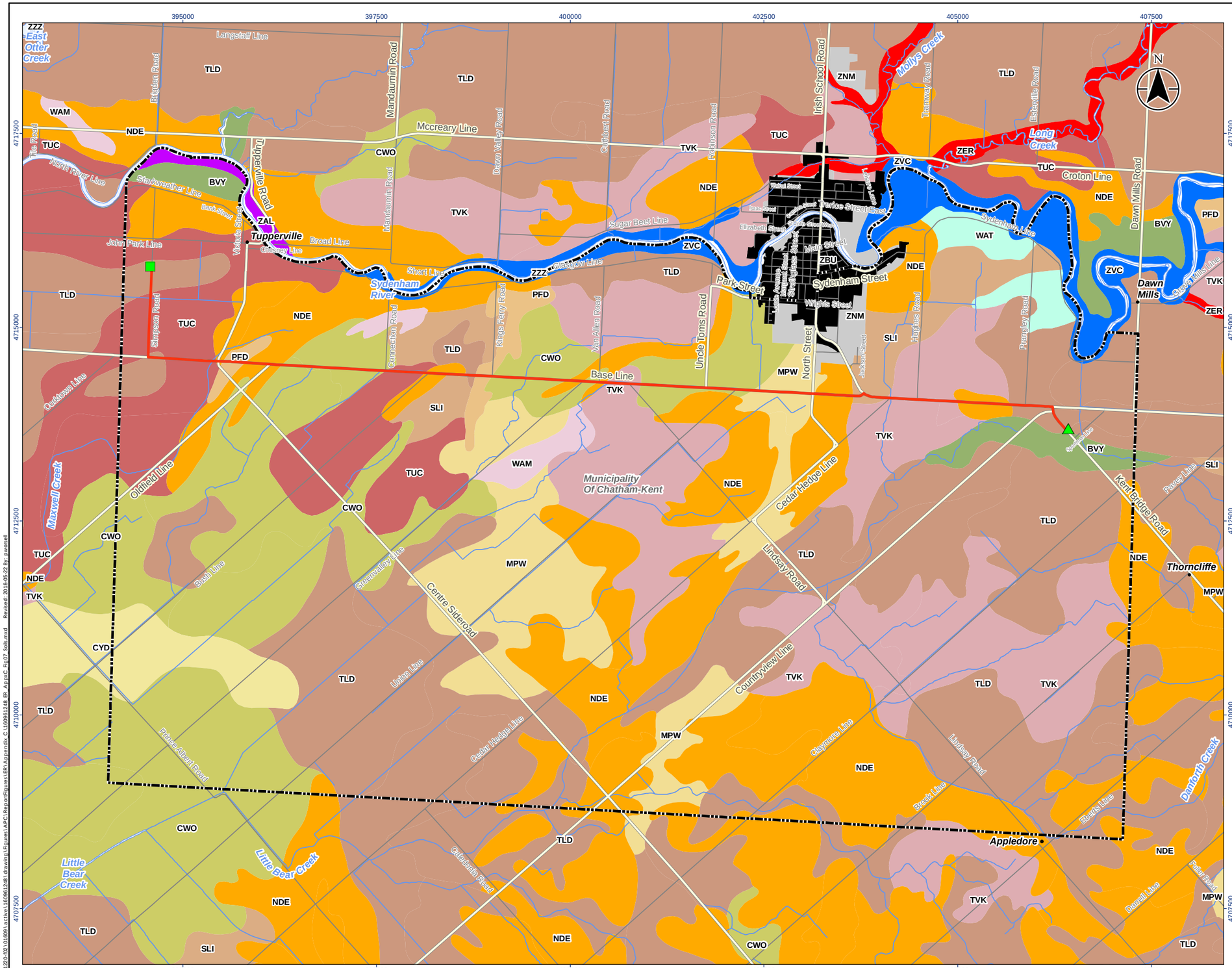

Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody

Soil Types

- BVY - BEVERLY
- CWO - COLWOOD
- CYD - CLYDE
- MPW - MAPLEWOOD
- NDE - NORMANDALE
- PFD - PLAINFIELD
- SLI - ST. WILLIAMS
- TLD - TOLEDO
- TUC - TUSCOLA
- TVK - TAVISTOCK
- WAM - WALSINGHAM
- WAT - WATTFORD
- ZAL - BOTTOM LAND
- ZBU - BUILT UP AREA
- ZER - ERODED CHANNEL
- ZNM - NOT MAPPED
- ZVC - VALLEY COMPLEX

0 1 2 km

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Notes

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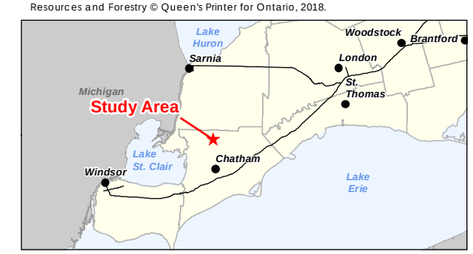

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
7

Title
Soil Types

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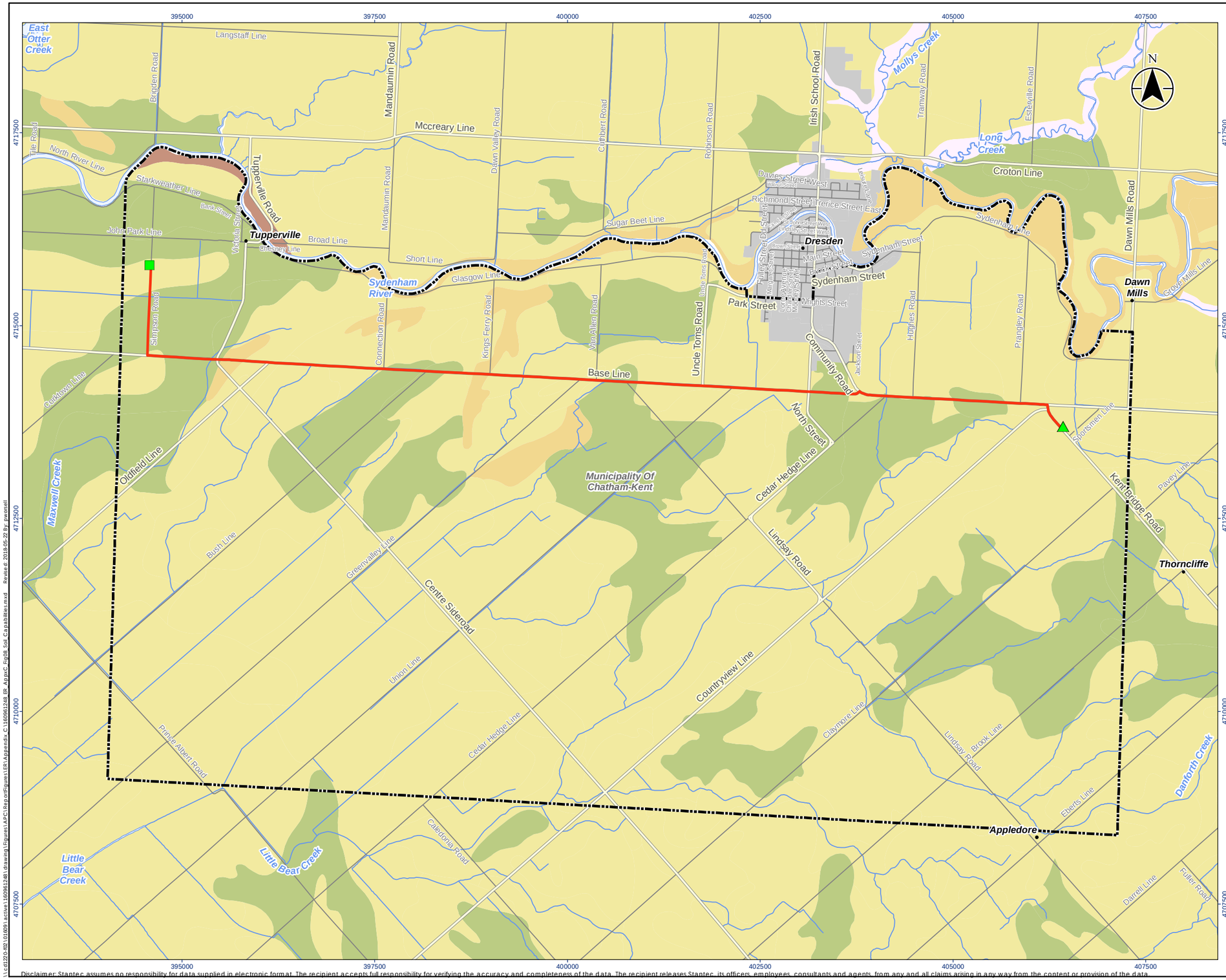

Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody

Soil Capability Classification of Agriculture

- 1: Soils in this class have no significant limitations in use for crops
- 2: Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices
- 3: Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices
- 5: Soils in this class gave very severe limitations that restrict their capability in producing perennial forage crops, and improvement practices are feasible
- 7: Soils in this class have no capacity for arable culture or permanent pasture
- CLI Unavailable

0 1 2 km

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Notes

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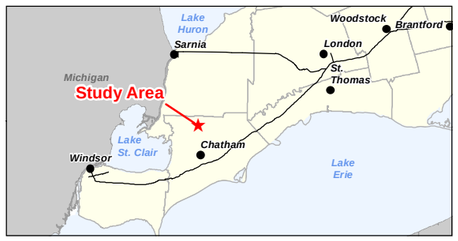

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
8

Title
Soil Capability

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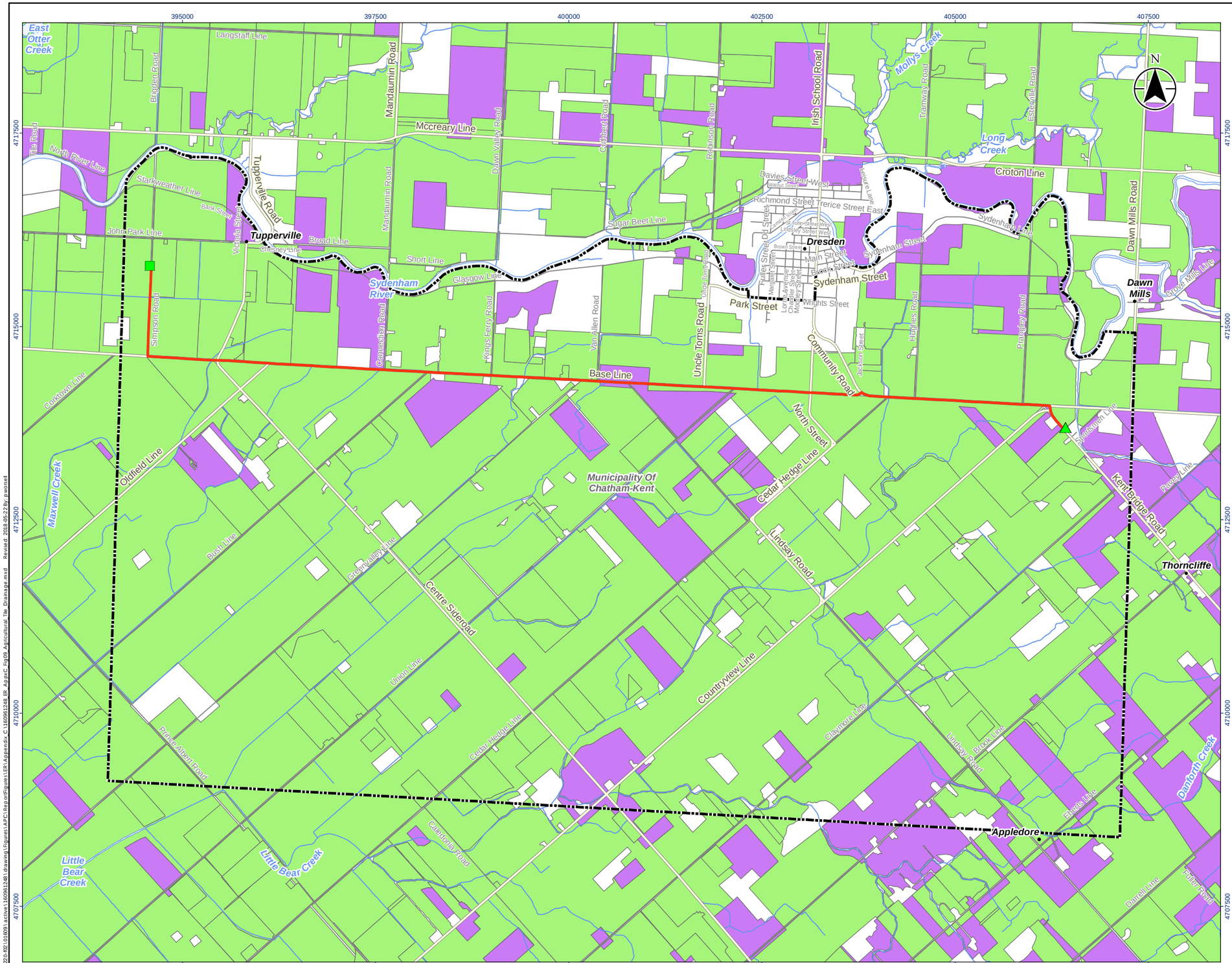

Notes

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Project Location
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Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
9

Title
Agricultural Tile Drainage

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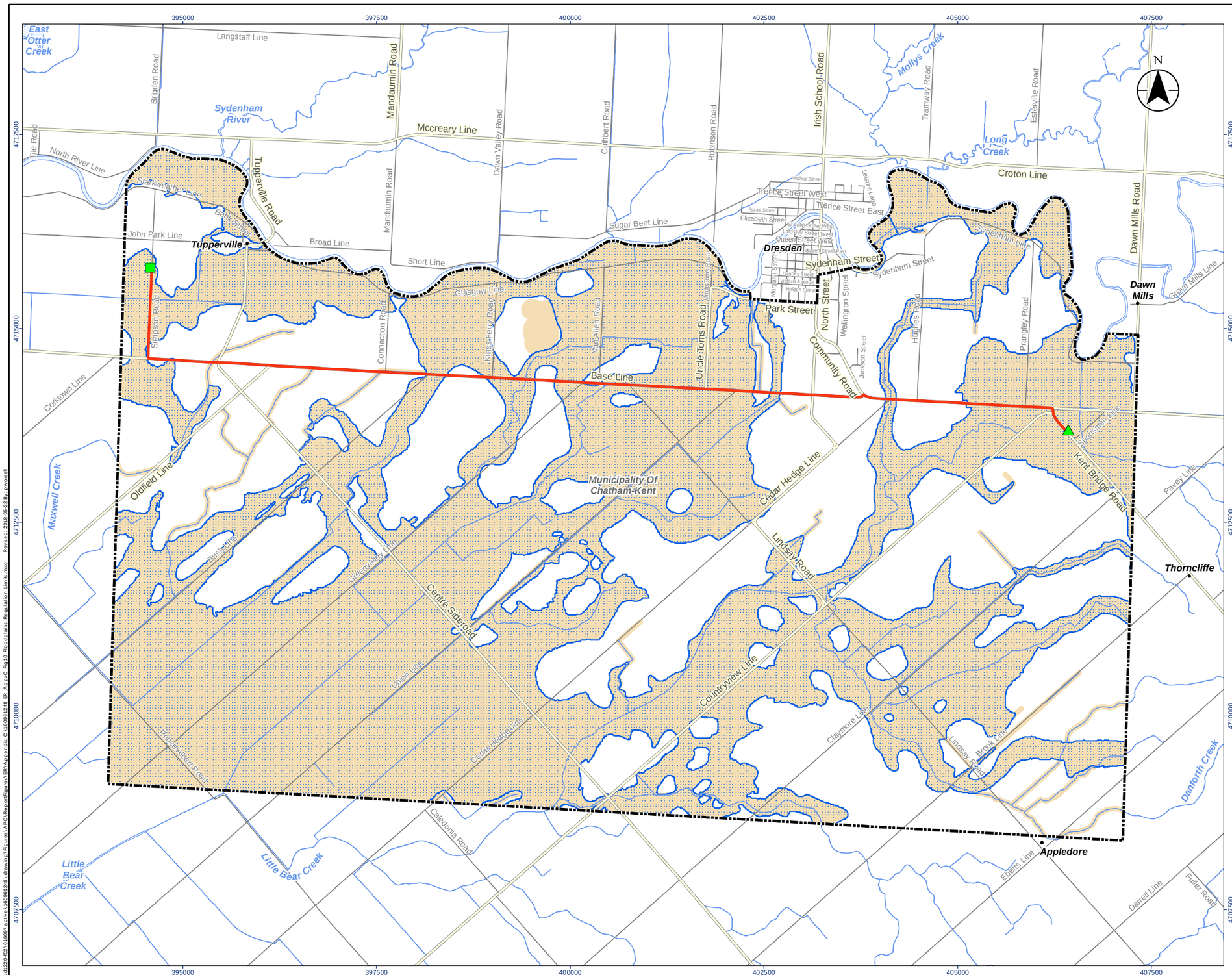

Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Major Road
- Minor Road
- Watercourse
- Floodplain [3]
- Municipal Boundary, Single/Lower Tier
- Regulation Limit [3]
- Waterbody

0 1 2 km

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Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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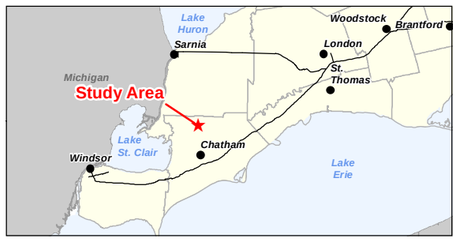
3. Regulation limit and floodplain data received by © St. Clair Region Conservation Authority, 2018. Data received on March 5, 2018.



Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
10

Title
Floodplains and Regulation Limits

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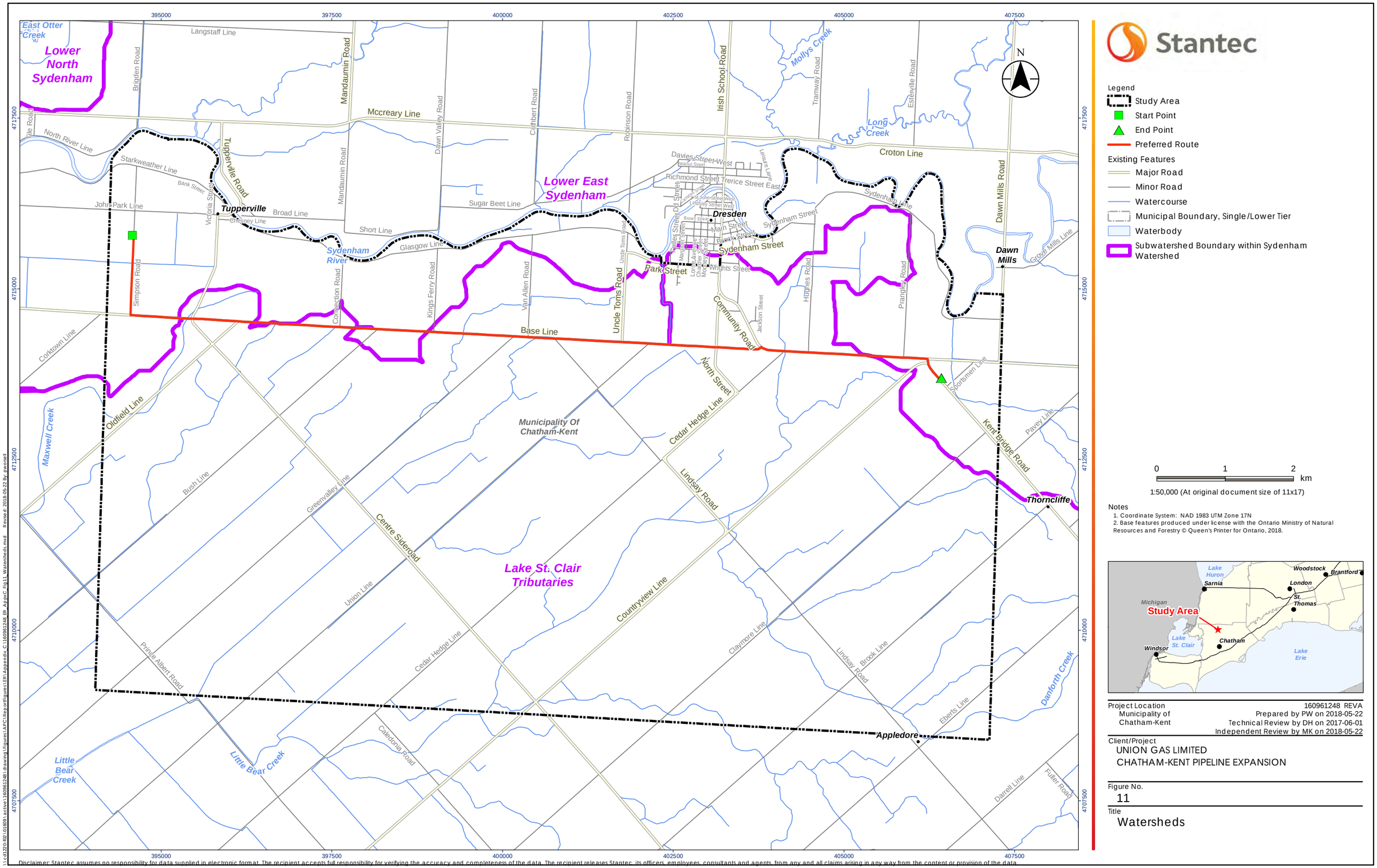

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody
- Subwatershed Boundary within Sydenham Watershed

0 1 2 km

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	Technical Review by DH on 2017-06-01
	Independent Review by MK on 2018-05-22

Client/Project

UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.

11

Title

Watersheds

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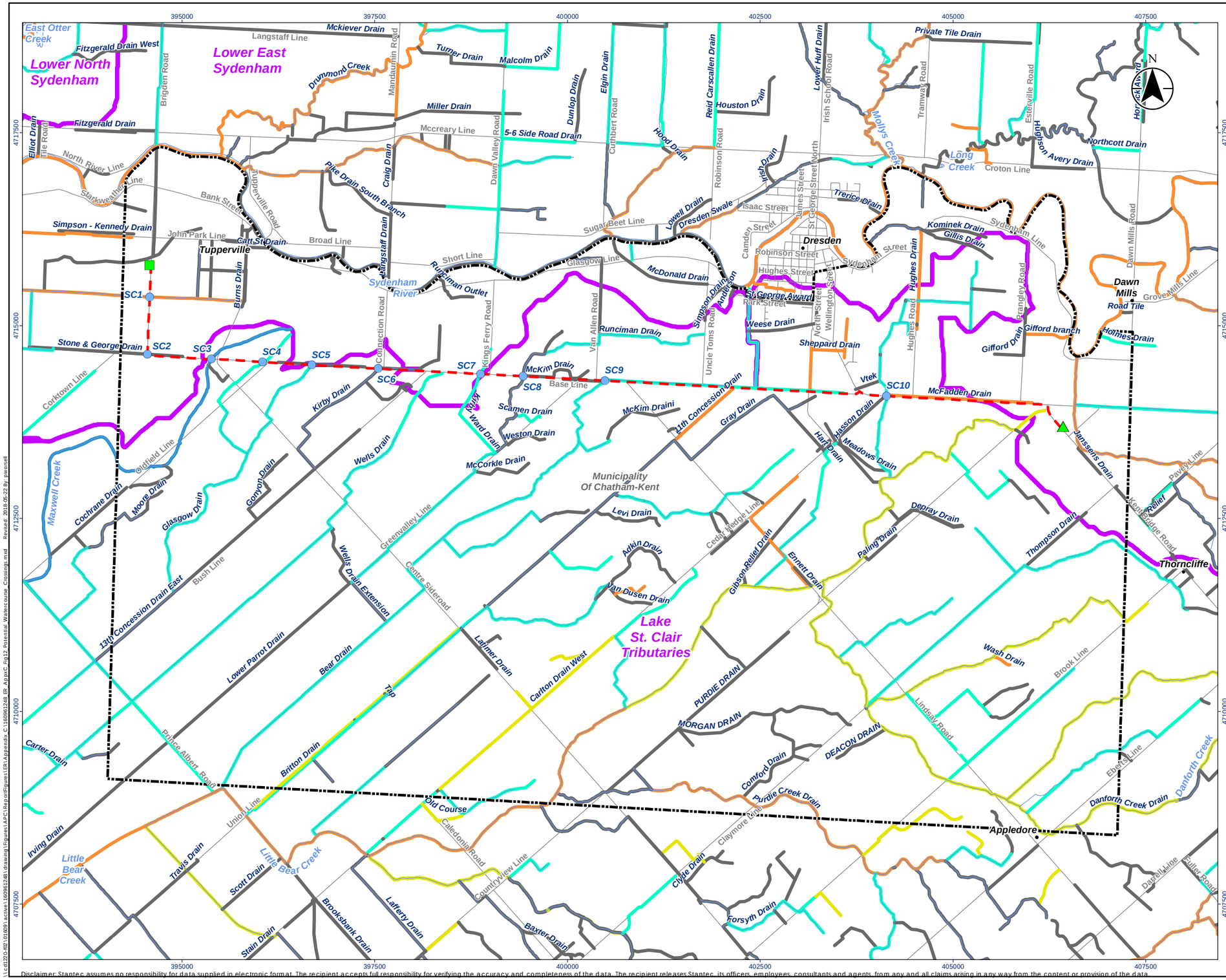

Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Watercourse Crossing
- Roads_lio (Standard) Minor
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Subwatershed Boundary within Sydenham Watershed
- Waterbody

Constructed Drainage - DFO Drain Class

- B
- C
- E
- F
- Not Ranked

0 1 2 km

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Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
12

Title
Potential Watercourse Crossings

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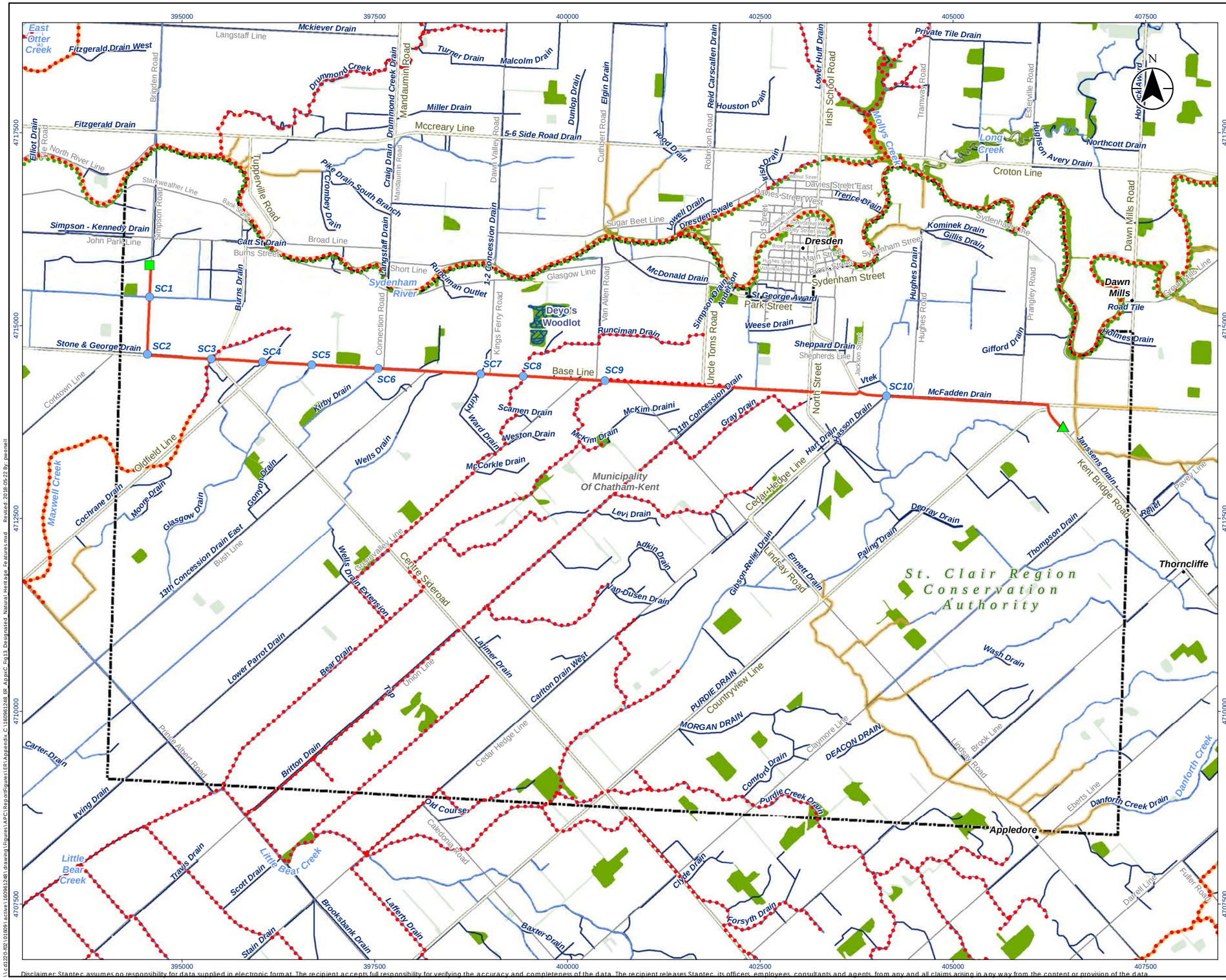

Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Watercourse Crossing
- Major Road
- Minor Road
- Constructed Drain
- DFO Species At Risk (Fish)
- DFO Species At Risk (Mussels)
- Thermal Regime, Warm
- Watercourse
- Conservation Area Administrative Boundary
- Municipal Boundary, Single/Lower Tier
- Waterbody
- Wetland, Provincially Significant
- Significant Woodland [3]
- Woodland

0 1 2 km

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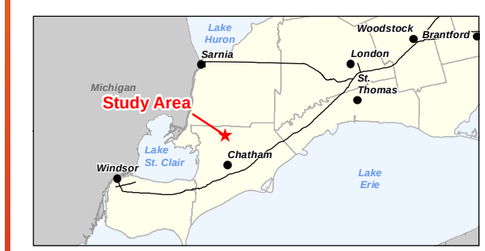
Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Significant woodland data provided from Chatham-Kent Official Plan mapping - Schedule of Natural Heritage and Hazard Features (C10).



Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
13

Title
Designated Natural Heritage Features

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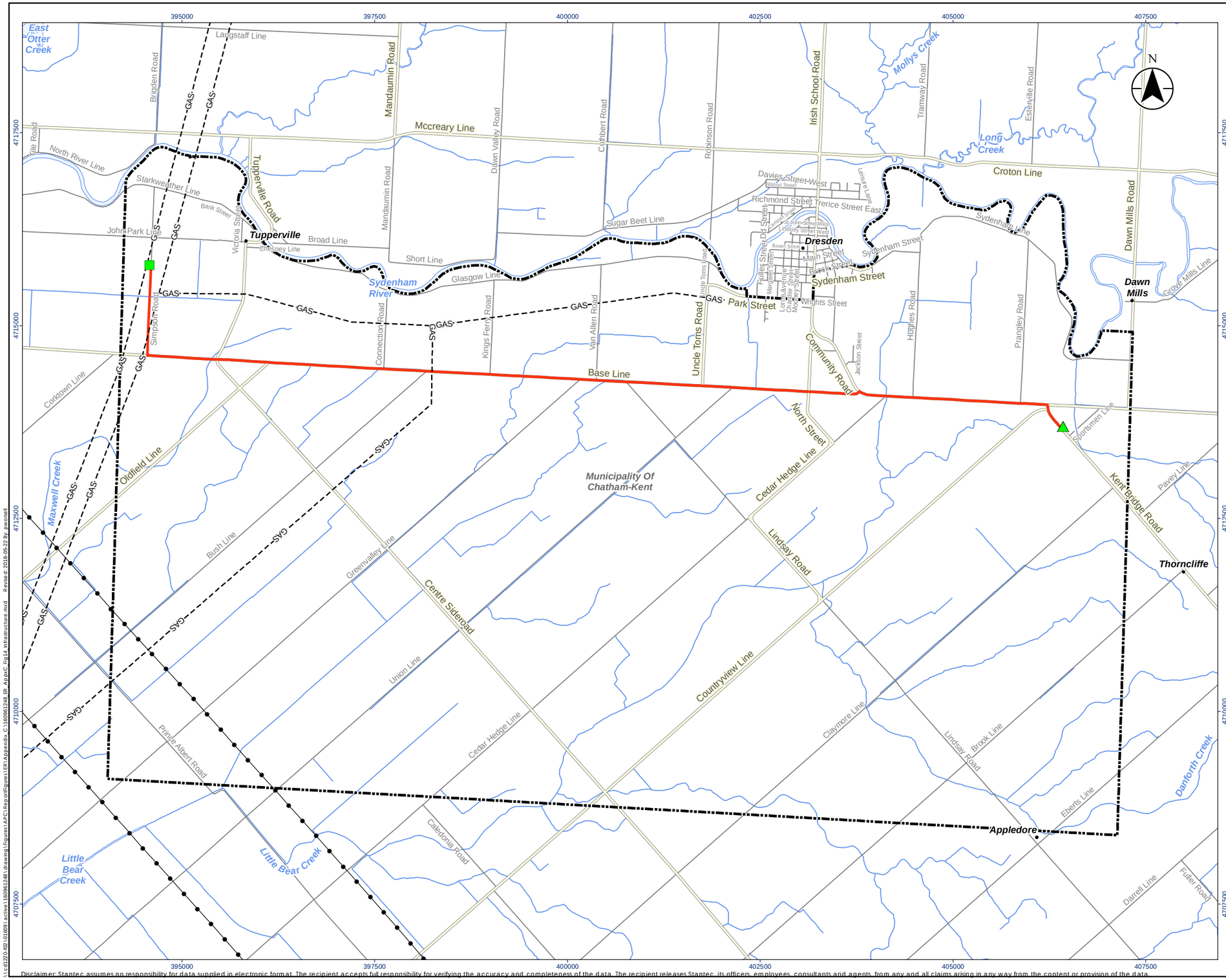

Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018; © Ontario Oil, Gas and Salt Resources Library, 2018.

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
14

Title
Infrastructure

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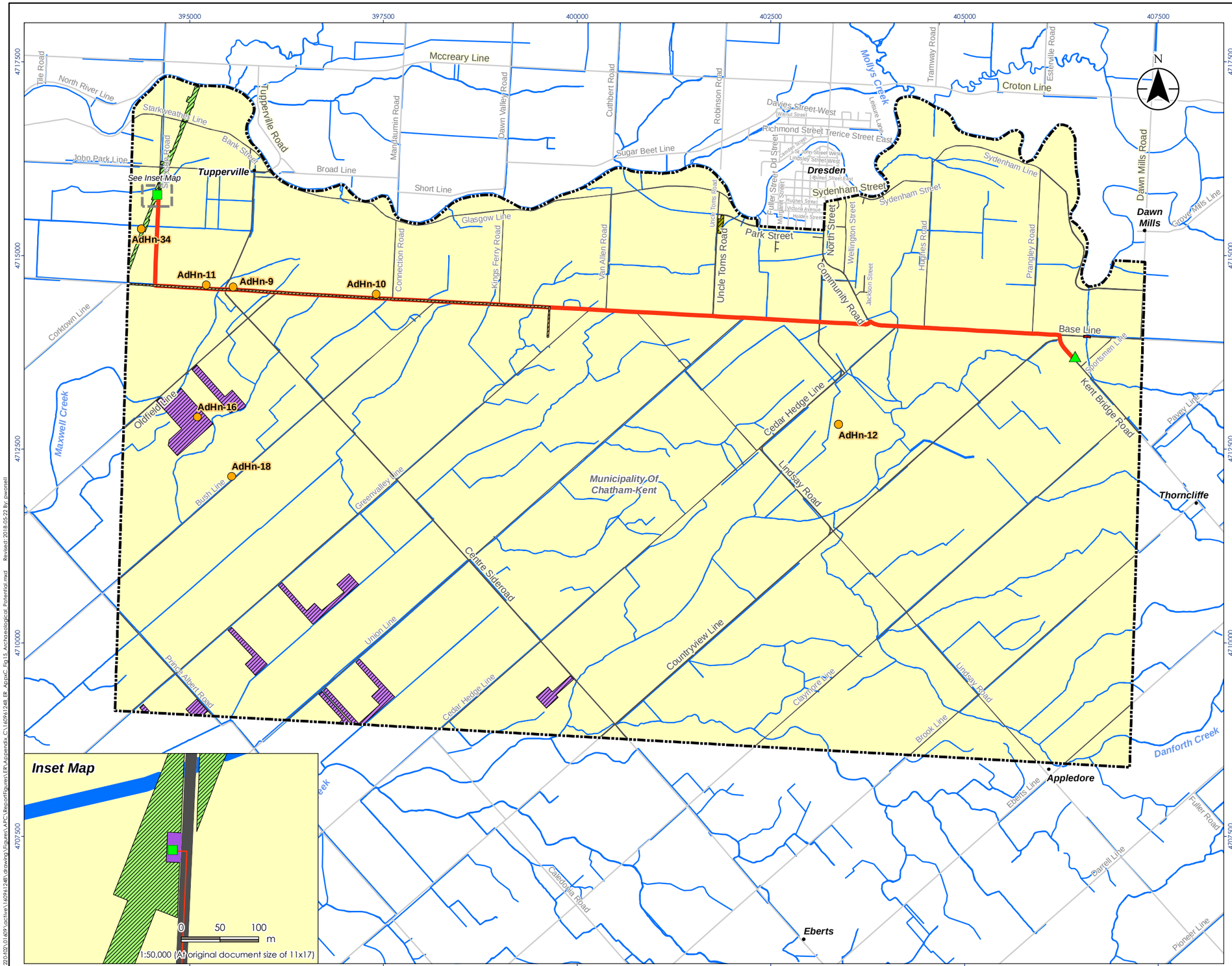
\\cd1220-f02\01609\active\160961248\drawing\figures\APC\ReportFigures\ER\Appendix C\160961248 ER_AppxC_Fig14_Infrastructure.mxd Revised: 2018-05-22 By: pwonsell



Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Known Archaeological Sites with Borden Number (within 1 km of Preferred Route)

Archaeological Potential

- Area of Archaeological Potential - Stage 2 Archaeological Assessment Required
- Municipal Road ROW, May Retain Archaeological Potential – Stage 2 Archaeological Assessment Required
- Existing Union Gas Infrastructure, Low to No Archaeological Potential - No Further Work Required
- Low and Permanently Wet Areas, Low to No Archaeological Potential - No Further Work Required
- Previously Surveyed No Further Work Required (Golder, 2015b)
- Previously Surveyed No Further Work Required (Detritus, 2013)
- Previously Surveyed No Further Work Required (London Museum of Archaeology, 1993; Ontario Heritage Trust, 2007)
- Previously Assessed, No Further Work Required (Stantec, 2017)
- Previously Assessed, No Further Work Required (Alder Heritage Assessments, 1997)

0 1 2 km

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Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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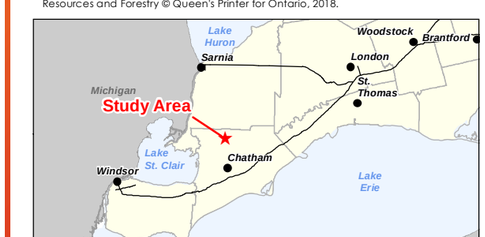

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
15

Title
Archaeological Potential

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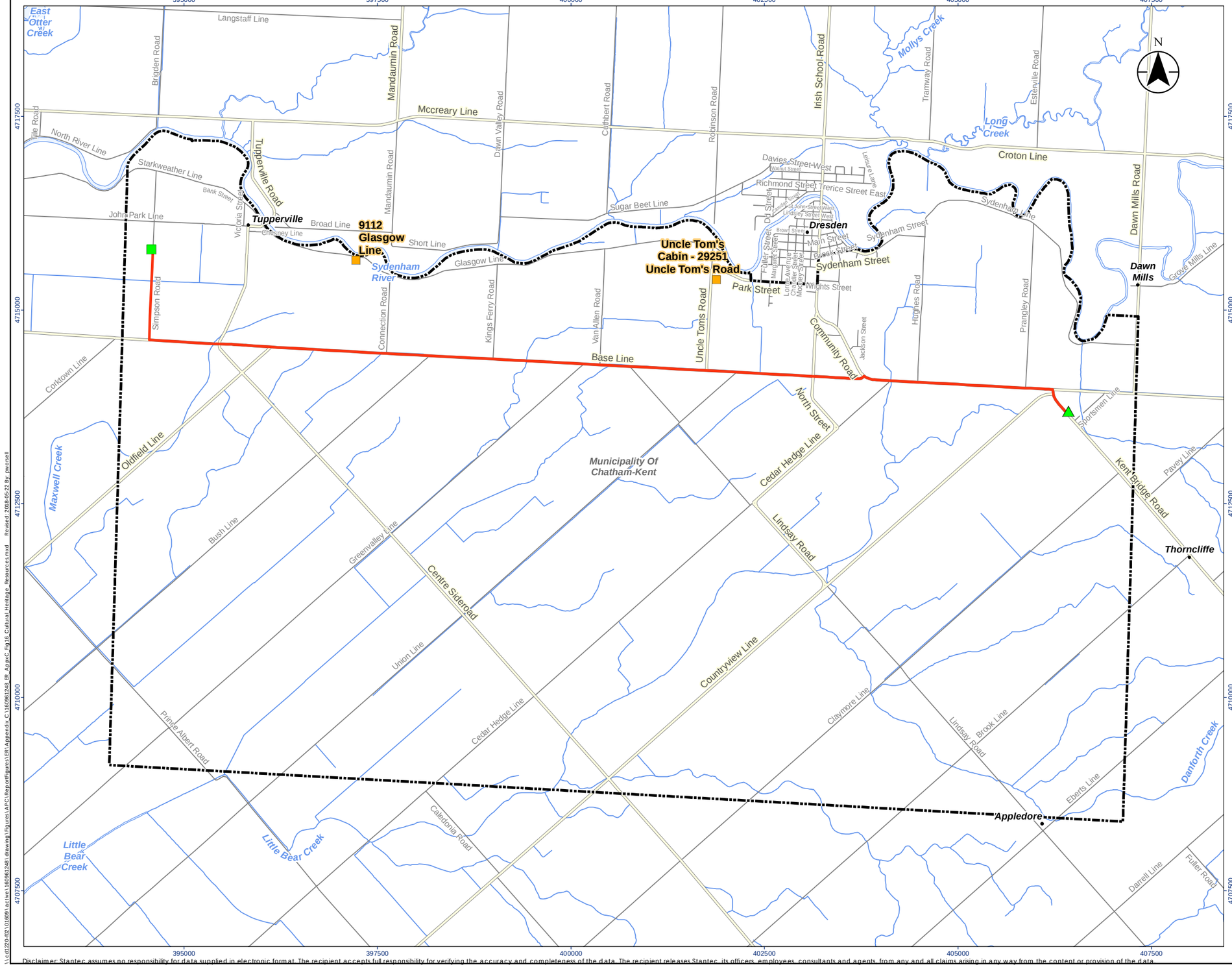

Stantec

Legend

- Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Identified Heritage Resource
- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody

0 1 2 km

1:50,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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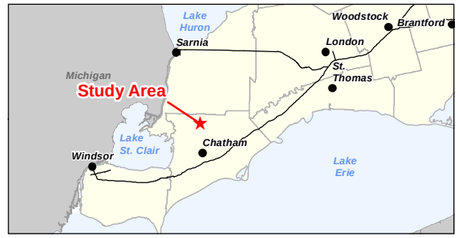

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-22
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-22

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
16

Title
Cultural Heritage Resources

Revised: 2018-05-22 By: pwonsell

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APPENDIX D:
DFO-OGLA/UGL AGREEMENT (2008)

Fisheries
and Oceans, Canada

Ontario Great Lakes Area

Bayfield Institute
867 Lakeshore Road
P.O. Box 5050
Burlington, Ontario
L7R 4A6

Pêches
et Océans, Canada

Secteur de l' Ontario et des Grands Lacs

Institut Bayfield
867, chemin Lakeshore
C.P. 5050
Burlington, Ontario
L7R 4A6

To: All General Managers/CAO's Conservation Authorities, Parks in Ontario and District Managers/Area Managers/Head Office Ontario Ministry of Natural Resources

SUBJECT: Agreement Letter between Union Gas Limited and Fisheries and Oceans Canada – Ontario Great Lakes Area Related to Watercourse Crossings for Pipeline Construction and Maintenance (DFO-OGLA / UGL AGREEMENT 2008)

In 1997 Fisheries and Oceans Canada – Ontario Great Lakes Area (DFO-OGLA) and Union Gas Limited (UGL) established a process for the review and notification of water crossing projects. Under this Agreement, UGL conducts water crossings under a specific set of conditions and mitigation measures without DFO review. DFO-OGLA and UGL have recently met to review and update procedures and guidelines relating to this agreement. The focus of these updates was to include references to the federal *Species at Risk Act* and DFO-OGLA's Operational Statements. A revised Agreement letter dated March 27, 2008 outlines the conditions of this Agreement (see attached).

By adhering to the Agreement Letter and the DFO-OGLA endorsed Sediment and Erosion Control Plans, UGL projects that meet the conditions of the agreement will not require a DFO-OGLA review. Note that DFO-OGLA reserves the right to review this exemption on an annual or as needed basis.

UGL has developed a good relationship with DFO-OGLA by demonstrating an understanding of the process and associated requirements. UGL continues to work with DFO-OGLA, building upon this relationship to further enhance and improve requirements for protection of fish and fish habitat.

Based on the above, we fully support and endorse the existing process for continued implementation and practice.

For further details regarding this agreement please contact me at (905) 336-6285.

Sincerely,

Karen Ralph
Chief, Area Operations
Ontario – Great Lakes Area
Fisheries and Oceans Canada

Copy Ed DeBruyn, Area Director, OGLA
District Managers, OGLA
Doug Schmidt/Brigitte Jones, Union Gas Limited
Jane Tymoshuk/Derrick Beach, OGLA

Canada

Fisheries
and Oceans, Canada

Ontario Great Lakes Area

Bayfield Institute
867 Lakeshore Road
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Burlington, Ontario
L7R 4A6

Pêches
et Océans, Canada

Secteur de l' Ontario et des Grands Lacs

Institut Bayfield
867, chemin Lakeshore
C.P. 5050
Burlington, Ontario
L7R 4A6

Bridgette Jones
Union Gas Limited
P.O. Box 2001
50 Keil Drive North
Chatham, Ontario
N7M 5M1

May 2, 2008

Dear Ms. Jones:

SUBJECT: Agreement Letter between Union Gas Limited and Fisheries and Oceans Canada – Ontario Great Lakes Area Related to Watercourse Crossings for Pipeline Construction and Maintenance (DFO-OGLA / UGL AGREEMENT 2008)

In 1997, Fisheries and Oceans Canada – Ontario Great Lakes Area (DFO-OGLA) and Union Gas Limited (UGL) established a process for the review and notification of water crossing projects. Under this Agreement, UGL conducts water crossings under a specific set of conditions and mitigation measures without DFO review. As a result of our recent meetings, this Agreement letter along with the following represents our updated agreement:

- Attachment A - direction on the compliance with the federal *Species at Risk Act,* and
- Attachment B - sediment and erosion control plans.

This Agreement entitles UGL to implement "dry" or trench less pipeline crossings (including small directional drills) conducted in accordance with the sediment control plans (SCP) contained in Attachment B without submitting formal plans for DFO-FHM's review. For projects that are not covered by the sediment and erosion control plans, UGL will comply with applicable Operation Statements (e.g. directional drilling, beaver dam removal). Please refer to the following website for the latest versions of the Operational Statements (http://www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/on/index_e.htm).

The generic SCP's include:

- "Generic Sediment Control Plan for Dry Flume Water Crossings", dated January, 2008.
- "Generic Sediment Control Plan for Dam and Pump Water Crossings" dated January, 2008.
- "Generic Sediment Control Plan for Temporary Vehicle Crossings" dated January, 2008.

Canada

DFO-OGLA is satisfied that if "dry"/trenchless watercourse crossings are carried out as specified in the generic SCP's, the proposed work is not likely to contravene subsection 35(1) of the *Fisheries Act*, which stipulates that:

"No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat."

DFO-OGLA will continue reviewing projects whenever the harmful alteration, disruption or destruction on fish habitat may be involved or under SARA. This would include, but not necessarily be limited to, the following scenarios:

- Projects that have the potential to contravene SARA must be referred to DFO for review to ensure compliance with SARA. To make this determination, follow the guidance in Attachment A.
- Pipeline crossings employing 'wet' open trench methods require site specific review. This also extends to include works which may impact wetlands and/or other sensitive fish habitat features that may not necessarily be innundated with water at the time of the work. Details of the work and existing conditions will need to be established early in the planning stage to enable DFO-OGLA or a partner agency to make a determination of the potential impacts to fish and fish habitat. An Authorization will be prepared once site specific details of the mitigation and compensation measures are approved by DFO-OGLA.The use of explosives in waters frequented by fish may result in the destruction of fish by means other than fishing. An Authorization, pursuant to Section 32 of the *Fisheries Act*, will be required for watercrossings that require the use of explosives.

If the harmful alteration, disruption or destruction of fish habitat occurs as a result of a change in the generic SCP's, prosecution under subsection 35(1) of the *Fisheries Act* may be initiated.

Please notify DFO-OGLA of all water crossings that apply to this agreement a minimum of 10 days prior to the work using the appropriate notification form.

If you have any questions, please feel free to contact me at (905) 336-6285.

Sincerely,

Karen Ralph,
Chief, Area Operations
Ontario – Great Lakes Area
Fisheries and Oceans Canada

Copy Ed DeBruyn, Area Director, OGLA
District Managers, OGLA
Doug Schmidt, Union Gas Limited
Jane Tymoshuk/Derrick Beach, OGLA

Canada

Attachment A: Guidance on the *Species at Risk Act*

Background

The Species at Risk Act (SARA) was created to prevent wildlife species from becoming extinct. It requires Canada to provide for the recovery of species at risk due to human activity, and to manage species of Special Concern, to prevent them from becoming Endangered or Threatened. The Act covers all wildlife species at risk nationally, their residences and critical habitats, and applies to all lands in Canada. SARA not only prohibits the killing, harming, harassing, capturing or taking of species at risk, but also makes it illegal to destroy their residences and critical habitats.

More specifically, the provisions of SARA:

- set out prohibitions against the killing or harming of a listed species and the destruction of their residences and critical habitats;
- require other federal departments to consider the impact on a listed species, their residences and critical habitats before issuing authorizations for certain activities; and
- provide for effective enforcement measures and significant penalties where needed to serve as a deterrent.

Refer to the SARA Public Registry at http://www.sararegistry.gc.ca/ for a current list of fish and mussel species that are afforded protection under SARA. Since the list of species subject to SARA is revised periodically by the Minister of the Environment in response to annual assessments conducted by COSEWIC, the SARA Public Registry should be checked for the most up-to-date list.

Three federal Ministers are responsible for the administration of SARA:

- The Minister of Fisheries and Oceans is responsible for aquatic species at risk;
- The Minister of Canadian Heritage (through the Parks Canada Agency) is responsible for individuals of species at risk found in national parks, national historic sites or other protected heritage areas;
- The Minister of the Environment is responsible for all other species at risk, and is also responsible for the administration of the Act.

Under SARA, the federal government must produce recovery strategies and action plans for species listed as Endangered or Threatened. Recovery strategies must be completed within one year for Endangered species, and within two years for Threatened species, of being listed under SARA.

The list of species subject to SARA is revised periodically by the Minister of the Environment in response to annual assessments conducted by COSEWIC. For an up-to-date list of wildlife species on each schedule, refer to the SARA Public Registry at http://www.sararegistry.gc.ca/.

Review Process - Aquatic Species at Risk
It will be the responsibility of Union Gas Limited (UGL) to determine whether a project should be referred to DFO for review under SARA. A series of distribution maps will be provided to UGL on an annual basis to be used as a screening tool. UGL will refer to the distribution maps to determine whether there is the potential for aquatic SAR to be present at proposed pipeline crossing sites. A Reference Guide provides further direction on the process to follow for projects proposed within the distribution range of a listed aquatic SAR.

Projects that have the potential to contravene SARA must be referred to DFO for review to ensure compliance with SARA. UGL will refer projects to DFO for review under SARA when it has been determined that Schedule 1 SARA aquatic species are present at the project site and will be potentially impacted by proposed project activities.

For projects that are referred to DFO by UGL, DFO will review works or undertakings, prepare authorizations and issue letters of advice in accordance with the provisions in the SARA, the *Fisheries Act* and CEAA. DFO is responsible for the enforcement of the SARA and protection of federally listed aquatic SAR in Ontario. The review of any proposed projects and/or enforcement activities will take into consideration the protection of SAR, ensuring compliance of the prohibitions of the Act as described in Sections 32, 33 and 58 (see below). These prohibitions only apply to Endangered or Threatened species listed on Schedule 1 of the Act, and to Extirpated species only if a SARA-compliant Recovery Strategy recommends its reintroduction to Ontario.

Since many measures in the SARA are already within the authority of the Minister of Fisheries and Oceans under the *Fisheries Act* (e.g. preventing destruction of fish habitat), the SARA will not replace, but complement, current responsibilities under the *Fisheries Act*.

SARA Permits:
It is the responsibility of UGL to obtain SARA permits when proposed project activities may affect an Extirpated, Endangered or Threatened fish or mussel species on Schedule 1 of the SARA. UGL will refer any proposed projects that may require a SARA permit to DFO for review.

A SARA permit should be obtained prior to the initiation of any the project construction activities when:

- Project activities may cause incidental harm to a SAR, in particular the contravention of any one of the 3 SARA prohibitions (Sections 32, 33 and 58)
- Field surveys are proposed to detect fish or mussel SAR including any monitoring programs for SAR
- Mitigation strategies include either SAR mussel relocations or fish salvage operations

Note: A SARA compliant Authorization may be issued for projects requiring both a *Fisheries Act* Authorization and a SARA permit. This type of Authorization combines the *Fisheries Act* Authorization and SARA permit into one document. The most appropriate approach for approvals will be determined on a case by case basis by the DFO assessor reviewing the file.

Species at Risk Act – Prohibitions

32. *(1) No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species....*

33. *No person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada....*

58. *(1) Subject to this section, no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species—or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada —if*
(a) the critical habitat is on federal land, in the exclusive economic zone of Canada or on the continental shelf of Canada;
(b) the listed species is an aquatic species; or
(c) the listed species is a species of migratory birds protected by the Migratory Birds Convention Act....

Selected References

Fisheries and Oceans Canada, *Species at Risk Act*:
http://www.dfo-mpo.gc.ca/species-especes/home_e.asp (English site)
http://www.dfo-mpo.gc.ca/species-especes/home_f.asp (French site)

Fisheries and Oceans Canada. 2007. Reference Guide for Fish and Mussel Species at Risk Distribution Maps. A Referral Review Tool for Projects Affecting Aquatic Species At Risk.

Species at Risk Act:
SARA Public Registry: http://www.sararegistry.gc.ca/
Environment Canada Species at Risk website: http://www.speciesatrisk.gc.ca/
COSEWIC http://www.cosewic.gc.ca
Habitat Stewardship Program http://www.cws-scf.ec.gc.ca/hsp-pih

Attachment B: Sediment Control Plans

Generic Sediment Control Plan – Dry Flume Crossings

This plan sets out the measures that will be taken by Union Gas Limited (company) and its contractors to control downstream sediment to the lowest level practically achievable during the construction of dry flume type crossings. The conditions and techniques set out on this plan are to be followed unless approved otherwise by the Department of Fisheries and Oceans (DFO).

General Measures

The company must use materials, construction practices, mitigation techniques and monitoring of operations at every water crossing in order to prevent the unauthorized harmful alteration, disruption or destruction of fish habitat or the impairment of water quality. The following requirements apply to any permanent or intermittent waterbody (stream, river, pond) and areas adjacent to it.

* The company will adhere to all permits and approvals of federal and provincial agencies related to watercourse crossings.
* The company will notify the appropriate federal or provincial agencies prior to commencement of a watercourse crossing in accordance with regulatory permit conditions.
* In-stream work will occur during the appropriate time windows for the geographic region and for the fish species present unless otherwise permitted by the appropriate agencies.
* Prior to removal of the low vegetative cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the areal extent of disturbance to the minimum needed for construction and delay grubbing to immediately prior to grading operations.
* All watercourses will require a minimal disturbance zone (MDZ) to be clearly marked with flagging prior to the commencement of clearing activities or any construction activity near the waterbody. This flagging will be set back a minimum of 5m from the waterbody and will be based on site specific conditions. Extra work area required at watercourse crossing will be situated away from the waterbody outside of the minimal disturbance zone (MDZ).
* Materials removed or stockpiled during construction (e.g., excavated soil, backfill material) must be deposited in a manner to ensure sediment does not enter a waterbody. Appropriate erosion and sediment controls (e.g. revegetation, vegetated buffer strips, drainage control, sediment settling devices, and sediment fence or other appropriate mitigation measures) will be installed around spoil or stockpiles, to prevent sediment from stockpile runoff from entering a watercourse.
* All vehicles, machinery and other construction equipment shall not enter the water. There must be no fording of any stream.
* Except during construction of the crossing, the company will not obstruct any watercourse so as to impede the free movement of fish.
* Flow shall be maintained at all times downstream of the watercrossing.
* All exposed soil must be stablized (e.g. graded to a stable slope and erosion control measures implemented) as quickly as possible to prevent erosion.
* The company is to adhere to the Generic Sediment Control Plan For Temporary Vehicle Crossings.
* All required materials (e.g., silt fencing, filter cloth, polyethylene liners, granular material, rip rap, dam materials) and installation equipment (e.g., pipe, flumes, pumps, pump hoses, generators, spares, energy dissipaters) will be on-site and in good working order prior to construction.
* Prior to commencing watercourse crossings, local weather stations will be monitored to determine whether any precipitation is forcasted. In-stream activity will be delayed if flows are in flood stage and until weather conditions are favourable.
* Water intakes used in fish bearing waters will be screened in accordance with the DFO Freshwater Intake Fish Screening Guidelines (1995).
* Fish recovery and transfer will be conducted prior to and during the isolation of flow and in accordance with permit regulations. See detailed construction sequence for timing of fish recovery operations.
* In-stream activities in all watercourses (e.g., trenching, pipe installation, backfilling) will be completed in as short a time as possible to minimize disturbance to water quality, fish and fish habitat.
* In situations where the crossing can be completed in one day, in-stream excavation will begin in the early morning to allow for same day installation.
* Refueling and lubrication of equipment will be conducted in areas that will allow any accidental spill of deleterious substance to be disposed of in an approved location before it reaches any waterbody. Appropriate spill prevention kits shall be readily available on site.
* The area around water crossings is to be regularly monitored and if erosion problems develop, immediate action is to be taken with appropriate treatments and completed as quickly as possible. Accumulated sediment is to be removed regularly.
* Revegetation must be completed as quickly as possible. Revegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
* The company will be held responsible for implementation of this plan.
* All use of silt fence, rock check dams and dewatering traps shall be constructed/installed in accordance to the most up to date company specifications and drawings. Where these mitigation measures are not sufficient to prevent sediment from entering the waterbody, additional mitigation measures will be implemented to prevent sediment from entering the waterbody.

Contingency Plan

If unforseen events (e.g., bedrock in trench, flume washout) cause the strategies set out in this plan to be insufficient or inappropriate to meet the objective, The company is expected to respond in a timely manner with all reasonable measures consistent with safety, to prevent, counteract or remedy any effects on fish or fish habitat that may result. DFO is to be notified as soon as practical.

Spill reporting procedures established by MOE shall be used to report any unexpected discharge of silt or sediment or other deleterious substance at the water crossing. The spill shall also be reported to the DFO as soon as possible in these circumstances.

If DFO determines that long term damage to fish habitat has occurred due to failure of this plan to control sediment, a restoration plan will be developed by the company, in consultation with and approval from DFO for implementation by the company.

Flume Sizing

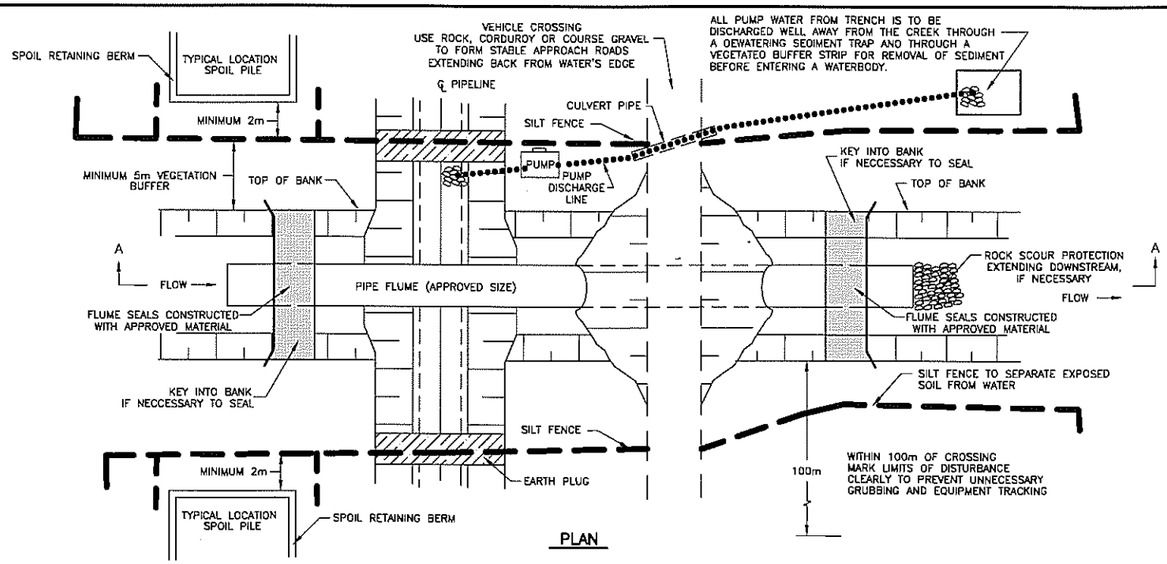
As a general guide, the flume method will be applied to streams where the expected maximum discharge of the watercourse exceeds 1.0 cubic metre/second. A combination of pumps and flumes may be required to bypass stream flow and to control water entrained within the isolated area. Specific methods proposed for each stream crossing will also be influenced by site specific conditions such as channel configuration, bank configuration and flow rates.

Flumes will be sized initially based on engineering hydrologic calculations. These theoretical sizes will be used as a guide, for confirmation in the field between the company and DFO.

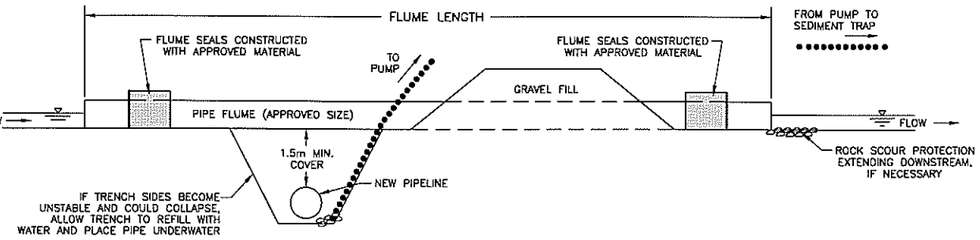
The capacity of the flumes will be sized to handle 150% of the anticipated flow.

Flumes in place for less than 2 weeks may have their size selected by the company based on actual measured flow in the creek at the time of installation plus an additional 50% buffer.

Flume sizes may also be selected to be the same as nearby culverts that have been in place for many years and have performed satisfactorily.



PLAN



SECTION A–A

Detailed Construction Sequence – Dry Flume Crossings

In general terms, the following sequence of construction and mitigation measures will be followed at all "dry flume" type water crossings.

1. Mark out and maintain limits of authorized work areas with fencing or flagging tape to avoid unnecessary disturbance of vegetation. Ensure equipment operators working on the crossing have been briefed about this plan and the measures needed to protect water quality. Install prework sediment control measures, including silt fences and measures to contain excavated spoil and backfill. All necessary equipment and materials to build the flume must be on site or readily available prior to commencing in-water construction. Pipe shall be strung, welded and coated ready for installation prior to watercourse trenching.
2. Install flumes equal to or larger than the diameter determined by the methods described above. Flume length is to be identified in the permit application. Flume is to set 10 percent of diameter below streambed level where soil conditions permit (otherwise installed at stream grade and slope). Place impervious dams at each end of the flume, upstream first then downstream. Alternative dam materials include coarse gravel with rip rap protection, peastone bags, steel plate and rockfill. During placement, install an impervious membrane, if necessary, to prevent leakage. Dams may need keying into the bank and streambed. Once area is isolated, conduct fish recovery and transfer operations and dewater the area between the dams. All pump water is to be discharged well away from the creek and through a sediment trap for filtering of solid material before entering the creek. Pump discharge lines shall be installed to keep pumped water from coming into contact with soil on the construction site.
3. Excavate trench through plugs and under flume, then dewater. Work area dewatering will be filtered to remove suspended solids. Lower in pipe by passing under flume and backfill immediately. The top 300 mm of trench backfill is to be clean rock, cobble material or native streambed material. The Company is to use granular backfill if the native material is not suitable. In this case, the excavated material is to be moved back and deposited behind sediment fences. Any excess material is to be disposed of above the high water mark in an approved location and stabilized to prevent reentry into the waterbody. Work is to be completed as quickly as possible.
4. Flumes shall be removed as quickly as possible, when no longer required for pipe laying or for road access, in the following manner: remove the vehicle crossing ramp; surplus gravel is to be removed from the crossing area to an approved location. Creek banks are to be restored to a stable angle and protected with erosion resistant material compatible with flow velocity (e.g., coarse gravel, rip rap or erosion control matting) to the maximum extent possible before removing the dams. If rip rap material contains fines, the completed face is to be washed off and the turbid water pumped to land. Then remove downstream dam; remove upstream dam; remove flume; complete bank trimming and erosion protection. If pea stone bags are used for the dams, place and remove by hand to avoid equipment breaking bags.
5. Restore, stabilize and reclaim bed and banks of waterbody to preconstruction profiles and protected with erosion resistant material compatible with flow velocity (e.g., "do not use erosion control matting in the bankfull channel" coarse gravel or rip rap) to the maximum extent possible between dams. If rip rap material contains fines, the completed face is to be washed off and the turbid water pumped to the dewatering sediment trap. All construction material (e.g. dams, rip rap, spilled pea gravel from pea stone bags) not required to return the waterbody to preconstruction condition shall be removed from the site and stablized above the high water mark in an approved location. Removal of all materials will be done in a manner that will not introduce sediment to the waterbody.
6. Site stabilization, which includes control of stormwater drainage using a combination of methods such as silt fences, erosion blankets, diversion berms and check dams etc., is to be completed within 10 days of the removal of the flume. If stabilization is delayed, short term erosion control measures shall be used to prevent sediment entering the water. Material accumulated at silt fences is to be removed or stabilized in place. Silt fences are to be removed when the site is permanently stablized.
7. Vegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
8. If post-construction monitoring reveals erosion problems, remedial work is to be undertaken as quickly as possible.

NOTES

Union Gas is responsible for implementation of appropriate sediment and erosion control to mitigate impacts to fish and fish habitat. Fisheries and Oceans Canada, Ontario-Great Lakes Area has reviewed Union Gas drawing, "GENERIC SEDIMENT CONTROL PLAN DRY FLUME WATER CROSSINGS" dated January 2008, and endorses its use as a guideline for implementation of erosion and sediment measures.

For more information on this plan, please contact:
Doug Schmidt,
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PROJECT
UNION GAS LIMITED
CONSTRUCTION PROGRAM

LOCATION
ALL DRY FLUME WATER CROSSINGS IN ONTARIO

DRAWING TITLE
GENERIC SEDIMENT CONTROL PLAN
DRY FLUME WATER CROSSINGS

SCALE	NTS	DATE	JAN. 1/08
FILE No.		PROJECT NO	
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Generic Sediment Control Plan – Dam & Pump Crossing

This plan sets out the measures that will be taken by Union Gas Limited (company) and its contractors to control downstream sediment to the lowest level practically achievable during the construction of dam and pump type crossings. The conditions and techniques set out on this plan are to be followed unless approved otherwise by the Department of Fisheries and Oceans (DFO).

General Measures

The company must use materials, construction practices, mitigation techniques and monitoring of operations at every water crossing in order to prevent the unauthorized harmful alteration, disruption or destruction of fish habitat or the impairment of water quality. The following requirements apply to any permanent or intermittent waterbody (stream, river, pond) and areas adjacent to it.

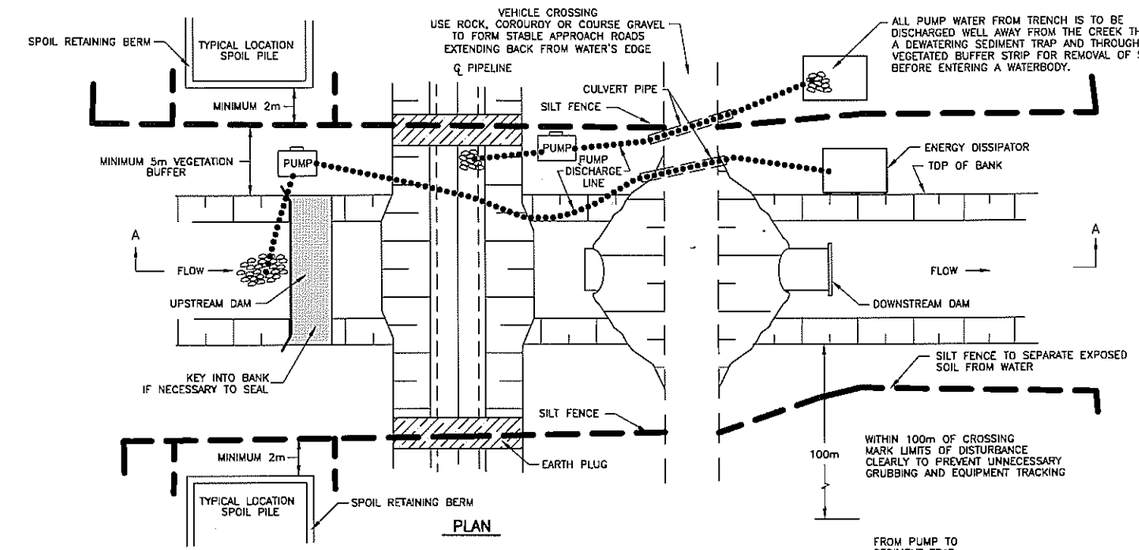
* The company will adhere to all permits and approvals of federal and provincial agencies related to watercourse crossings.
* The company will notify the appropriate federal or provincial agencies prior to commencement of a watercourse crossing in accordance with regulatory permit conditions.
* In-stream work will occur during the appropriate time windows for the geographic region and for the fish species present unless otherwise permitted by the appropriate agencies.
* Prior to removal of the low vegetative cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the areal extent of disturbance to the minimum needed for construction and delay grubbing to immediately prior to grading operations.
* All watercourses will require a minimal disturbance zone (MDZ) to be clearly marked with flagging prior to the commencement of clearing activities or any construction activity near the waterbody. This flagging will be set back a minimum of 5m from the waterbody and will be based on site specific conditions. Extra work area required at watercourse crossing will be situated away from the waterbody outside of the minimal disturbance zone (MDZ).
* Materials removed or stockpiled during construction (e.g., excavated soil, backfill material) must be deposited in a manner to ensure sediment does not enter a waterbody. Appropriate erosion and sediment controls (e.g. revegetation, vegetated buffer strips, drainage control, sediment settling devices, and sediment fence or other appropriate mitigation measures) will be installed around spoil or stockpiles, to prevent sediment from stockpile runoff from entering a watercourse.
* All vehicles, machinery and other construction equipment shall not enter the water. There must be no fording of any stream.
* Except during construction of the crossing, the company will not obstruct any watercourse so as to impede the free movement of fish.
* Flow shall be maintained at all times downstream of the watercrossing.
* All exposed soil must be stablized (e.g. graded to a stable slope and erosion control measures implemented) as quickly as possible to prevent erosion.
* The company is to adhere to the Generic Sediment Control Plan For Temporary Vehicle Crossings.
* All required materials (e.g., silt fencing, filter cloth, polyethylene liners, granular material, rip rap, dam materials) and installation equipment (e.g., pipe, flumes, pumps, pump hoses, generators, spares, energy dissipaters) will be on-site and in good working order prior to construction.
* Prior to commencing watercourse crossings, local weather stations will be monitored to determine whether any precipitation is forcasted. In-stream activity will be delayed if flows are in flood stage and until weather conditions are favourable.
* If there is any flow in the creek, the company is to install pumps to maintain streamflow around the blocked off section of channel. An energy dissipator is to be built to accept pump discharge and prevent streambed or streambank erosion.
* Adequate pump capacity will be on site to handle anticipated water flows and any potential increases in flow during the construction period. Backup pumps with adequate capacity to handle 100% of the downstream flow must be on site and ready for immediate replacement, should the primary operating pump(s) fail.
* Water intakes used in fish bearing waters will be screened in accordance with the DFO Freshwater Intake Fish Screening Guidelines (1995).
* Fish recovery and transfer will be conducted prior to and during the isolation of flow and in accordance with permit regulations. See detailed construction sequence for timing of fish recovery operations.
* In-stream activities in all watercourses (e.g., trenching, pipe installation, backfilling) will be completed in as short a time as possible to minimize disturbance to water quality, fish and fish habitat.
* In situations where the crossing can be completed in one day, in-stream excavation will begin in the early morning to allow for some day installation.
* Refueling and lubrication of equipment will be conducted in areas that will allow any accidental spill of deleterious substance to be disposed of in an approved location before it reaches any waterbody. Appropriate spill prevention kits shall be readily available on site.
* The area around water crossings is to be regularly monitored and if erosion problems develop, immediate action is to be taken with appropriate treatments and completed as quickly as possible. Accumulated sediment is to be removed regularly.
* Revegetation must be completed as quickly as possible. Revegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
* The company will be held responsible for implementation of this plan.
* All use of silt fence, rock check dams and dewatering traps shall be constructed/installed in accordance to the most up to date company specifications and drawings. Where these mitigation measures are not sufficient to prevent sediment from entering the waterbody, additional mitigation measures will be implemented to prevent sediment from entering the waterbody.

Contingency Plan

If unforseen events (e.g., bedrock in trench, dam washout) cause the strategies set out in this plan to be insufficient or inappropriate to meet the objective, the company is expected to respond in a timely manner with all reasonable measures consistent with safety, to prevent, counteract or remedy any effects on fish or fish habitat that may result. DFO is to be notified as soon as practical.

Spill reporting procedures established by MOE shall be used to report any unexpected discharge of silt or sediment or other deleterious substance at the water crossing. The spill shall also be reported to the DFO as soon as possible in these circumstances.

If DFO determines that long term damage to fish habitat has occurred due to failure of this plan to control sediment, a restoration plan will be developed by the company, in consultation with and approval from DFO for implementation by the company.



Detailed Construction Sequence – Dam and Pump Crossings

In general terms, the following sequence of construction and mitigation measures will be followed at all "dam and pump" type water crossings.

1. Mark out and maintain limits of authorized work areas with fencing or flagging tape to avoid unnecessary disturbance of vegetation. Ensure equipment operators working on the crossing have been briefed about this plan and the measures needed to protect water quality. Install pre-work sediment control measures, including silt fences and measures to contain excavated spoil and backfill. All necessary equipment and materials to build the dams and to pump water must be on site or readily available prior to commencing in-water construction. Pipe shall be strung, welded and coated ready for installation prior to watercourse trenching.
2. Install pumps in natural pool upstream of the excavation. Excavate temporary sump within right-of-way if no natural pool exists. Check pump operation to equalize flow and ensure water intakes used in fish bearing waters are screened in accordance with DFO guidelines. Rip rap, stilling wells, filter cloth, gravel filters or other mitigation measures will be used at the upstream inlet of the pump to prevent suspension of sediment from pumping when necessary. Rip rap and rock check dams will be used when necessary to prevent scouring and erosion at the pump outlet. Pump discharge lines shall be installed to keep pumped water from coming into contact with soil on the construction site.
3. Dams are to be made of steel plate, inflatable rubber dam (aquadam), peastone bags, cobbles, well graded coarse gravel fill or rock fill and constructed so that sediment is not introduced to the waterbody. An impervious membrane is to be incorporated into the dam if necessary to control seepage flow. Dams may need keying into the banks and streambed. Install downstream dam only if needed to keep the trench area dry. Dewater the area between dams and for fish bearing streams, conduct fish salvage operations. All pump water is to be discharged well away from the creek and through a dewatering sediment trap for removal of sediment before entering the waterbody.
4. Excavate trench through plugs and streambed as quickly as possible, re-positioning discharge hose as necessary. Lower the pipe in the trench and backfill immediately. During this operation, try to maintain pumping as much as possible. The top 300 mm of trench backfill is to be clean rock, cobble material or native streambed material. The company is to use granular backfill if the native material is not suitable. Any excess material is to be disposed of above the high water mark in an approved location and stabilized to prevent reentry into the waterbody. Work is to be completed as quickly as possible.
5. Restore, stabilize and reclaim bed and banks of waterbody to preconstruction profiles and protected with erosion resistant material compatible with flow velocity (e.g., "do not use erosion control matting in the bankfull channel" coarse gravel or rip rap) to the maximum extent possible between dams. If rip rap material contains fines, the completed face is to be washed off and the turbid water pumped to the dewatering sediment trap. All construction material (e.g. dams, rip rap, spilled pea gravel from pea stone bags) not required to return the waterbody to preconstruction condition shall be removed from the site and stablized above the high water mark in an approved location. Removal of all materials will be done in a manner that will not introduce sediment to the waterbody. The downstream dam shall be removed first. Keep pump running until normal flow is resumed. Complete bank trimming and erosion protection. If pea stone bags are used for the dams, place and remove by hand to avoid equipment breaking bags.
6. Site stabilization, which includes control of stormwater drainage using combinations of silt fences, erosion blankets, diversion berms and check dams etc., is to be completed within 10 days of trench backfilling. If stabilization is delayed, short term erosion control measures shall be used to prevent sediment entering the water. Material accumulated at silt fences is to be removed or stabilized in place. Silt fences are to be removed when the site is permanently stabilized.
7. Vegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.
8. If post-construction monitoring reveals erosion problems, remedial work is to be undertaken as quickly as possible.

NOTES

Union Gas is responsible for implementation of appropriate sediment and erosion control to mitigate impacts to fish and fish habitat. Fisheries and Oceans Canada, Ontario-Great Lakes Area has reviewed Union Gas drawing, "GENERIC SEDIMENT CONTROL PLAN DAM AND PUMP WATER CROSSINGS" dated January 2008, and endorses its use as a guideline for implementation of erosion and sediment measures.

For more information on this plan, please contact:
Doug Schmidt,
Principal Environmental Planner,
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1-800-571-8446, ext. 2895

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PROJECT
UNION GAS LIMITED
CONSTRUCTION PROGRAM

LOCATION
ALL DAM AND PUMP WATER CROSSINGS IN ONTARIO

DRAWING TITLE
GENERIC SEDIMENT CONTROL PLAN DAM AND PUMP WATER CROSSINGS

SCALE NTS	DATE JAN. 1/08
FILE No.	PROJECT NO

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Generic Sediment Control Plan — Vehicle Crossings

This plan sets out the measures that will be taken by Union Gas Limited (company) and its contractors to control downstream sediment to the lowest level practically achievable during the construction, use and removal of temporary vehicle water crossing at streams, rivers and ponds. The conditions and techniques set out on this plan are to be followed unless approved otherwise by the Department of Fisheries and Oceans (DFO).

General Measures

The company must use materials, construction practices, mitigation techniques and monitoring of operations at every water crossing in order to prevent the unauthorized harmful alteration, disruption or destruction of fish habitat or the impairment of water quality. Vehicle crossings typically include temporary bridges such as wooden mats (swamp mats), portable bridges and culvert/grade fill ramps. The following requirements apply to any waterbody (stream, river, pond) and areas adjacent to it.

* Temporary vehicle access to be in place for less than four seasons and no work shall occur outside of timing windows, unless prior approval is obtained from the permitting agency. If temporary vehicle access is to stay in place outside of the in-water timing windows, then appropriate fish passage will be provided.
* Use existing vehicle access accross watercourses wherever possible.
* Prior to removal of the low vegetative cover, effective mitigation techniques for erosion and sediment control must be in place to protect water quality. Limit the areal extent of disturbance to the minimum needed for construction and delay grubbing to immediately prior to grading operations.
* Prior to commencing the installation of temporary vehicle crossings, local weather stations will be monitored to determine whether any precipitation is forcasted. If practical work will be delayed until weather conditions are favourable and if flows are in flood stage. If necessary to proceed with work under unfavourable conditions, the company will exercise due diligence.
* Vehicle crossing structures capable of handling anticipated high water flows during the construction period will be used. See guidelines below on sizing of water openings.
* Coarse cobbles, sandbags, geotextile liners and/or curb stringers to protect culvert and ramp approach fills from erosion and to prevent sedimentation of a watercourse will be used.
* On the approaches to vehicle crossing structures, road ditches constructed for drainage control will incorporate the necessary erosion and sedimentation control measures (e.g., silt fence, check dams) to prevent sediment from entering the watercourse.
* Except during construction of the crossing, the company will not obstruct any watercourse so as to impede the free movement of water and fish.
* All exposed mineral soil must be graded to a stable slope and treated as quickly as possible to prevent erosion and sediment from entering the water.
* All temporary vehicle crossing structures will be removed upon completion of construction. Banks and approaches will be restored and stabilized immediately upon removal of a vehicle crossing structure.
* The area around water crossings is to be regularly monitored and if erosion problems develop, immediate action is to be taken with appropriate treatments and completed as quickly as possible. Accumulated sediment is to be removed regularly from sediment control mitigations.
* Equipment fording will only be allowed with approval from the applicable government agencies. Fording will only be considered if:
  - The fording site does not support known critical aquatic habitat, such as spawning gravels;
  - The fording does not take place during fish spawning, incubation or migration periods;
  - The work site cannot be accessed from the opposite side of the watercourse to avoid fording activities;
  - The fording site has low profile and gradual banks which will not require grading to support vehicle traffic;
  - The fording site has relatively shallow water depths (less than 1m) at time of use;
  - The fording site has coarse substrate which will support vehicle travel without creating erosion and sedimentation;
  - Run-off from the approach slopes to the ford can be effectively controlled to prevent sediment introductions to the stream.
  - The number of crossings of the fording should be limited to a one-time event (over and back).
  - Boundaries of the fording site will be marked on both sides of the crossing to confine all vehicle traffic to the ford.
  - Fords will be aligned at right angles to the channel flow wherever possible to minimize instream travel.
  - Excess soil will be removed from vehicles before fording. In addition, all vehicles using the ford will be in good working order and checked to ensure no fuel, hydraulic fluid or lubricating fluid leaks are present.
  - Bed and banks of ford sites will be restored when no longer needed.
* For additional information refer to the Fisheries and Oceans Operational Statement-Clear Span Bridges. If the installation of a clean span bridge can meet all the conditions as stated in the Operational Statement, DFO review is not necessary.
* The company will be held responsible for implementation of this plan.

Sizing of Water Opening

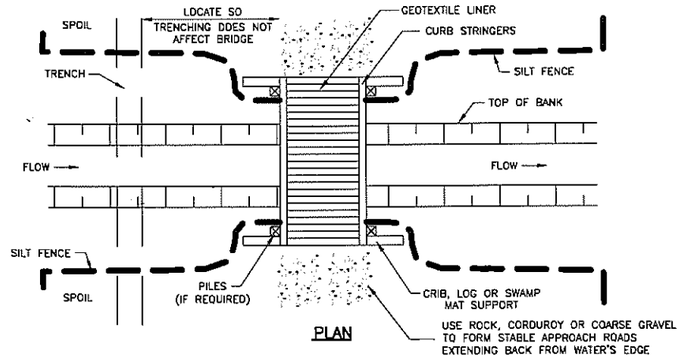
It is important that the size of the water opening be selected so the structure can safely pass flood flows that can reasonably be expected to occur during the life of the crossing. Either of the following methods can be followed:

* Install a bridge that clear spans the creek from top of bank to top of bank and ensure adequate freeboard to allow for anticipated increase in stream discharge and passage of debris.
* Conduct a hydrology analysis to determine theoretical opening size. The design flow will be the two year flood (Q2), unless the culvert is to be left in place through the spring freshet, in which case the theoretical opening size will be based on the five year flood (Q5). Culvert sizes may also be selected to be the same as existing nearby culverts that have been in place for many years and have performed satisfactorily.
* Culvert sizes and lengths must be approved by DFO prior to installation.
* If culverts are used, the approved size or equivalent multiple culverts must be installed. If a bridge is selected with cribs or piers in the water, the opening must provide the same end area as the culvert and must be approved by DFO.

Detailed Construction Sequence — Temporary Bridges

In general terms, the following sequence of construction and mitigation measures will be followed at all temporary bridges:

1. Generally, there are no restrictions on timing for the construction of clear-span structures as they do not involve in-water work. However, if there are any activites with the potential to disrupt fish or fish habitat (e.g., in-water crossing of watercourse by machinery), these should be done during provincial fisheries, timing windows.
2. Install the bridge in a manner that will minimize sediment entering the water. Stringers must be engineered to support the loads expected on the bridge. Curbs at least 150 mm high must be installed along the edge of the deck and if necessary, the deck lined with geotextile to contain mud on the bridge. Fasteners connecting components must be strong enough to hold them in position during the life of the bridge. If used, cribs are to be filled with rock or cobble. Rip rap erosion protection is to be placed around the cribs and on the fill slopes projecting into the water.
3. Road approaches leading to bridges and flume vehicle crossings must be raised and stable so equipment loads are supported a sufficient distance back from the water to reduce mud entering the stream from equipment tracks. This may require using materials such as gravel, rock or corduroy. If cuts are needed to obtain a satisfactory grade, they are to be dug with side ditches and stable slopes. Erosion and sediment control measures are to be installed to keep sediment on land (eg., check dams, filter cloth, rip rap, seed and mulch, sediment traps, etc.)
4. While the bridge is in use, any buildup of mud on the bridge deck or approaches that is affecting water quality is to be scraped off and disposed of in an approved location.
5. Temporary crossings shall be removed as quickly as possible when no longer required. Surplus gravel and bridge materials are to be removed from the crossing area and stabilized above the floodplain in an approved location. The creek bed and banks are to be restored to a stable angle and protected with erosion resistant material compatible with flow velocity (eg., coarse gravel or rip rap) Measures such as berms or logs may be needed to prevent sediment laden water running down the road.
6. Vegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.



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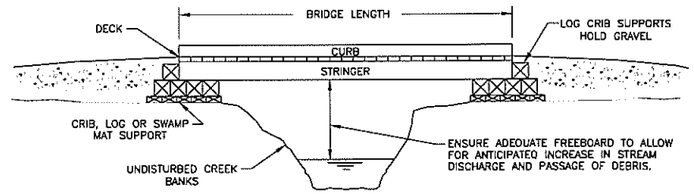
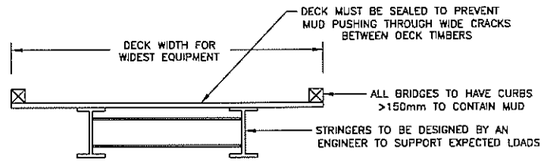


BRIDGE PROFILE

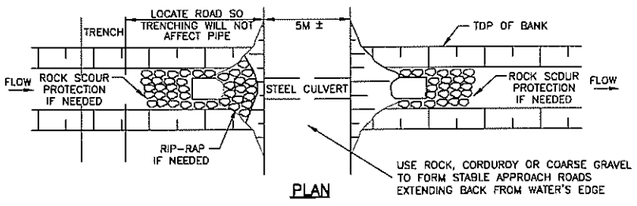


TYPICAL STEEL BRIDGE SECTION

Detailed Construction Sequence — Temporary Culverts

In general terms, the following sequence of construction and mitigation measures will be followed at all temporary culverts:

1. Install culvert pipe of diameter and length as per approval conditions. Culvert invert is to be set to allow a minimum of 10cm water depth for fish passage where soil conditions permit (otherwise at at stream grade and slope). If streambed soils are soft, install coarse gravel or rockfill pad under the pipe. Pipe installation can be done in flowing water unless DFO specifies otherwise. Culvert backfill and fill for the road is to be coarse granular or rock fill material. Erosion protection may be needed on the upstream road fill slope and if scour is possible, rip rap is to be placed in the streambed upstream and downstream of the pipe outlet.
2. The road approach leading to the culvert crossing must be raised and stable so equipment loads are supported a sufficient distance back from the water to reduce mud entering the water from equipment tracks. This may require using materials such as gravel, rock or corduroy. If cuts are needed to obtain a satisfactory grade, they are to be dug with side ditches and stable slopes. Erosion and sediment control measures are to be installed to keep sediment on land (eg., check dams, filter cloth, rip rap, seed and mulch, sediment traps, etc).
3. While the culvert is in use, any build-up of mud on the road surface or approaches that is affecting water quality is to be scraped off and disposed of in an approved location.
4. When the temporary crossing is no longer required, it is to be removed as quickly as possible. Removal shall not occur outside the construction windows as identified in the approval without prior written approval from DFO. Surplus gravel is to be removed from the crossing area and disposed of in an approved location. The creek bed and banks are to be restored to a stable angle and protected with erosion resistant material compatible with flow velocity (eg., coarse gravel, rip rap or erosion control matting). Measures such as berms or logs may be needed to prevent sediment laden water running down the road.
5. Vegetate any disturbed areas by planting and seeding preferably native trees, shrubs or grasses and cover such areas with mulch or erosion control matting to prevent soil erosion and to help seeds germinate.



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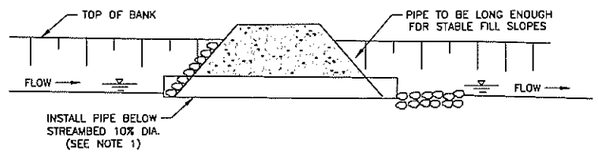

STREAM PROFILE

NOTES

Union Gas is responsible for implementation of appropriate sediment and erosion control to mitigate impacts to fish and fish habitat. Fisheries and Oceans Canada, Ontario-Great Lakes Area has reviewed Union Gas drawing, "GENERIC SEDIMENT CONTROL PLAN TEMPORARY VEHICLE CROSSINGS" dated January 2008, and endorses its use as a guideline for implementation of erosion and sediment measures.

For more information on this plan, please contact:
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DATE	REV NO	REVISION	BY	APPD

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PROJECT
UNION GAS LIMITED
CONSTRUCTION PROGRAM

LOCATION
ALL TEMPORARY VEHICLE CROSSINGS (BRIDGES & CULVERTS) IN ONTARIO

DRAWING TITLE
GENERIC SEDIMENT CONTROL PLAN TEMPORARY VEHICLE CROSSINGS

SCALE	NTS	DATE	JAN. 1/08
FILE No.		PROJECT NO	

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APPENDIX E: STAGE 1 ARCHAEOLOGICAL ASSESSMENT AND CULTURAL HERITAGE REPORT

Stage 1 Archaeological Assessment: Chatham Kent Rural Pipeline Expansion Project

Parts of Various Lots and Concessions, Geographic Townships of Camden and Chatham, former Kent County, now Municipality of Chatham-Kent, Ontario

May 17, 2018

Prepared for:

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PIF Number: P256-0531-2018
Project Number: 160961248

ORIGINAL REPORT

Table of Contents

EXECUTIVE SUMMARY ..... **I**

PROJECT PERSONNEL ..... **II**

ACKNOWLEDGEMENTS ..... **II**

1.0 PROJECT CONTEXT **1.1**
1.1 DEVELOPMENT CONTEXT 1.1
1.1.1 Objectives 1.1
1.2 HISTORICAL CONTEXT 1.2
1.2.1 Post-contact Indigenous Resources 1.2
1.2.2 Euro-Canadian Resources 1.4
1.3 ARCHAEOLOGICAL CONTEXT 1.7
1.3.1 The Natural Environment 1.7
1.3.2 Pre-contact Indigenous Resources 1.8
1.3.3 Known Archaeological Sites and Surveys 1.10
1.3.4 Existing Conditions 1.14

2.0 FIELD METHODS **2.1**

3.0 ANALYSIS AND CONCLUSIONS **3.1**

4.0 RECOMMENDATIONS **4.1**

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION **5.1**

6.0 BIBLIOGRAPHY AND SOURCES **6.1**

7.0 IMAGES **7.1**
7.1 PHOTOGRAPHS 7.1

8.0 MAPS **8.1**

9.0 CLOSURE **9.1**

LIST OF TABLES

Table 1: Generalized Cultural Chronology of the Study Area 1.8
Table 2: Registered Archaeological Sites 1.10
Table 3: Previous Archaeological Assessments 1.12

LIST OF FIGURES

Figure 1: Study Area Overview 8.2
Figure 2: Map of Treaty Areas in Upper Canada.....8.3
Figure 3: Treaties and Purchases (Adapted from Morris 1943) 8.4
Figure 4: The 1796 Chenail Ecarté Treaty.....8.5
Figure 5: The 1833 Plan of Camden Township 8.6
Figure 6: The 1821 Plan of Camden Gore.....8.7
Figure 7: The 1880 Map of Camden Township.....8.8
Figure 8: The 1809 Survey of Chatham Township 8.9
Figure 9: The 1820 Plan of Chatham Gore.....8.10
Figure 10: The 1880 Map of Chatham Township.....8.11
Figure 11: Archaeological Potential of the Study Area.....8.12

Executive Summary

Stantec Consulting Ltd. (Stantec) was retained by Union Gas Limited (Union Gas) to complete a Stage 1 archaeological assessment for the Chatham Kent Rural Pipeline Expansion Project (the Project). The Project Area, or study area, for the Stage 1 assessment of the Project comprises approximately 4,150 hectares of various Lots and Concessions, Geographic Townships of Camden and Chatham, former Kent County, now Municipality of Chatham-Kent, Ontario. The Stage 1 archaeological assessment was conducted during the preliminary planning phase of the Project in accordance with the provisions of the *Ontario Heritage Act* (Government of Ontario 1990a) and the requirements of Section 4.3.4 of the Ontario Energy Board's (OEB) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 7th Edition* (OEB 2016).The proposed pipeline for the Project will begin at Union Gas' existing Simpson Road Station, near the community of Tupperville, and proceed south and east within the road allowance of Base Line Road to an endpoint near the corner of Base Line Road and Kent Bridge Road, east of Dresden. While the alignment for the new pipe is expected to largely follow the road allowance of Base Line Road and Simpson Road, the final construction easement, or temporary land use, will be determined by Union Gas at a later date. Thus, the current study area for the Stage 1 archaeological assessment is large and serves to capture a broad and generalized geographic area associated with the Project.

A property inspection was conducted under archaeological consulting license P256 issued to Parker Dickson, MA, of Stantec by the Ministry of Tourism, Culture and Sport (MTCS). The property inspection was completed on March 22, 2018 under Project Information Form number P256-0531-2018 in accordance with Section 1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). The property inspection included the Preferred Route for the new pipe alignment and the lands immediately adjacent to it. The goal of the property inspection was to identify the presence or absence of any features of archaeological potential.Generally, the study area is judged to retain potential for pre-contact Indigenous, post-contact Indigenous, and Euro-Canadian archaeological resources. In accordance with Section 1.3.1 and Section 7.7.4 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), Stage 2 archaeological assessment is required for any portion of the Project's anticipated construction easement which impacts an area of archaeological potential. In addition to the above, the Stage 1 archaeological assessment determined that there are small pockets of previously surveyed lands and disturbed lands within the study area which retain low to no archaeological potential. In accordance with Section 1.3.2 and Section 7.7.4 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), Stage 2 archaeological assessment is not required for any portion of the Project's anticipated construction easement which impacts a previously surveyed or disturbed area. Further details regarding Stage 2 archaeological assessment recommendations are provided in the body of the report.

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 for portions of the study area and so these portions recommended for further archaeological fieldwork remain subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990a) and may not be altered, or have artifacts removed, 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.



Project Personnel

Project Managers:	Mark Knight, MA, RPP, MCIP Steve Thurtell, M.Sc., Senior Environmental Consultant
Licensed Archaeologist:	Parker Dickson, MA (P256)
Field Director:	Parker Dickson, MA (P256)
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Report Writer:	Parker Dickson, MA (P256)
Quality Review:	Peter Popkin, Ph.D., CAHP, MCIfA (P362)
Independent Review:	Tracie Carmichael, BA, B.Ed. (R140)

Acknowledgements

Proponent Contacts:	Norm Dumouchelle, Union Gas Limited
Ministry of Tourism, Culture and Sport:	Robert von Bitter – Archaeological Sites Database Coordinator
Ministry of Natural Resources and Forestry:	Lisa Casselman – Survey Records Clerk

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

Stantec Consulting Ltd. (Stantec) was retained by Union Gas Limited (Union Gas) to complete a Stage 1 archaeological assessment for the Chatham Kent Rural Pipeline Expansion Project (the Project). The Project Area, or study area, for the Stage 1 assessment of the Project comprises approximately 4,150 hectares of various Lots and Concessions, Geographic Townships of Camden and Chatham, former Kent County, now Municipality of Chatham-Kent, Ontario (Figure 1). The Stage 1 archaeological assessment was conducted during the preliminary planning phase of the Project in accordance with the provisions of the *Ontario Heritage Act* (Government of Ontario 1990a) and the requirements of Section 4.3.4 of the Ontario Energy Board's (OEB) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 7th Edition* (OEB 2016).

To increase capacity and accommodate additional demand for natural gas in the Municipality of Chatham-Kent, Union Gas is proposing to construct a nominal pipeline size (NPS) 8-inch natural gas pipeline, approximately 17 kilometres in length. The proposed pipeline will begin at Union Gas' existing Simpson Road Station, near the community of Tupperville, and proceed south and east within the road allowance of Base Line Road to an endpoint near the corner of Base Line Road and Kent Bridge Road, east of Dresden. Construction is planned to begin as early as Spring/Summer 2019 with an in-service date approximately six months after the start of construction. The proposed pipeline will meet the growing agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent and surrounding areas, including in the fast-growing greenhouse market.

While the alignment for the new pipe is expected to largely follow the road allowance of Base Line Road and Simpson Road (see "Preferred Route" on Figure 1), the final construction easement, or temporary land use, will be determined by Union Gas at a later date. Thus, the current study area for the Stage 1 archaeological assessment is large and serves to capture a broad and generalized geographic area associated with the Project.

1.1.1 Objectives

The objectives of the Stage 1 archaeological assessment were to compile available information about the known and potential archaeological 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 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 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 the study area's archaeological potential which will support recommendations for Stage 2 survey for all or parts of the study area; 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* to determine the presence of known archaeological sites in and around the study area; and
- A property inspection of the study area.

1.2 HISTORICAL CONTEXT

1.2.1 Post-contact Indigenous Resources

"Contact" is typically used as a chronological benchmark when discussing Indigenous archaeology in Canada and describes the contact between Indigenous and European cultures. The precise moment of *contact* is a constant matter of discussion. Contact in what is now the province of Ontario is broadly assigned to the 16th century (Loewen and Chapdelaine 2016).

The post-contact Indigenous 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 study area for the Project falls within the lands of the archaeologically known Western Basin tradition. It has been put forward that the Western Basin people were of the Fire Nation, an Algonkian-speaking group pushed out of Ontario by the Iroquoian-speaking Neutral people in the early 17th century (Murphy and Ferris 1990). The Neutral, in turn, ceased to exist as a corporate entity following the incursion of the New York Iroquois in 1650 (Heidenreich 1990). The Indigenous people who occupied this portion of southwestern Ontario have been referred to as Anishinaabe or Anishinaabeg; Chippewa; and Ojibwa, an Algonquian-speaking people. According to traditional history, they were once one nation, but subdivisions occurred as people migrated to different areas. They were also known as the Three Fires Confederacy and acted together in political and military affairs through the 17th to 19th centuries.

Under British administration in the 19th century, the groups were divided into separate bands. The Anishinaabe included the western Algonquian peoples, among them the Chippewa and the Odawa. Until the 18th century, the central Algonquian-speaking peoples, among them Potawatomi, were located in the Michigan Peninsula (Blackbird

1887). In the middle of 18th century, the Chippewa were located on the south shores of Lake Huron, the east shores of Georgian Bay, and on the west end of Lake Ontario. Indigenous peoples continue to play a large role in the occupation of the study area and its environs.

Following the American Revolutionary War, Britain focused on the settlement of European immigrants into what became province of Upper Canada in 1791. To enable widespread settlement, the British government negotiated a series of treaties with Indigenous peoples. Figure 2 provides a map of southwestern Ontario illustrating early treaties and purchases (Government of Canada n.d.a). One of the earliest treaties involving lands associated with the study area was made on May 19, 1790. Originally identified as the Detroit Treaty, the chiefs of the Odawa, Chippewa, Pottawatomi, and Huron Nations and representatives of the British Crown established a vast tract of land "…from the Detroit River easterly to Catfish Creek and south of the river La Tranche [now Thames River] and Chenail Ecarté [now St. Clair River], 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…[i]n Middlesex County, Deleware and Westminster Township and part of North Dorchester" (Morris 1943:17). Today, this treaty is identified as Treaty Number 2, illustrated by the letter "C" on Figure 3. As discussed in Section 1.2.2.2 below, geo-referencing of early maps provides inconsistences in spatial boundaries. A plaque, erected by the Historic Sites and Monuments Board of Canada further identifies this treaty as *McKee's Purchase*. A commemorative plaque located in the Blenheim Memorial Park in Blenheim, Ontario reads (Ontario Plaques 2018a):

> *In May 1790 Alexander McKee, Deputy Agent of the British Indian Department, and the principal chiefs of the Ottawa, Potawatomi, Chippewa and Wyandot negotiated a treaty whereby the British Crown acquired title to what is now southwestern Ontario. This treaty completed the process begun with Niagara treaties of 1781 and 1784, with the result that most of the Ontario peninsula was soon opened to British and Loyalist settlement.*

Later, on September 29, 1795, McKee obtained a preliminary agreement from several Ojibwa Chiefs to set apart land at Chenail Ecarté for the purpose of establishing a Reserve for those who lost their lands and homes during the last stages of the American Revolutionary War (Willig 2008). A preliminary agreement was signed by which the Crown offered to pay £1,200 for these lands (Willig 2008). On September 7, 1796, the Chenail Ecarté Treaty was signed by the Ojibwa and Odawa chiefs (Lytwyn 2009). Figure 4 provides an early illustration by Abraham Iredell of the Chenail Ecarté Treaty lands (Government of Canada n.d.b; see also Curnoe 1996:166). Today, this treaty is more commonly identified as Treaty Number 7, identified by the letter "J" on Figure 3. This treaty comprises "…a tract of land near the River called Chenail Ecarte… [to include] the Township of Sombra in Lambton County and the Gore of Chatham Township in Kent County" (Morris 1943:21).

A portion of the study area for the Project encroaches upon Treaty Number 21, which was an agreement made on March 9, 1819 between John Aiken, on behalf of the British Crown, and the Chippewa Nation. Treaty Number 21 is illustrated on Figure 4 by the letter "R". The lands of Treaty Number 21 commence:

> *…at the northerly side of the River Thames at the south west angle of the Township of London; thence along the western boundary of the Township of London, in a course north 21 degrees, 30 minutes west, twelve miles to the north west angle of the said Township; then on a course about south 62 degrees and 30 minutes west forty-eight miles more or less until it intersects a line on a course produced north two miles from the*

> *north east angle of the Shawnee [Sombra] Township; then along the eastern boundary line of the said Township, twelve miles and a half more or less to the northern boundary line of the Township of Chatham; then east twenty-four miles more or less to the River Thames; then along the water['s edge of the River Thames against the stream to the place of beginning, reserving a tract of land situate[d] on the northerly side of the River Thames nearly opposite to the northerly angle of the Township of Southwold and south west angle of the Del[a]ware Township containing 15,360 acres; also reserving two miles square distant about four miles above the rapids where the Indians have their improvements and nearly parallel to the Moravian Village containing 5,120 acres.*
>
> (Morris 1943:24-25)

As demonstrated above, the nature of Indigenous settlement size, population distribution, and material culture shifted as European settlers encroached upon Indigenous territory. However, despite this shift, "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…systems of ideology and thought" (Ferris 2009:114). As a result, Indigenous peoples of southern Ontario have left behind archaeologically significant resources throughout the region which show continuity with past peoples, even if they have not been explicitly recorded in Euro-Canadian documentation. Examples of Indigenous documentation (e.g., notations on early township survey plans and surveyor's field notes) are noted below.

1.2.2 Euro-Canadian Resources

In 1791, the Provinces of Upper Canada and Lower Canada were created from the former Province of Quebec by an act of British Parliament. At this time, Colonel John Graves Simcoe was appointed as the Lieutenant Governor of Upper Canada and was tasked with governing the new province, directing its settlement and establishing a constitutional government modelled after that of Britain's (Petryshyn 1985). In 1792, Simcoe divided Upper Canada into 19 counties consisting of previously-settled lands, new lands opened for settlement, and lands not yet acquired by Crown. These new counties stretched from Essex in the west, to Glengarry in the east.

1.2.2.1 Kent County

Kent County was established in 1792 by John Graves Simcoe, Lieutenant Governor of Upper Canada. Similar to the southern portions of Lambton County, Kent County initially contained vast tracts of low lying marshy and swampy areas. As a result, once cleared and properly drained, the land became a fertile agricultural block. Kent County originally contained 11 municipalities: the Town of Chatham and the townships of Camden, Chatham, Dover, Harwich, Howard, Orford, Raleigh, Romney, Tilbury East, and Zone. One of the earliest Euro-Canadian settlements in Kent County was the Baldoon Settlement in Dover Township founded by Thomas Douglas, fifth Earl of Selkirk, Scotland in 1804 (Mitchell 1914). The original influx of Scottish settlers totaled 111; however, nearly one-third perished within the first year (Mitchell 1914). Over time, the Baldoon Settlement was prosperous and attracted additional settlers. Eventually, the area surrounding the Baldoon Settlement became the Town of Wallaceburg.

STAGE 1 ARCHAEOLOGICAL ASSESSMENT: CHATHAM KENT RURAL PIPELINE EXPANSION PROJECT

Project Context
May 17, 2018

Camden Township, named after Charles Pratt, the 1st Earl of Camden was initially surveyed by Patrick McNiff in 1793. Later, Abraham Iredell resurveyed portions of various township in Kent County, including Camden Township. The township was originally identified as Camden West to avoid confusion with the previously established Camden Township in Addington County. Camden Township includes a gore-shaped piece of land, north of the Thames River to, modernly, Base Line Road, and the Gore of Camden, an oblong-shaped territory stretching approximately 12 miles east to west, and four miles north to south (Belden & Co. 1880). The first recorded European settler in the township was Joshua Cornwall in 1796, followed by Lemeul Sherman sometime prior to 1804 (Lauriston 1939).

Survey records, obtained from the MNRF, were examined for evidence of Indigenous and early Euro-Canadian settlements in Camden Township (MNRF 2018). An early survey plan of the township, drawn in 1833 by Benjamin Springer, depicts lot and concession delineations with a number of areas identified as swamp and marsh land. No land grant recipients are identified on this plan, however a dotted line, likely representing an original Indigenous trail or path is illustrated – see Lot 11 on Concession I, II, and III (Figure 5). Originally drafted in 1821, a survey of the Gore of Camden Township depicts numerous land grant recipients and illustrates how land grants changed over time; especially during the latter half of the 19th century, as multiple names are denoted in each lot, with many overlapping each other (Figure 6). In the eastern portion of the Gore of Camden Township, along the eastern bank of the Sydenham River, an “Indian Village” and “Indian Clearing” are illustrated (see Inset 1 and 2 of Figure 6).

The 1880 *Illustrated Historical Atlas of the County of Kent, Ontario* (Belden & Co. 1880) shows the extent to which Camden Township was settled by the late 19th century (Figure 7). In addition to the early communities of Dresden, Kent Bridge, Dawn Mills, Grove Mills, and Thamesville, settlement of the township was focused along major roadways (i.e., Base Line Road and Kent Bridge Road) and the Sydenham River (formerly Bear Creek). Of particular note is the illustrated homestead of Josiah Henson on Lot 2, Concession 4 of the Gore of Camden Township.

Josiah Henson was born into slavery in Charles County, Maryland, but fled to Canada in 1830 to become one of the founders of a settlement for fugitive slaves (Ontario Heritage Trust 2007). Henson purchased 200 acres to form the Dawn Settlement - a refuge for fugitives fleeing from slavery who escaped to Canada from the United States. Henson became one of the first African-Americans to document his experiences as a slave in his 1849 autobiography *The Life of Josiah Henson, Formerly a Slave, Now an Inhabitant of Canada, as Narrated by Himself* (Henson 1849). Later, in 1852, influenced heavily by Henson’s autobiography, author Harriet Beecher Stowe penned the novel *Uncle Tom’s Cabin or Life Among the Lowly* to illustrate the cruelty and injustice of slavery (Stowe 1852).

Today, Henson’s homestead, and associated property, including the Dawn Settlement, are known as the Uncle Tom’s Cabin Historic Site. Two plaques are featured prominently at the Uncle Tom’s Cabin Historic Site. One plaque, erected by the Historic Sites and Monuments Board of Canada in 1999 (Ontario Plaques 2018b), briefly describes Josiah Henson as:

> *After escaping to Upper Canada from slavery in Kentucky, the Reverend Josiah Henson became a conductor of the Underground Railroad and a force in the abolition movement. The found of the Black settlement of Dawn, he was also an entrepreneur and established a school, the British-American Institute. His fame grew after Harriet Beecher Stowe stated that his memoirs published in 1849 had provided “conceptions and incidents” for her extraordinarily popular novel, Uncle Tom’s Cabin. Henson’s celebrity raised international awareness of Canada as a haven for refugees from slavery.*

A second plaque, erected by the Ontario Heritage Foundation (Ontario Plaques 2018c), describes the Dawn Settlement:

> *In the 1830s, the Reverend Josiah Henson and other abolitionists sought ways to provide refugees from slavery with the education and skills they needed to become self-sufficient in Upper Canada. They purchased 200 acres of land here in 1841 and established the British American Institute, one of the first schools in Canada to emphasize vocational training. The community of Dawn developed around the institute. Its residents farmed, attended the institute, and worked at sawmills, grist-mills, and other local industries. Some returned to the United States after emancipation was proclaimed in 1863. Others remained, contributing to the establishment of a significant black community in this part of the province.*

Chatham Township was initially surveyed by Abraham Iredell in 1796 and later by Thomas Smith in 1809. Survey records, obtained from the MNRF, were examined for evidence of Indigenous and early Euro-Canadian settlements in Chatham Township (MNRF 2018). An early survey plan of the township, originally drawn in 1809, depicts a relatively vacant landscape, excepting the north bank of the Thames River where numerous land grant recipients are illustrated (Figure 8). The Baldoon settlement, though technically located in the Township of Dover, is illustrated in the northwest corner on the Chatham Township survey map of 1809. While an Indigenous presence is not illustrated within the boundaries of the 1809 survey of Chatham Township, an "Indian Boundary" line is depicted along the township's northern border. Further, McKeough (1919) notes a vibrant Indigenous population in Kent County during European settlement of the region.

An additional early survey plan of Chatham Township illustrates the Gore of Chatham from 1820 (Figure 9). The plan depicts a sparsely populated block of land, with numerous areas identified as swamp and marsh land. The few land grant recipients noted on the survey are concentrated along major waterways, including the St. Clair River, Bear Creek (now Sydenham River), and Otter Creek. The 1820 survey of Sombra Township, confirmed by an examination of the accompanying field notes, also illustrates an Indigenous presence in the township (Figure 9). In the southern portion of the township, along the banks of Bear Creek (now Sydenham River), there are two "Sugar Camps" and an "Indian Corn Field" illustrated (see Inset 2, 3, and 4 on Figure 9). A third "Sugar Camp" is illustrated in the northwestern portion of the township (see Inset 1 on Figure 9).

The 1880 *Illustrated Historical Atlas of the County of Kent, Ontario* (Belden & Co. 1880) shows the extent to which Chatham Township was settled by the late 19th century (Figure 10). Though the interior of the township has been settled, the population of the township and economic centres continue to be focused around major waterways, e.g., the St. Clair River, the Sydenham River, and the Thames River. By this time, the Towns of Wallaceburg and Chatham had been firmly established, and smaller communities were spread throughout the township, including: Oungah, Louiseville, Kent Bridge, Darrell, and Appledore.

1.2.2.2 Summary

As illustrated above, the historical context of the Stage 1 study area for the Project includes numerous examples of Indigenous and early Euro-Canadian resources. In discussing the late 19th century historical mapping it must be remembered that 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). Further, review of historic mapping, including treaty maps, also has inherent accuracy difficulties due to potential error in geo-referencing. Geo-referencing is conducted by assigning spatial coordinates to fixed locations and using these points to spatially reference the remainder of the map. Due to changes in "fixed" locations over time (e.g., road intersections), errors/difficulties of scale and the relative idealism of the historic cartography, historic maps may not translate accurately into real space points. This may provide obvious inconsistencies during the historic map review. Nonetheless, the majority of the study area has been subject to European-style agricultural practices for over 100 years, having been densely populated by Euro-Canadian farmers by the late 19th century. Moreover, much of the study area has been cleared of woodlot and had extensive drainage systems installed to reclaim swamp and marshland as agricultural field.

1.3 ARCHAEOLOGICAL CONTEXT

1.3.1 The Natural Environment

The Stage 1 study area for the Project includes portions of two broad physiographic regions: the St. Clair Clay Plain and the Bothwell Sand Plain. The St. Clair Clay Plain physiographic region is described as:

> *Adjoining Lake St. Clair in Essex and Kent 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 100 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 and Putnam 1986:147)

The clay plains east of Lake St. Clair, in the Geographic Township of Chatham, and extending north into the Geographic Township of Sombra, are known as the Chatham Flats. This area was originally home to vast swaths of swamp forest consisting of elm, black ash, white ash, silver maple, and red maple (Chapman and Putnam 1986:150). Development of these lands was delayed until artificial drainage was established by the municipality. Large open ditches are common within nearly every municipal road right-of-way (ROW).

The Bothwell Sand Plain comprises a portion of the eastern edge of the Stage 1 study area. Chapman and Putnam (1987:147) describe the Bothwell Sand Plan as:

> *…the delta of the Thames River in glacial Lake Warren…. The sands were spread thinly over the clay floor, covering some 700 square miles. With only three or four feet of sand, more or less over clay, water invariably collects above the clay because the rain readily infiltrates the sandy surface put percolates slowly through the clay below. With a water table so close to the surface the depressions are swampy, or at least moist. … This is a region of low-grade soil, in contrast to the fertile Chatham flats….*

Water sources are abundant within the Stage 1 study area. In addition to large primary water sources, such as the Sydenham River located adjacent to the northern boundary of the study area, there are numerous other primary and secondary sources of potable water. For example, portions of Maxwell Creek, Little Bear Creek, and Danforth Creek are located within the study area. Additional secondary and tertiary creeks and streams from these primary sources are noted throughout the study area.

1.3.1.1 Recent Reports

A Technical Memorandum was prepared by Stantec (2018) to provide a preliminary overview of built and cultural heritage resources within the study area for the Project. The preliminary overview identified two heritage resources within the study area. A property at 9112 Glasgow Line is listed on the Chatham-Kent Heritage Register. The listed property is approximately 630 metres north of the Preferred Route for the Project. Further, the Ontario Heritage Trust operates an interpretative centre and museum at 29251 Uncle Tom's Road. This site, identified as Uncle Tom's Cabin Historic Site, is located approximately one kilometre north of the Preferred Route for the Project. The site is significant for its association with the Underground Railroad and settlement of refugee slaves in southwestern Ontario. The results of the preliminary overview indicated that further assessment is required to determine the interaction of the Project with identified and potential heritage resources. As such, a Cultural Heritage Assessment Report has been recommended for the Project and is in progress by Stantec.

1.3.2 Pre-contact Indigenous Resources

This portion of southwestern Ontario has been occupied by Indigenous peoples since the retreat of the Wisconsin glacier approximately 11,000 years ago. Much of what is understood about the lifeways of these Indigenous peoples is derived from archaeological evidence and ethnographic analogy. In Ontario, Indigenous culture prior to the period of contact with European peoples has been distinguished into cultural periods based on observed changes in material culture. These cultural periods are largely based in observed changes in formal lithic tools, and separated into the Early Paleo-Indian, Late Paleo-Indian, Early Archaic, Middle Archaic, and Late Archaic periods. Following the advent of ceramic technology in the Indigenous archaeological record, cultural periods are separated into the Early Woodland, Middle Woodland, and Late Woodland periods, based primarily on observed changes in formal ceramic decoration. It should be noted that these cultural periods do not necessarily represent specific cultural identities but are a useful paradigm for understanding changes in Indigenous culture through time. Table 1 provides a general outline of the cultural chronology of the study area, summarized from Ellis and Ferris (1990).

Table 1: Generalized Cultural Chronology of the Study Area

Period	Characteristics	Time	Comments
Early Paleo-Indian	Fluted Projectiles	9000 – 8400 B.C.	spruce parkland/caribou hunters
Late Paleo-Indian	Hi-Lo Projectiles	8400 – 8000 B.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	Narrow Point	2500 – 1800 B.C.	increasing site size
	Broad Point	1800 – 1500 B.C.	large chipped lithic tools

Period	Characteristics	Time	Comments
	Small Point	1500 – 1100 B.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	Couture Corded Pottery	400 B.C. – A.D. 500	increased sedentism
	Riviere au Vase Phase	A.D. 500 – 800	seasonal hunting and gathering
Late Woodland	Younge Phase	A.D. 800 – 1200	incipient agriculture
	Springwells Phase	A.D. 1200 – 1400	agricultural villages
	Wolf Phase	A.D. 1400 – 1550	earth worked villages, warfare
Contact Indigenous	Various Algonkian and Iroquoian Groups	A.D. 1600 – 1875	early written records and treaties
Historic	French/Euro-Canadian	A.D. 1749 – present	European settlement

Local environmental conditions were significantly different from what they are today. Ontario's first peoples would have crossed the landscape in small groups in search of food, particularly migratory game species. In this area, caribou may have been a Paleo-Indian diet staple, supplemented by wild plants, small game, birds, and fish. Given the low density of populations on the landscape at this time and their mobile nature, Paleo-Indian sites are small and ephemeral. Such sites are sometimes identified by the presence of fluted points. Sites are frequently located adjacent to the shorelines of large glacial lakes (Ellis and Deller 1990).

Archaeological records indicate subsistence changes around 8000 B.C. at the start of the Archaic Period in southwestern Ontario. Since the large mammal species that formed the basis of the Paleo-Indian diet became extinct or moved north with the warming of the climate, Archaic populations had a more varied diet, exploiting a range of plants and bird, mammal, and fish species. Reliance on specific food resources like fish, deer, and several nut species became more noticeable through the Archaic Period and the presence of warmer, more hospitable environs led to expansion of group and family sizes. In the archaeological record, this is evident in the presence of larger sites. The coniferous forests of earlier times were replaced by stands of mixed coniferous and deciduous trees by about 4000 B.C. The transition to more productive environmental circumstances led to a rise in population density. As a result, Archaic sites become more abundant over time. Artifacts typical of these occupations include a variety of stemmed and notched projectile points; chipped stone scrapers; ground stone tools (e.g., celts, adzes) and ornaments (e.g., bannerstones, gorgets); bifaces or tool blanks; animal bone; and chert waste flakes, a byproduct of the tool making process (Ellis *et al*. 1990).

Significant changes in cultural and environmental patterns occurred in the Early and Middle Woodland periods (*circa* 950 B.C. to A.D. 800). Occupations became increasingly more permanent in this period, culminating in major semi-permanent villages by roughly 1,000 years ago. Archaeologically, the most significant changes by Woodland peoples were the appearance of artifacts manufactured from modeled clay and the emergence of more sedentary villages. The earliest pottery was crudely made by the coiling method and early house structures were simple oval enclosures. The Early and Middle Woodland periods are also characterized by extensive trade in raw materials, objects and finished tools, with sites in Ontario containing trade items with origins in the Mississippi and Ohio River valleys (Spence *et al*. 1990).



By the Late Woodland period there was a distinctive cultural occupation in southwestern Ontario, including Essex, Kent, and Lambton counties. The primary Late Woodland occupants of the Windsor area were populations described by archaeologists as Western Basin Tradition. Murphy and Ferris (1990:189) indicate that these people had ties with populations in southeastern Michigan and northwestern Ohio and represent an *in situ* cultural development from the earlier Middle Woodland groups. The Western Basin Tradition seems to have been centred in the territory comprising the eastern drainage basin of Lake Erie, Lake St. Clair, and the southern end of Lake Huron. The Western Basin Tradition is divided up into four phases based on differences in settlement and subsistence strategies and pottery attributes.

1.3.3 Known Archaeological Sites and Surveys

In Canada, archaeological sites are registered within the Borden system, a national grid system designed by Charles Borden in 1952 (Borden 1952). The grid covers the entire surface area of Canada and is divided into major units containing an area that is two degrees in latitude by four degrees in longitude. Major units are designated by upper case letters. Each major unit is subdivided into 288 basic unit areas, each containing an area of 10 minutes in latitude by 10 minutes in longitude. The width of basic units reduces as one moves north due to the curvature of the earth. In southern Ontario, each basic unit measures approximately 13.5 kilometres east-west by 18.5 kilometres north-south. In northern Ontario, adjacent to Hudson Bay, each basic unit measures approximately 10.2 kilometres east-west by 18.5 kilometres north-south. Basic units are designated by lower case letters. Individual sites are assigned a unique, sequential number as they are registered. These sequential numbers are issued by the MTCS who maintain the *Ontario Archaeological Sites Database*. The study area is located within Borden block AdHn.

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* (Government of Ontario 1990b). 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 *Ontario Archaeological Sites Database* has shown that there are seven registered archaeological sites within the study area and within one kilometre of the study area (Government of Ontario 2018a). Table 2 provides a summary of the previously registered archaeological sites within the study area and within one kilometre of the study area. All but one the registered archaeological sites (i.e., AdHn-18) are located within the boundaries of the Stage 1 study area; three of which are located within 50 metres of the preliminary Preferred Route, i.e., AdHn-9, AdHn-10, and AdHn-11 (see Tile 1 in the Supplementary Documentation).

Table 2: Registered Archaeological Sites

Borden #	Site Name	Site Type	Cultural Affiliation
AdHn-9	Butler	Scatter, homestead	19th century Afro- or Euro-Canadian
AdHn-10	CanEnerco East	Scatter, homestead	19th century Afro- or Euro-Canadian
AdHn-11	CanEnerco West	Scatter, homestead	19th century Afro- or Euro-Canadian
AdHn-12	N/A	Isolated find	Late Woodland

Borden #	Site Name	Site Type	Cultural Affiliation
AdHn-16	Location 6	Isolated find	Late Archaic
AdHn-18	Location 21	Scatter, homestead	19th century Euro-Canadian
AdHn-34	Location 23	Scatter, homestead	19th century Euro-Canadian

The Butler site (AdHn-9), CanEenrco East site (AdHn-10), and CanEnerco West site (AdHn-11), were registered by Elizabeth Alder in 1997 as part of an archaeological assessment for the proposed Chatham 7-17-XII NPS Pipeline (Government of Ontario 2018a). The Butler site (AdHn-9) comprises a scatter of red brick, whiteware and machine cut nails spread over an area of approximately 20 metres by 20 metres (Alder Heritage Assessments 1997:6) (Government of Ontario 2017a). Data entered in the *Ontario Archaeological Sites Database* for the Butler site (AdHn-9) notes that the artifacts were not collected and former "U.S. slaves lived here at one time" (Government of Ontario 2018a). Alder Heritage Assessments (1997) determined that the artifacts may represent the remains of the structure illustrated on the historic atlas map of the township. It was determined that the Butler site (AdHn-9) retains further cultural heritage value or interest and a Stage 3 archaeological assessment is recommended (Alder Heritage Assessments 1997).

The CanEnerco East site (AdHn-10) comprises a scatter of 30 pieces of whiteware and one of bottle glass (Alder Heritage Assessments 1997:5) The data entered in the *Ontario Archaeological Sites Database* for the CanEnerco East site (AdHn-10) notes that the artifacts were not collected and "early settlers in area were former U.S. slaves" (Government of Ontario 2018a). Although Alder Heritage Assessments (1997) determined that the site represents a dispersed scatter of no further concern, a review of the artifacts and their geographic context by Stantec has determined that the CanEnerco East site (AdHn-10) retains further cultural heritage value or interest and a Stage 3 archaeological assessment is recommended.

The CanEnerco West site (AdHn-11) comprises a scatter of 16 pieces of whiteware (Alder Heritage Assessments 1997:6). The data entered in the *Ontario Archaeological Sites Database* notes that the artifacts were not collected and "early settlers in area were former U.S. slaves" (Government of Ontario 2018a). Although Alder Heritage Assessments (1997) determined that the site represents a dispersed scatter of no further concern, a review of the artifacts and their geographic context by Stantec has determined that the CanEnerco East site (AdHn-10) retains further cultural heritage value or interest and a Stage 3 archaeological assessment is recommended.

A query of the *Ontario Public Register of Archaeological Reports* identified seven archaeological assessments which may document work within the broad Stage 1 study area or within 50 metres of it (Government of Ontario 2018b). Table 3 provides a summary of the relevant reports. In addition to the reports noted in Table 3, further archaeological assessments were identified in the *Ontario Public Register of Archaeological Reports* which may be of relevance; however, some of these reports were not available for review as part of the Stage 1 archaeological assessment for the Project (see Supplementary Documentation).

Table 3: Previous Archaeological Assessments

Year	Report	Author	PIF #
1993	*Archaeological Assessment at Josiah Henson Heritage Park (Uncle Tom's Cabin Historic Site), Dresden, Ontario*	London Museum of Archaeology	93-017
1997	*Archaeological Assessment of Proposed Chatham 7-17-XII NPS Pipeline CanEnerco Limited Camden and Chatham Townships Kent County, Ontario*	Alder Heritage Assessments	97-014
2007	*Stage 1 and 2 Archaeological Assessment: Uncle Tom's Cabin National Historic Site, Dresden, Ontario*	Ontario Heritage Trust	P096-015
2013	*Archaeological Assessment (Stage 1) Base Line Bridge over Little Bear Creek West (Prangley Drain) Part of Lot 1 Concession 6-7 Geographical Township of Dresden, Historical Township of Camden, Municipality of Chatham-Kent, Ontario*	Detritus Consulting Ltd.	P017-0256-2013
2015a	*Stage 1 Archaeological Assessment North Kent Wind Project Various Lots and Concession Former Townships of Chatham and Dover, Historical County of Kent Now Municipality of Chatham-Kent, Ontario*	Golder Associates Ltd.	P457-0006-2015
2015b	*Stage 2 Archaeological Assessment North Kent Wind 1 Project Various Lots and Concessions Former Township of Chatham and Dover, Historical County of Kent Now Municipality of Chatham-Kent Ontario*	Golder Associates Ltd.	P457-0008-2015
2016	*Stage 1 Archaeological Assessment: Panhandle Reinforcement Project (Dawn – Dover), Parts of Various Lots and Concessions, Geographic Township of Dawn, now Township of Dawn-Euphemia, and Geographic Township of Sombra, now Township of St. Clair, Lambton County; and Geographic Townships of Chatham and Dover, now Municipality of Chatham-Kent, Ontario*	Stantec	P256-0388-2015
2017a	*Stage 2 Archaeological Assessment: Panhandle Reinforcement Project (Dawn – Dover), Parts of Various Lots and Concessions, Geographic Township of Dawn, now Township of Dawn-Euphemia, and Geographic Township of Sombra, now Township of St. Clair, Lambton County; and Geographic Townships of Chatham and Dover, now Municipality of Chatham-Kent, Ontario*	Stantec	P256-0401-2016
2017b	*Stage 3 Archaeological Assessment: Location 23 (AdHn-34), Panhandle Reinforcement Project (Dawn-Dover), Part of Lot 25, Concession 1, Geographic Township of Sombra, former Lambton County, now Municipality of Chatham-Kent, Ontario*	Stantec	P083-0298-2016

In 1993, the London Museum of Archaeology (1993) completed a Stage 1-2 archaeological assessment for the Uncle Tom's Cabin Historic Site in advance of lands to be impacted by proposed construction activities. No archaeological resources were identified during the assessment.

As noted previously, the Stage 1-2 archaeological assessment for the proposed Chatham 7-17-XII NPS Pipeline identified three archaeological sites: the Butler site (AdHn-9), CanEenrco East site (AdHn-10), and CanEnerco West site (AdHn-11). The study area for the assessment was largely limited to the existing municipal ROW for Base Line Road and the archaeological sites were identified north of the ROW. No further archaeological assessment was recommended for the study area (Alder Heritage Assessments 1997); however, further Stage 3 assessment was

recommended for the Butler site (AdHn-9) and upon further review of the data from and CanEenrco East site (AdHn-10) and CanEnerco West site (AdHn-11), Stantec has determined that both sites retain further cultural heritage value or interest and a Stage 3 archaeological assessment is recommended.

In 2007, the Ontario Heritage Trust completed a Stage 1 and 2 archaeological assessment for the Uncle Tom's Cabin National Historic Site (Ontario Heritage Trust 2007). The assessment was completed to support the Ontario Heritage Trust's purchase of the associated property. The assessment determined that the site did not warrant registration as an archaeological site with the MTCS and no further archaeological assessment was recommended (Ontario Heritage Trust 2007).

Detritus Consulting Ltd. (2013) completed a Stage 1 archaeological assessment for a small study area along Base Line Road, east of Kent Bridge Road to support existing road infrastructure reconstruction and/or replacement. Detritus Consulting Ltd. concluded that the study area retain low to no archaeological potential and no further archaeological assessment was recommended (Detritus Consulting Ltd. 2013).

In 2015, Golder Associates Ltd. (Golder) completed a Stage 1 archaeological assessment for the North Kent Wind Project (Golder 2015a). It was recommended that a Stage 2 archaeological assessment be completed for any portion of the North Kent Wind Project which may impact an area of archaeological potential. Subsequently, Golder completed a Stage 2 archaeological assessment for the North Kent Wind Project (Golder 2015b). Overall, the Stage 2 survey identified 58 locations containing archaeological resources, including AdHn-16 and AdHn-18 mentioned in Table 3 above. Location 6 (AdHn-16) comprises an isolated Crawford Knoll projectile point, dating to the Late Archaic period (*circa* 1500 to 1100 B.C.) (Golder 2015b). Golder (2015b) did not recommend a Stage 3 archaeological assessment for Location 6 (AdHn-16). Location 6 (AdHn-16) is located within the Stage 1 study area for the Project, but not within 50 metres of the preliminary Preferred Route. Location 21 (AdHn-18) comprises a scatter 194 19th century Euro-Canadian artifacts, including refined ceramics, glass, faunal remains, and metal artifacts (Golder 2015b). Golder (2015b) recommended a Stage 3 archaeological assessment for Location 21 (AdHn-18). Location 21 (AdHn-18) is located nearly one kilometre beyond the boundaries of the Stage 1 study area for the Project.

In 2016, Stantec (2016) completed a Stage 1 archaeological assessment for the Panhandle Reinforcement Project (Dawn – Dover). It was recommended that a Stage 2 archaeological assessment be completed for any portion of the Panhandle Reinforcement Project (Dawn – Dover) which may impact an area of archaeological potential. Subsequently, Stantec (2017a) completed a Stage 2 archaeological assessment for the Temporary Land Use (TLU) for the Panhandle Reinforcement Project (Dawn – Dover). Overall, the Stage 2 survey identified 26 new archaeological locations, including Location 23 (AdHn-34). Location 23 (AdHn-34) was recommended for a Stage 3 archaeological assessment (Stantec 2017a).

A Stage 3 archaeological assessment of Location 23 (AdHn-34) was completed by Stantec (2017b). The Stage 3 assessment recovered 2,613 Euro-Canadian artifacts dating to the turn of the 20th century (Stantec 2017b). Stantec (2017b) determined that the cultural heritage value or interest of the site had been sufficiently document and a Stage 4 mitigation of development impacts was not recommended.

1.3.4 Existing Conditions

The study area for the Stage 1 archaeological assessment of the Project comprises approximately 4,150 hectares and includes various Lots and Concessions, Geographic Townships of Dawn and Sombra, former Lambton County, and Geographic Townships of Camden and Chatham, former Kent County, now Municipality of Chatham-Kent, Ontario. The proposed pipeline will begin at Union Gas' existing Simpson Road Station, near the community of Tupperville, and proceed south and east within the road allowance of Base Line Road to an endpoint near the corner of Base Line Road and Kent Bridge Road, east of Dresden. Broadly, much of the study area consists of active agricultural field with smaller pockets of sparse woodlot. The study area is also inundated with numerous water sources, municipal road ROWs, and municipally constructed drains, as well as the southern portion of the community of Dresden. Existing Union Gas infrastructure, such as metering stations, pumping stations, and storage facilities, are located within the study area. While the alignment for the new pipe is expected to largely follow the road allowance of Base Line Road and Simpson Road (see "Preferred Route" on Figure 1), the final construction easement, or temporary land use, will be determined by Union Gas at a later date. Thus, the current study area for the Stage 1 archaeological assessment is large and serves to capture a broad and generalized geographic area associated with the Project. The study area, and specifically the lands adjacent to the preliminary Preferred Route, was subject to a property inspection on March 22, 2018. Further details regarding the property inspection are provided in Section 2.0 below.

2.0 FIELD METHODS

Initial background research compiled information concerning any known and/or potential archaeological resources within the study area. A property inspection was conducted under archaeological consulting license P256 issued to Parker Dickson, MA, of Stantec by the MTCS. The property inspection was completed on March 22, 2018 under Project Information Form (PIF) number P256-0531-2018 in accordance with Section 1.2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011). During the property inspection on March 22, 2018, the weather was sunny and mild. The lighting and visibility of land features was suitable for the identification of features of archaeological potential. At no time were field, lighting, or weather conditions detrimental to the identification of features of archaeological potential

As noted in Section 1.1 and 1.3.4, the Stage 1 study area for the Project comprises approximately 4,150 hectares in various Lots and Concessions, Geographic Townships of Dawn and Sombra, former Lambton County, and Geographic Townships of Camden and Chatham, former Kent County, now Municipality of Chatham-Kent, Ontario. The proposed pipeline will begin at Union Gas' existing Simpson Road Station, near the community of Tupperville, and proceed south and east within the road allowance of Base Line Road to an endpoint near the corner of Base Line Road and Kent Bridge Road, east of Dresden. While the alignment for the new pipe is expected to largely follow the road allowance of Base Line Road and Simpson Road (see "Preferred Route" on Figure 1), the final construction easement, or temporary land use, will be determined by Union Gas at a later date. Thus, the overall study area for the Stage 1 archaeological assessment is large and serves to capture a broad and generalized geographic area associated with the Project. However, since the Preferred Route provides a moderately reliable indicator of the final alignment, the property inspection was largely limited to the Preferred Route, and the lands immediately adjacent to it, to identify the presence or absence of any features of archaeological potential.

The photography from the property inspection is presented in Section 7.1 and confirms that the requirements 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 6 illustrate typical agricultural fields within the study area which retain archaeological potential. Typical woodlots within the study area, though sparse, are depicted in the background of these photos. Numerous modern disturbances were noted throughout the study area, including existing Union Gas infrastructure (Photos 7 and 8), a former rail line (Photo 9), and municipal road ROWs (Photos 10 to 18). While the road surface, gravel shoulder, and adjacent ditching are visibly disturbed, other portions of the municipal road ROWs, particularly those immediately adjacent to agricultural fields, are not definitively disturbed. Other modern disturbances are noted throughout the study area, including residences, commercial buildings, and greenhouses, but were not photo documented as part of the property inspection. Lastly, portions of primary water sources are noted throughout the study area, specifically, Maxwell Creek and Little Bear Creek (Photos 19 and 20). These areas are low and permanently wet.

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 the 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. However, it is worth noting that extensive land disturbance can eradicate archaeological potential (Wilson and Horne 1995).

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in 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 locations. 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.

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 site location and type 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.

Primary water sources are abundant within the Stage 1 study area. Transecting the study area are primary sources such as Maxwell Creek and Little Bear Creek; and the Sydenham River is adjacent to the northern boundary of the study area. Additional secondary and tertiary creeks and streams from these, and other, primary sources run throughout the study area. Moreover, additional ancient and/or relic tributaries of water sources may have existed but are not identifiable today and are not indicated on historic mapping. Further examination of the study area's natural environment identified soil conditions suitable for Indigenous and Euro-Canadian agriculture, especially in the 19th and 20th centuries following the implementation of municipal drainage systems and agricultural field tiling.

Indigenous trails/paths, clearings, sugar camps, and villages are noted on the early 19th century township surveys and plans. These notations help to further establish a former Indigenous presence within the study area; aiding the determination of potential for the identification of Indigenous archaeological resources.

An examination of the *Ontario Archaeological Sites Database* identified three 19th century archaeological sites within 50 metres of the preliminary Preferred Route. All three sites retain further cultural heritage value or interest and are recommended for Stage 3 archaeological assessment.

For Euro-Canadian sites, archaeological potential can be extended to areas of early Afro-Canadian and 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* (Government of Ontario 1990a) or property that local histories or informants have identified with possible historical events, activities, or occupations. Historical mapping demonstrates that the study area includes early concession roads with structures illustrated as fronting these roads, particularly along Base Line Road. Moreover, Uncle Tom's Cabin Historic Site is situated within the study area, which signifies an important early community and network of relationships related to the Underground Railroad and the fleeing, to the area, of African American slaves from the United States. Much of the established road and rail networks and agricultural settlement from the 19th century is still visible today.

In summary, it has been determined that the majority of the study area retains potential for the identification of pre-contact Indigenous, post-contact Indigenous, and Euro-Canadian/Afro-Canadian archaeological resources. However, as noted above, extensive and deep land alteration can eradicate archaeological potential. The Stage 1 property inspection has determined that portions of the study area, particularly focused around Union Gas' proposed preliminary pipeline route, have been subject to extensive land disturbance which has removed archaeological potential. These areas include modern disturbances associated with existing Union Gas infrastructure (i.e., the TLU for the Panhandle Reinforcement Project [Dawn – Dover]), municipal road ROWs, and an existing former rail line. However, while the road surface, gravel shoulder, and adjacent ditching are visibly disturbed along portions of Simpson Road and Base Line Road, other portions of the municipal road ROWs, particularly those immediately adjacent to agricultural fields, are not definitively disturbed. These portions retain archaeological potential and require confirmation of disturbance. Previous archaeological assessments have been conducted for portions of the Stage 1 study area associated with the Project (see Table 3). As they relate to the current study area, these intersecting and overlapping areas of previous assessment (excepting areas which were only subject to Stage 1 assessment and retain archaeological potential) are considered to retain low to no archaeological potential (i.e., London Museum of Archaeology 1993; Alder Heritage Assessments 1997; Ontario Heritage Trust 2007; Detritus Consulting Ltd. 2013; Golder 2015b; and Stantec 2017a).

As noted above, numerous existing and disturbed farm complexes, residences, ROWs, and other existing features (i.e., existing roads, other railways, wind turbine infrastructure, residential and commercial complexes) were identified throughout the study area; however, they were not specifically examined during the property inspection and may still retain archaeological potential. As such, these areas have been included as part of the determination that the majority of the study area exhibits potential for the identification and recovery of archaeological resources. For example, areas along the various roadways were examined as part of the property inspection and disturbances, such as ditching and buried utilities, were evident; however, the proposed Project impacts were not known at the time of the property inspection and so, the specific ROWs will require further archaeological assessment to confirm complete disturbance.

4.0 RECOMMENDATIONS

The Stage 1 archaeological assessment of the study area for the Project determined that much of the area retains potential for the identification and documentation of archaeological resources. In accordance with Section 1.3.1 and Section 7.7.4 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 archaeological assessment is required for any portion of the Project's anticipated construction easement which impacts an area of archaeological potential (Figure 11).**

The objective of the Stage 2 archaeological assessment will be to document any archaeological resources within the portions of the study area still retaining archaeological potential and to determine whether these archaeological resources require further assessment. 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 provide at least 80% ground surface visibility.

Moreover, for areas inaccessible for ploughing, the Stage 2 archaeological assessment will include a test pit survey at five metre intervals 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.

In addition to the above, areas along the various roadways were examined as part of the property inspection and disturbances, such as ditching, were evident; however, the proposed Project impacts were not known at the time of the property inspection and so, the specific roadways and ROWs will require further archaeological assessment in accordance with Section 2.1.8 of Standard 2 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011b). Any portion of the ROW within agricultural or accessible land may require ploughing and pedestrian survey in accordance with Section 2.1.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011b) noted above, depending on the specific Project impact. Confirmation of disturbance will also be required for any anticipated Project impact to other existing features (i.e., existing roads, railways, and previously constructed wind farm infrastructure; as well as farm complexes, residences, and any other existing feature that was not specifically examined during the property inspection).

If the archaeological field team determines any lands to be low and wet, steeply sloped, or disturbed during the course of the Stage 2 field work, those areas will not require survey, but will be photographically documented in accordance with Section 2.1 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

In addition to the above, the Stage 1 archaeological assessment determined that there are small pockets of previously surveyed lands and disturbed lands within the study area which retain low to no archaeological potential (i.e., London Museum of Archaeology 1993; Alder Heritage Assessments 1997; Ontario Heritage Trust 2007; Detritus Consulting Ltd. 2013; Golder 2015b; and Stantec 2017a). In accordance with Section 1.3.2 and Section 7.7.4 of the MTCS' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), **Stage 2 archaeological assessment is not required for any portion of the Project's anticipated construction easement which impacts a previously surveyed or disturbed area (Figure 11).**

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 still required for portions of the study area and so these portions recommended for further archaeological fieldwork remain subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990a) and may not be altered, or have artifacts removed, except by a person holding an archaeological license.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the 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 O.18 (Government of Ontario 1990a). 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 study area of a development proposal have been addressed to the satisfaction of the MTCS, 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* (Government of Ontario 1990a) 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 Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990a)

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* (Government of Ontario 1990a) 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* (Government of Ontario 1990a)

The *Funeral, Burial and Cremation Services Act,* 2002, S.O. 2002, c.33 (Government of Ontario 2002), requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the Registrar of Cemeteries at the Ministry of Government and Consumer Services is also immediately notified.

Additional archaeological assessment is still required for portions of the study area and so these portions recommended for further archaeological fieldwork remain subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990a) and may not be altered, or have artifacts removed, except by a person holding an archaeological license.

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STAGE 1 ARCHAEOLOGICAL ASSESSMENT: CHATHAM KENT RURAL PIPELINE EXPANSION PROJECT

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STAGE 1 ARCHAEOLOGICAL ASSESSMENT: CHATHAM KENT RURAL PIPELINE EXPANSION PROJECT

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May 17, 2018

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7.0 IMAGES

7.1 PHOTOGRAPHS

Photo 1: Typical Agricultural Field within Study Area – Retains Archaeological Potential, facing Northeast



Photo 2: Typical Agricultural Field within Study Area – Retains Archaeological Potential, facing Northwest



Photo 3: Typical Agricultural Field within Study Area – Retains Archaeological Potential, facing West



Photo 4: Typical Agricultural Field within Study Area – Retains Archaeological Potential, facing West



Images
May 17, 2018

Photo 5: Typical Agricultural Field within Study Area – Retains Archaeological Potential, facing Southeast



Photo 6: Typical Agricultural Field within Study Area – Retains Archaeological Potential, facing West



Photo 7: Existing Union Gas Infrastructure – Disturbed, Low to No Archaeological Potential, facing Northeast



Photo 8 Existing Union Gas Infrastructure – Disturbed, Low to No Archaeological Potential, facing Northwest



Images
May 17, 2018

Photo 9: Former Rail Line – Disturbed, Low to No Archaeological Potential, facing West



Photo 10: Simpson Road ROW – Partially Disturbed, facing North



Photo 11: Simpson Road ROW – Partially Disturbed, facing South



Photo 12: Base Line Road ROW – Partially Disturbed, facing East



Images
May 17, 2018

Photo 13: Base Line Road ROW – Partially Disturbed, facing West



Photo 14: Base Line Road ROW – Partially Disturbed, facing East



Photo 15: Base Line Road ROW – Partially Disturbed, facing East



Photo 16: Base Line Road ROW – Partially Disturbed, facing West



Images
May 17, 2018

Photo 17: Base Line Road ROW – Partially Disturbed, facing West



Photo 18: Base Line Road ROW – Partially Disturbed, facing West



Photo 19: Maxwell Creek – Low and Permanently Wet, Low to No Archaeological Potential, facing Northeast

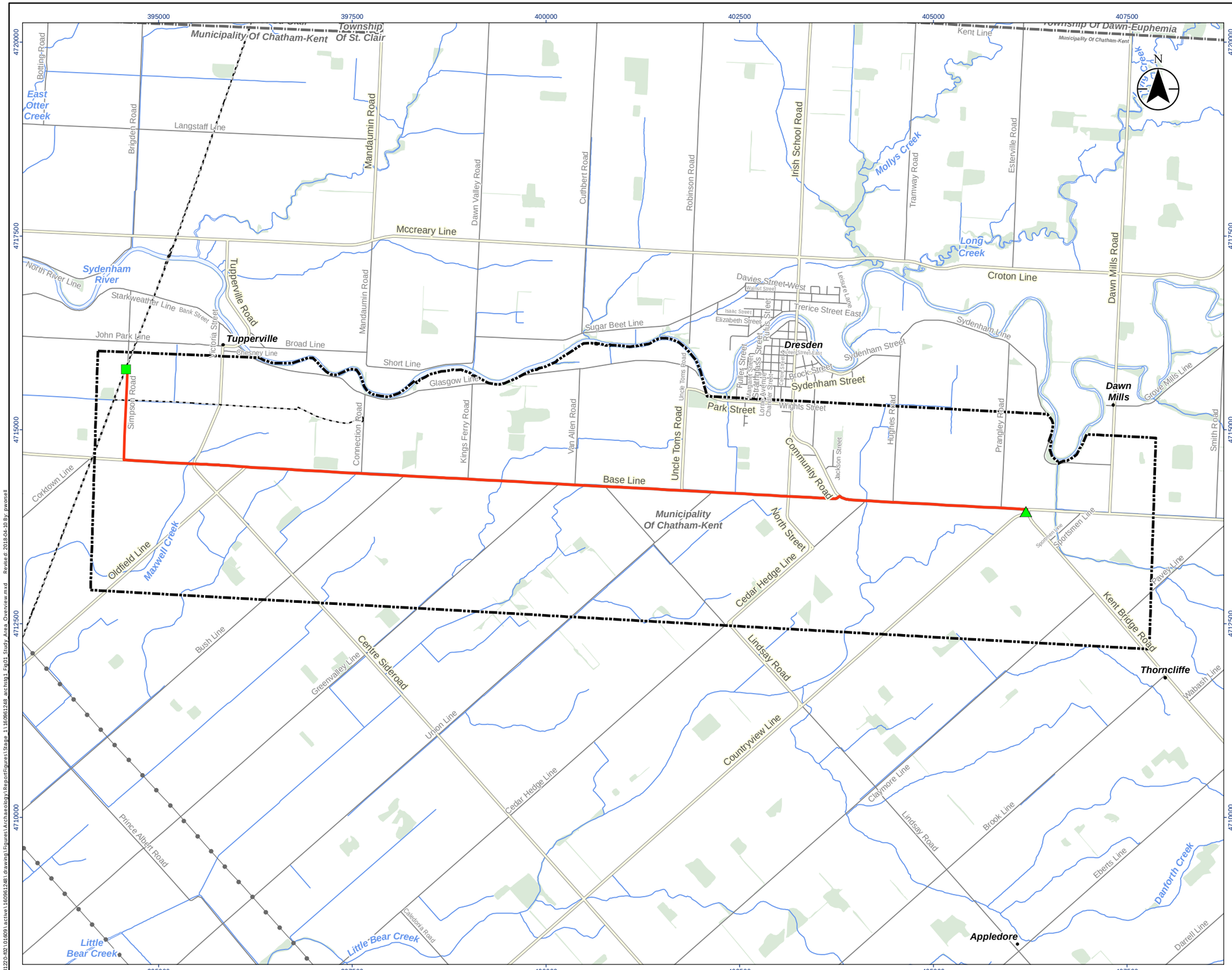


Photo 20: Little Bear Creek – Low and Permanently Wet, Low to No Archaeological Potential, facing Southwest



8.0 MAPS

Maps identifying exact site locations do not form part of this public report; they may be found in the Supplementary Documentation.



Stantec

Legend

- Archaeological Study Area
- Start Point
- End Point
- Preferred Route

Existing Features

- Existing Union Gas Pipeline
- Hydro Line
- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Municipal Boundary, Upper Tier
- Waterbody
- Wooded Area

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-04-10
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-04-10

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
1

Title
Study Area Overview

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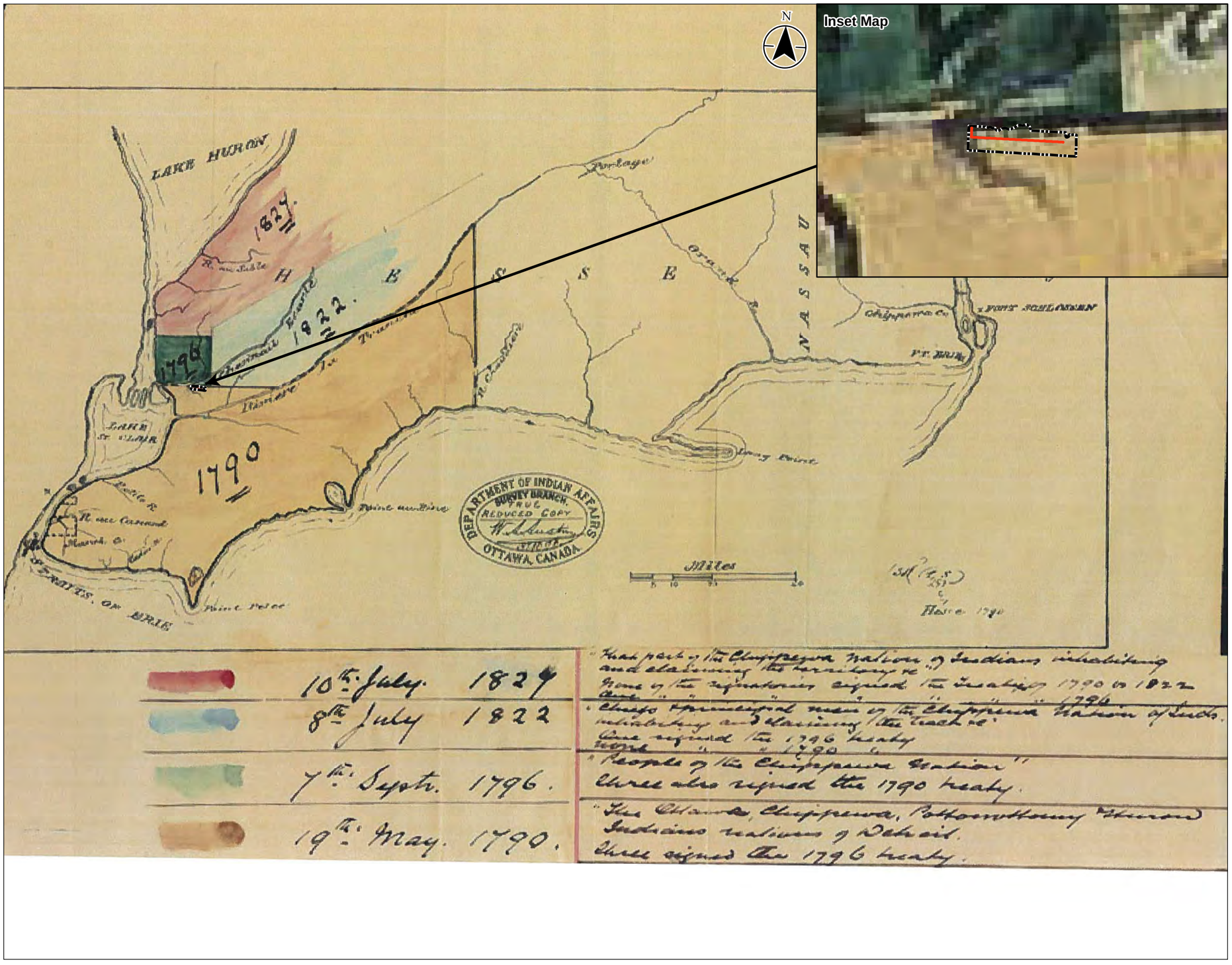

Stantec

Legend

Archaeological Study Area

Preferred Route

Notes

1. Map is not to scale.

2. Government of Canada. n.d.a. Map of Treaty Areas in Upper Canada. Ottawa: Department of Indian Affairs, Survey Branch.

Project Location
Municipality of
Chatham-Kent

160961248 REVA
Prepared by PW on 2018-04-10
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-04-10

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
2

Title
Map of Treaty Areas in Upper Canada

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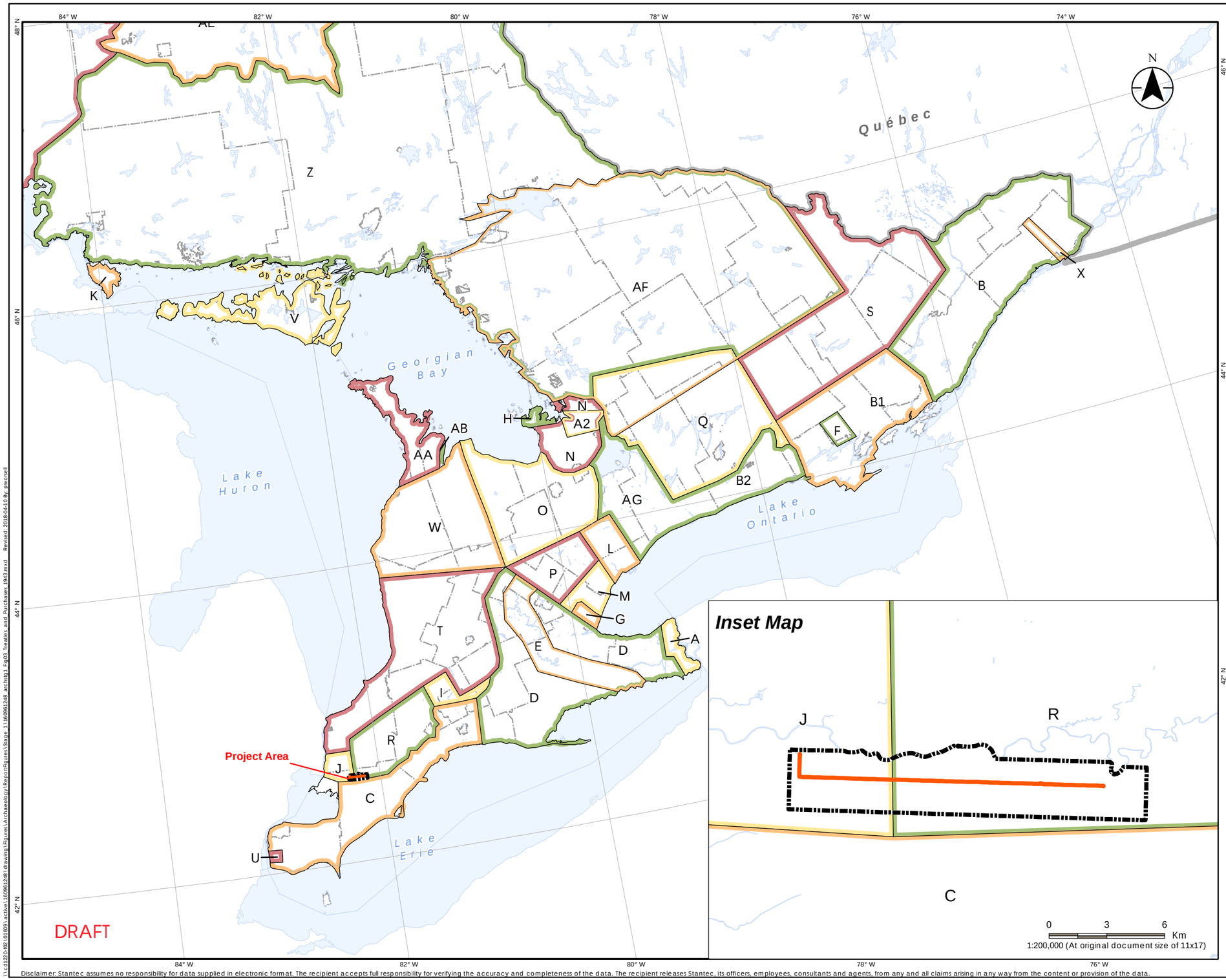

Stantec

Legend

- Archaeological Study Area
- Preferred Route
- Waterbody
- Municipal Boundary - Upper Tier

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)

0 50 100 Km
1:3,000,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-04-10
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
3

DRAFT

Title
Treaties and Purchases
(Adapted from Morris 1943)

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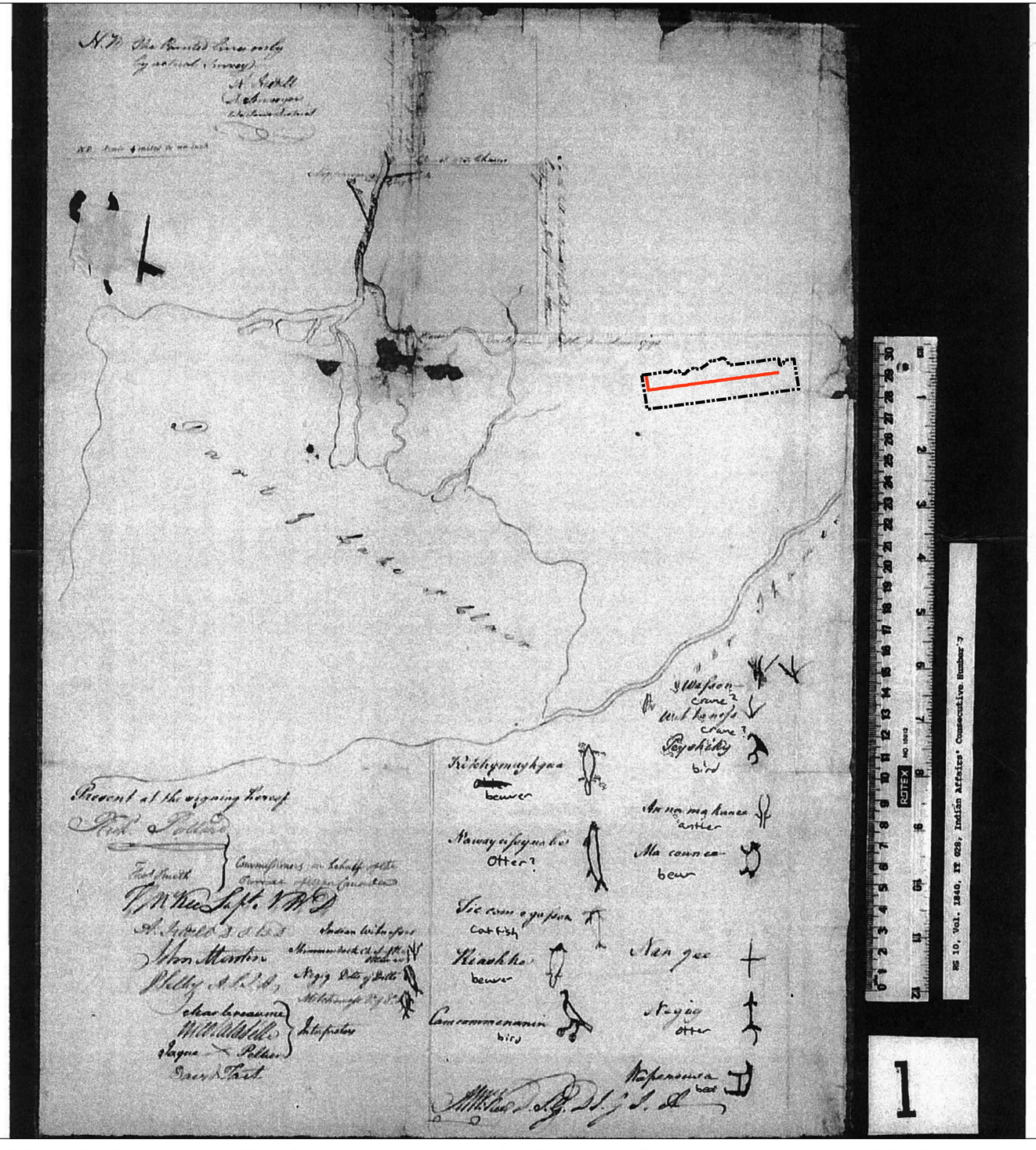

Stantec

Legend

Archaeological Study Area

Preferred Route

Notes

1. Map is not to scale.

2. Government of Canada. n.d.b. Surrender #7, September 7, 1796. Ottawa: National Archives of Canada, File IT026 C-3.

Project Location Municipality of Chatham-Kent	160961248 REVA Prepared by PW on 2018-04-10 Technical Review by DH on 2017-06-01 Independent Review by MK on 2018-04-10

Client/Project

UNION GAS LIMITED

CHATHAM-KENT PIPELINE EXPANSION

Figure No.

4

Title

The 1796 Chenail Ecarté Treaty

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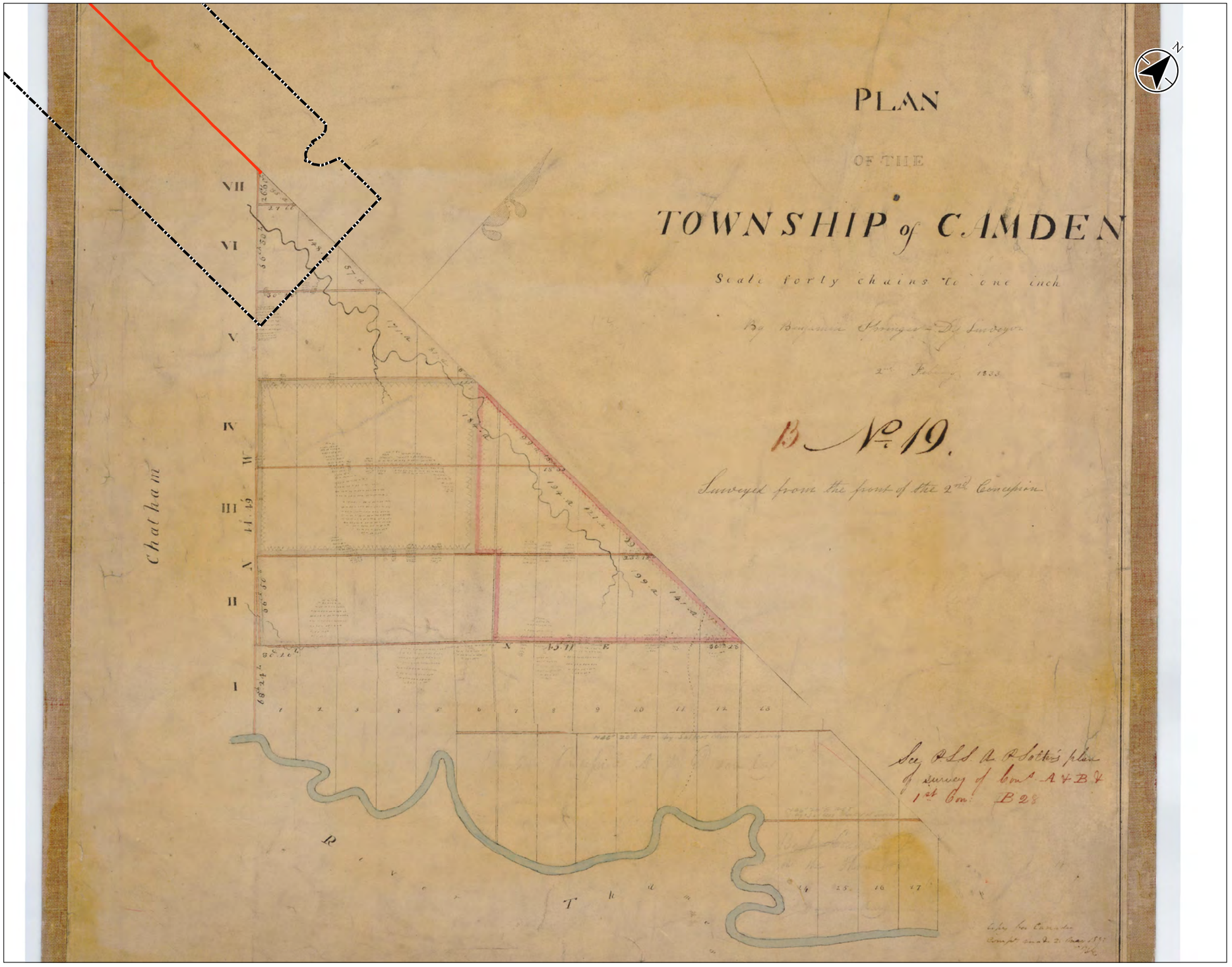

Stantec

Legend
Archaeological Study Area
Preferred Route

Notes
1. Map is not to scale.
2. Historic map source: Springer, Benjamin. 1883. Plan of the Township of Camden. Ministry of Natural Resources and Forestry.

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-04-10
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-04-10

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
5

Title
The 1833 Plan of Camden Township

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Stantec

Legend
Archaeological Study Area
Preferred Route

Notes
1. Map is not to scale.

2. Government of Ontario. n.d.a. Crown Land Surveys. Personal communication: Lisa Casselman, Survey Records Clerk, Ministry of Natural Resources and Forestry.

Project Location
Municipality of
Chatham-Kent

160961248 REVA
Prepared by PW on 2018-04-10
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-04-10

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
6

Title
The 1821 Plan of Camden Gore

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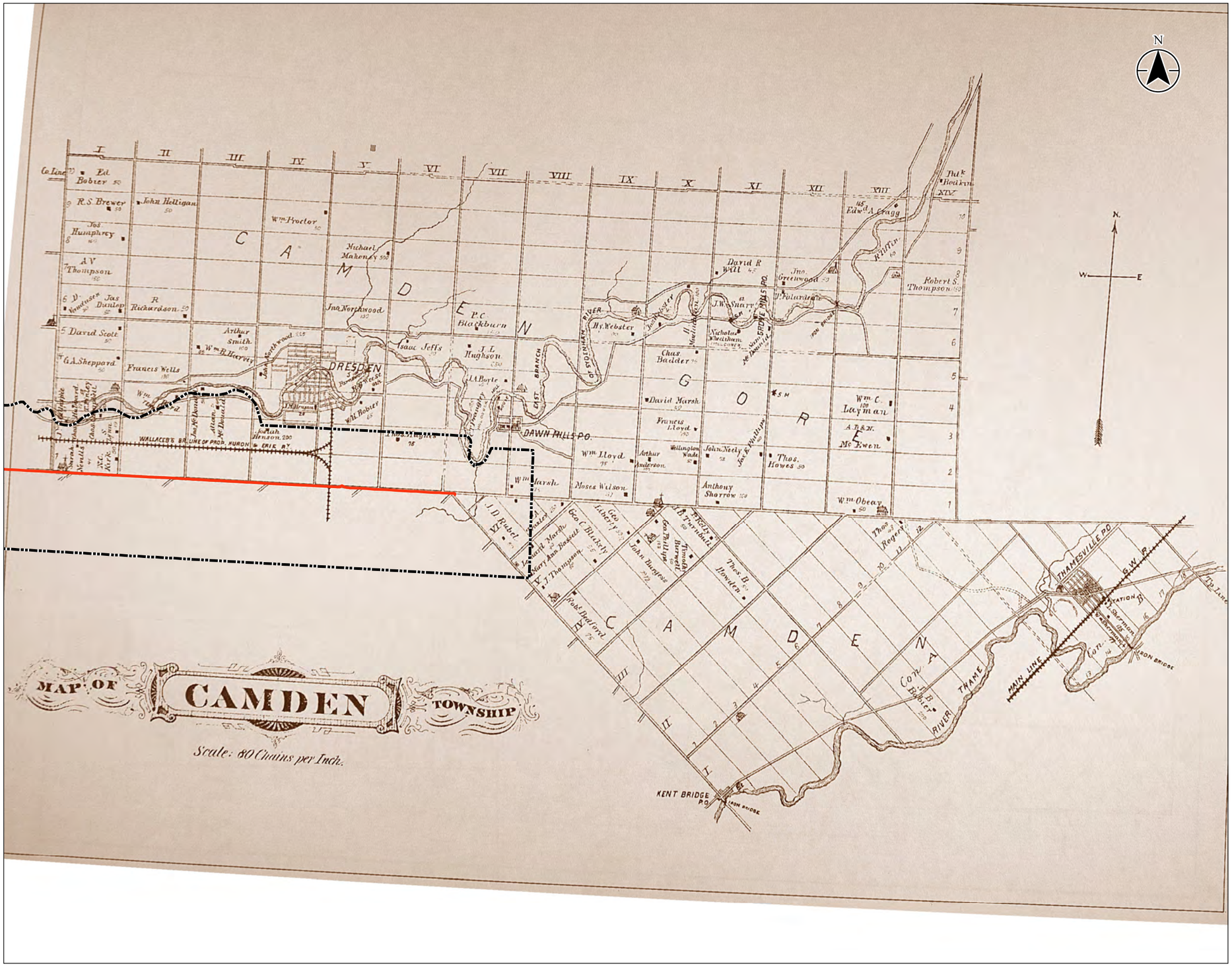
MAP OF CAMDEN TOWNSHIP
Scale: 80 Chains per Inch.
N
DRESDEN
DAWN MILLS P.O.
KENT BRIDGE P.O.
THAMESVILLE P.O.
CAMDEN
GORE
CAMDEN
MAIN LINE
G.W.R.
THAMES RIVER
WALLACE'S BR. LINE OF PROP. HURON & ERIE RY.
Ed. Bobier
R.S. Brewer
John Halligan
Jos. Humphrey
A.V. Thompson
Jas. Dunlop
R. Richardson
David Scott
G.A. Sheppard
Frances Wells
Wm. Proctor
Michael Makenday
Arthur Smith
Wm. B. Herring
Jno. Northwood
Isaac Jeffs
P.C. Blackburn
J.L. Hughson
G.A. Boyle
Hy. Webster
Chas. Badder
David Marsh
Frances Lloyd
Wm. Lloyd
Moses Wilson
Anthony Sharrow
Wm. Obeay
David R. Will
Jno. Greenwood
Robert S. Thompson
Wm. C. Leayman
A.D. & N. McEwen
Thos. Howes
John Neely
Wellington Wade
Arthur Anderson
Thos. Rogers
Thos. B. Howden
Geo. C. Blackly
Geo. Liberty
Mary Ann Bassett
V.J. Thompson
John Burgess
Jacob Bedford
J.D. Rubel
Wm. Marsh
Edw. A. Cragg
Jno. Smart
Nicholas Washburn
Jno. Northwood
Wm. Henson, 200
Wm. H. Bobier
Thos. Sharman
Wm. Fraser
Allan
Wm. McDonald
Sarah A. Neville
N.C. Kirk
Jno. Northwood
Jno. Northwood
Jno. Northwood



Stantec

Legend
- Archaeological Study Area
- Preferred Route

Notes
1. Map is not to scale.

2. Government of Ontario. n.d.a. Crown Land Surveys. Personal communication: Lisa Casselman, Survey Records Clerk, Ministry of Natural Resources and Forestry.

Project Location	160961248 REVA
Municipality of Chatham-Kent	Prepared by PW on 2018-04-10
	Technical Review by DH on 2017-06-01
	Independent Review by MK on 2018-04-10

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
8

Title
The 1809 Survey of Chatham Township

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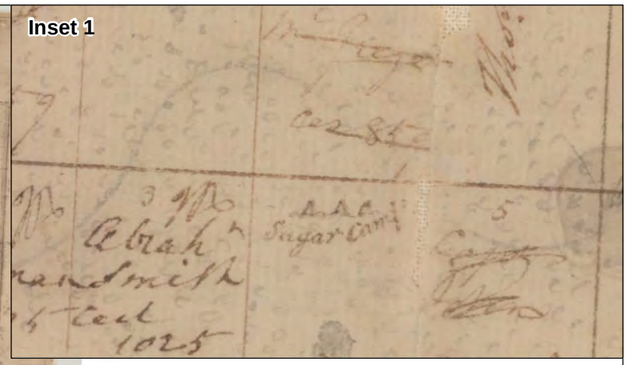





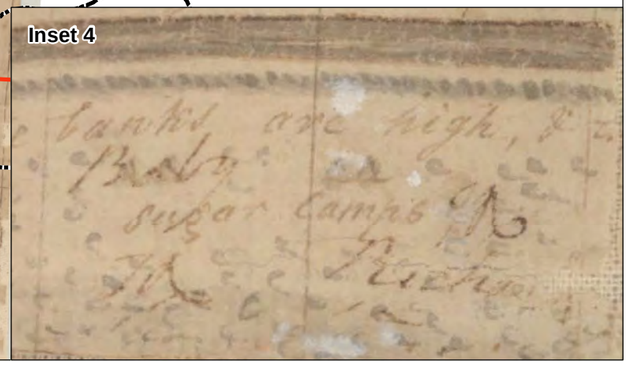

Stantec

Legend
- Archaeological Study Area
- Preferred Route

Notes
1. Map is not to scale.

2. Government of Ontario. n.d.a. Crown Land Surveys. Personal communication: Lisa Casselman, Survey Records Clerk, Ministry of Natural Resources and Forestry.

Project Location	160961248 REVA
Municipality of Chatham-Kent	Prepared by PW on 2018-04-10
	Technical Review by DH on 2017-06-01
	Independent Review by MK on 2018-04-10

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
9

Title
The 1820 Plan of Chatham Gore

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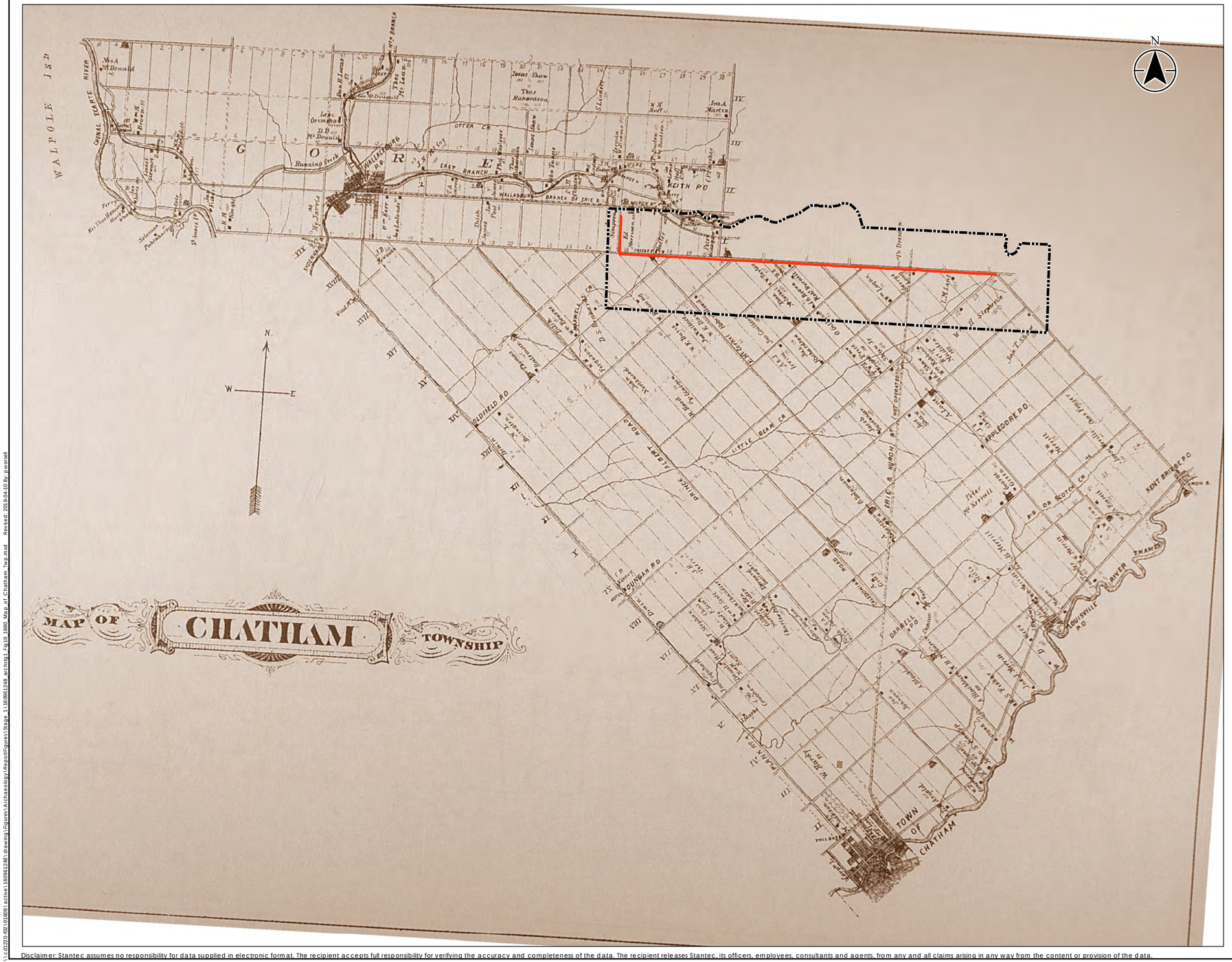

Legend

- Archaeological Study Area
- Preferred Route

Notes

1. Map is not to scale.
2. Belden & Co. 1880b. Illustrated Historical Atlas of the County of Kent Ont. Toronto: H. Belden & Co.

Project Location	160961248 REVA
Municipality of Chatham-Kent	Prepared by PW on 2018-04-10
	Technical Review by DH on 2017-06-01
	Independent Review by MK on 2018-04-10

Client/Project

UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.

10

Title

The 1880 Map of Chatham Township

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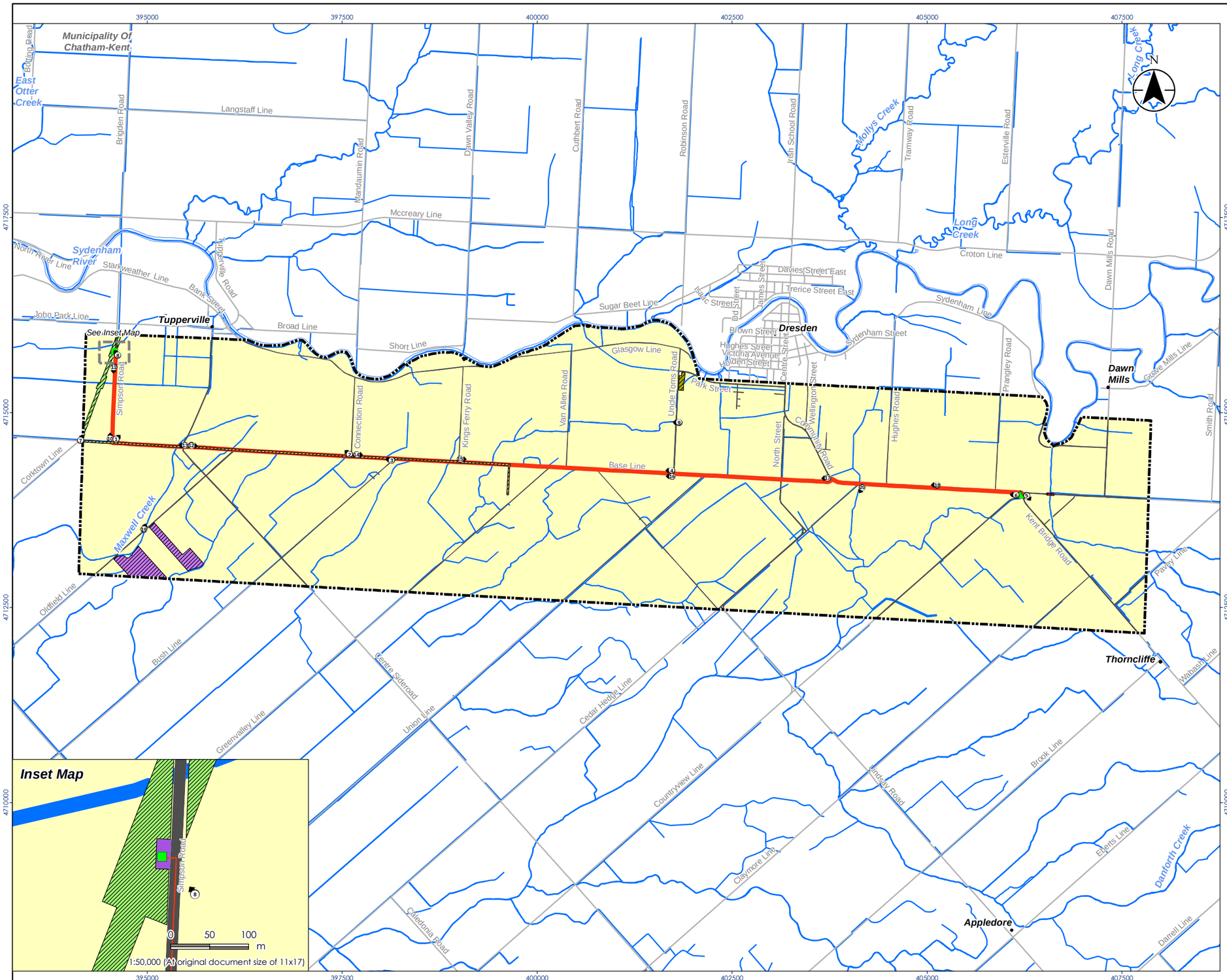

Stantec

Legend

- Archaeological Study Area
- Start Point
- End Point
- Photo Location
- Preferred Route
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody

Archaeological Potential

- Area of Archaeological Potential - Stage 2 Archaeological Assessment Required
- Municipal Road ROW, May Retain Archaeological Potential – Stage 2 Archaeological Assessment Required
- Existing Union Gas Infrastructure, Low to No Archaeological Potential - No Further Work Required
- Low and Permanently Wet Areas, Low to No Archaeological Potential - No Further Work Required
- Previously Surveyed No Further Work Required (Golder, 2015b)
- Previously Surveyed No Further Work Required (Detritus, 2013)
- Previously Surveyed No Further Work Required (London Museum of Archaeology, 1993; Ontario Heritage Trust, 2007)
- Previously Assessed, No Further Work Required (Stantec, 2017)
- Previously Assessed, No Further Work Required (Alder Heritage Assessments, 1997)

0 1 2 km

1:50,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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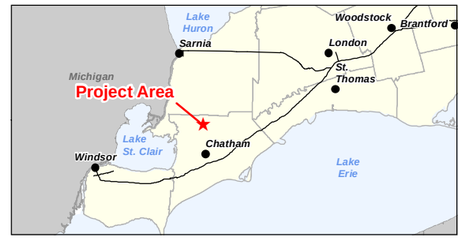

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-04-10
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-04-10

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
11

Title
Archaeological Potential of the Study Area

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9.0 CLOSURE

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All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. The conclusions are based on the conditions encountered by Stantec at the time the work was performed. Due to the nature of archaeological assessment, which consists of systematic sampling, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire property.

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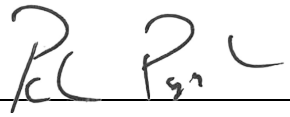
Quality Review 

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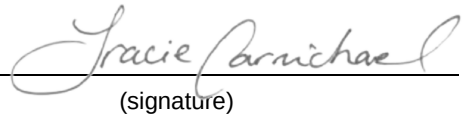
Independent Review 

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Chatham-Kent Rural Pipeline Expansion Project: Cultural Heritage Assessment Report



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May 31, 2018

Sign-off Sheet

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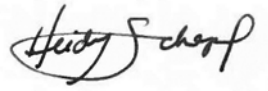

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Table of Contents

EXECUTIVE SUMMARY I

PROJECT PERSONNEL III

ABBREVIATIONS IV

GLOSSARY V

1.0 INTRODUCTION 1.1
1.1 STUDY PURPOSE AND OBJECTIVES 1.1
1.2 PROJECT OVERVIEW 1.1
1.3 ACTIVITY SUMMARY 1.2

2.0 METHODOLOGY 2.1
2.1 REGULATORY REQUIREMENTS 2.1
2.2 MUNICIPAL AND AGENCY CONSULTATION 2.2
2.3 FIELD PROGRAM 2.2
2.4 EVALUATION OF CULTURAL HERITAGE VALUE OR INTEREST 2.3
2.4.1 Ontario Regulation 9/06 ..... 2.3
2.5 ASSESSMENT OF PROJECT IMPACTS 2.3
2.6 MITIGATION STRATEGIES 2.4

3.0 HISTORICAL DEVELOPMENT 3.1
3.1 INTRODUCTION 3.1
3.2 PHYSIOGRAPHY 3.2
3.3 SURVEY AND SETTLEMENT 3.3
3.4 19TH CENTURY DEVELOPMENT 3.5
3.4.1 Township of Chatham 3.5
3.4.2 Township of Camden 3.6
3.5 20TH CENTURY DEVELOPMENT 3.7
3.6 SITE HISTORY 3.8
3.6.1 Lot 1, Concession 1, Camden Gore, Camden Township 3.8
3.6.2 Lot 1, Concession 2, Camden Gore, Camden Township 3.8
3.6.3 Lot 1, Concession 3, Camden Gore, Camden Township 3.9
3.6.4 Lot 1, Concession 4, Camden Gore, Camden Township 3.9
3.6.5 Lot 1, Concession 5, Camden Gore, Camden Township 3.9
3.6.6 Lot 1, Concession 6, Camden Gore, Camden Township 3.9
3.6.7 Lot 1, Concession 7, Camden Gore, Camden Township 3.9
3.6.8 Lot 1, Concession 7, Camden Township 3.10
3.6.9 Lot 25, Concession 1, Chatham Gore, Chatham Township 3.10
3.6.10 Lot 26, Concession 1, Chatham Gore, Chatham Township 3.10
3.6.11 Lot 27, Concession 1, Chatham Gore, Chatham Township 3.10
3.6.12 Lot 28, Concession 1, Chatham Gore, Chatham Township 3.10
3.6.13 Lot 29, Concession 1, Chatham Gore, Chatham Township 3.10
3.6.14 Lot 30, Concession 1, Chatham Gore, Chatham Township 3.11

3.6.15 Lots 21 to 24, Concession 8, Chatham Township....3.11
3.6.16 Lot 20, Concession 10, Chatham Township....3.11
3.6.17 Lots 21 to 22, Concession 10, Chatham Township....3.11
3.6.18 Lots 18 to 20, Concession 11, Chatham Township....3.12
3.6.19 Lot 15, Concession 12, Chatham Township....3.12
3.6.20 Lot 16, Concession 12, Chatham Township....3.12
3.6.21 Lot 17, Concession 12, Chatham Township....3.12
3.6.22 Lot 18, Concession 12, Chatham Township....3.12
3.6.23 Lot 13, Concession 13, Chatham Township....3.12
3.6.24 Lot 14, Concession 13, Chatham Township....3.12
3.6.25 Lot 15, Concession 13, Chatham Township....3.13
3.6.26 Lot 11, Concession 14, Chatham Township....3.13
3.6.27 Lot 12, Concession 14, Chatham Township....3.13
3.6.28 Lot 13, Concession 14, Chatham Township....3.13

4.0 RESULTS....4.1
4.1 AGENCY AND MUNICIPAL CONSULTATION....4.1
4.2 FIELD PROGRAM....4.2
4.2.1 Potential Heritage Resources....4.2
4.2.2 OEB Guideline Indicators....4.3
4.3 EVALUATION OF CULTURAL HERITAGE VALUE OR INTEREST....4.4

5.0 EVALUATION OF ANTICIPATED IMPACTS AND MITIGATION OPTIONS....5.1
5.1 DESCRIPTON OF UNDERTAKING....5.1
5.2 RELATIONSHIP TO PROJECT....5.1
5.3 ANTICIPATED IMPACTS....5.2
5.3.1 Summary of Impacts....5.7
5.4 MITIGATION OPTIONS....5.7

6.0 RECOMMENDATIONS....6.1
6.1 AVOIDANCE OF CULTURAL HERITAGE RESOURCES....6.1
6.2 SITE PLAN CONTROLS....6.1
6.2.1 Condition Surveys and Vibration Monitoring....6.1
6.3 ENVIRONMENTAL MONITORING AND REPORTING....6.2
6.4 DEPOSIT COPIES....6.2

7.0 SOURCES....7.1

LIST OF TABLES

Table 1: Identified and Protected Heritage Resources with the Study Area....4.2
Table 2: Indicators of CHVI According to Section 4.3.4 of the *OEB Environmental Guidelines*....4.3
Table 3: Summary of Determination of CHVI....4.5
Table 4: Evaluation of Potential Impacts....5.2
Table 5: Evaluation of Mitigation and Avoidance Options....5.8

LIST OF APPENDICES

APPENDIX A: FIGURES
- Figure 1: Project Location
- Figure 2: Study Area
- Figure 3: Kent County 1876
- Figure 4: Kent County 1881
- Figure 5: Potential and Protected Cultural Heritage Resources
- Figure 6: Identified Cultural Heritage Resources

APPENDIX B: CULTURAL HERITAGE INVENTORY FORMS

Executive Summary

Union Gas Limited (Union Gas) is proposing to construct a new eight-inch diameter natural gas pipeline, approximately 13 kilometres in length, in the Municipality of Chatham-Kent. This proposed pipeline begins at Union Gas' existing Simpson Road Station, (near the community of Tupperville) and proceeds south within the road allowance of Simpson Road and east within the road allowance of Base Line to an endpoint just south of the intersection of Base Line and Kent Bridge Road east of Dresden. This project comprises various lots and concessions within the former County of Kent, including sections of the former townships of Camden and Chatham, now the Municipality of Chatham-Kent. This proposed pipeline will meet the growing residential, agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent, including in the fast-growing greenhouse market. Construction is planned to begin as early as Spring/Summer 2019 with an in-service date approximately six months after the start of construction.

Union Gas retained Stantec to undertake an environmental study of the construction and operation of the natural gas pipeline. The Ontario Energy Board (OEB) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario* (the *Environmental Guidelines*) (OEB 2011) require that where the Project may affect known or potential heritage resources, further studies may be required. In order to identify the presence of heritage resources within the Study Area, understand the potential impacts of the Project on these resources, and prepare mitigation strategies to minimize these impacts, it was determined that a Cultural Heritage Assessment Report (CHAR) would be prepared.

The study methodology is broadly based on guidelines provided by Ministry of Tourism, Culture and Sport (MTCS) within InfoSheet #5 in *Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (Government of Ontario 2006a). The *OEB Environmental Guidelines* make provisions for the consideration of heritage in the pipeline development planning stage of the Project. The *OEB Environmental Guidelines* stipulate that pipeline proponents are responsible for demonstrating the appropriate level of due diligence regarding heritage resources. This involves identification of heritage resources and the assessment of impacts of the Project on these resources.

Where a potential heritage resource was identified within the Study Area, an evaluation of the cultural heritage value or interest of the property, or properties, was undertaken. Where cultural heritage value or interest 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 within Appendix B. A total of 41 heritage resources were identified within the Study Area following evaluation.

Where a heritage resource was identified within or across the Project Location, an assessment of potential impacts resulting from the Project was undertaken. The assessment of potential impacts was undertaken according to Info Sheet #5 (Government of Ontario 2006b). Given the proposed undertaking,

the evaluation of potential impacts was undertaken where a component, or heritage attribute, of the heritage resource was positioned within the Project Location.

Where potential impacts are identified, measures to mitigate the impact have been prepared. A total of 29 cultural heritage resources were determined to be situated within the 50-metre buffer of the preferred pipeline route. In order to prevent negative indirect Project Impacts, these heritage resources should be isolated from Project activities. It is recommended that site plan controls be put in place prior to construction to prevent potential indirect impacts as a result of the Project. The site plan control methods shall be determined in advance of construction by the proponent to indicate where Project activities are restricted. As described in Section 5.4, site plan controls should include mapping heritage resources within the 50-metre buffer on construction maps and physically demarcating these properties to communicate the presence of these properties to construction crews.

Three built heritage resources are located within 15 metres of Project activities. These resources are at risk for indirect impacts resulting from construction-related ground vibration. To mitigate this risk, vibration monitoring, including pre-construction condition survey, vibration monitoring of PPV during construction, and post-construction condition survey should be carried out by a qualified building condition specialist or geotechnical engineer with previous experience working with heritage structures.

To assist in the retention of historic information, copies of this report should be deposited with local libraries and municipalities. It is recommended that this report be deposited at the Chatham-Kent Public Library and the Chatham-Kent Municipal Heritage Committee.

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Abbreviations

BHR	Built Heritage Resource
CHAR	Cultural Heritage Assessment Report
CHL	Cultural Heritage Landscape
CHR	Cultural Heritage Resource
CHVI	Cultural Heritage Value or Interest
ER	Environmental Report
HR	Heritage Resource
MTCS	Ministry of Tourism, Culture and Sport
OEB	Ontario Energy Board
OHA	*Ontario Heritage Act*
OHT	Ontario Heritage Trust
O. Reg.	Ontario Regulation
PPS	Provincial Policy Statement
RoW	Right-of-Way

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 2014 Provincial Policy Statement (PPS) (Government of Ontario 2014)).
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 2014).
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 cultural heritage value or interest 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 2014).

Potential Heritage Property	Refers to any property previously identified by municipal staff or provincial agencies as containing, or having the potential to contain, cultural heritage value or interest. 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 any land or air space in, on, over, or under which part of the proposed pipeline is situated.
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 2014).
Study Area	Refers to all properties through which the Project Location is proposed to pass through plus a 50-metre area surrounding the Project components. 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

In 2018, Union Gas Limited (Union Gas) retained Stantec Consulting Ltd. (Stantec) to conduct an environmental study addressing a proposed natural gas pipeline approximately 13 kilometres in length (the Project) (Figure 1, Appendix A). As part of this study, Stantec identified the need to consider heritage resources as defined by Section 4.3.4 of the *Ontario Energy Board (OEB) Environmental Guidelines* (the *Environmental Guidelines*) (OEB 2011). The *Guidelines* require that where the Project may affect known or potential heritage resources, further studies may be required. In order to identify the presence of heritage resources within the Study Area, understand the potential impacts of the Project on these resources, and prepare mitigation strategies to minimize these impacts, it was determined that a Cultural Heritage Assessment Report (CHAR) would be prepared.

To meet these objectives, the CHAR:

- Summarizes the historical context of the area surrounding the Project
- Identifies properties protected under the *Ontario Heritage Act* (OHA) through consultation with the local heritage planners and regulatory bodies
- Identifies and describes potential heritage resources situated on properties within the Project Location based on a windshield survey of the Study Area
- Evaluates the cultural heritage value or interest (CHVI) of potential heritage resources at the Project Location according to *Ontario Regulation* (O. Reg.) *9/06* to determine the heritage resources within the Study Area (Government of Ontario 2006a)
- Identifies areas of potential impacts according to the Ministry of Tourism, Culture and Sport's (MTCS) *InfoSheet #5 in Heritage Resources in the Land Use Planning Process, Cultural Heritage and Archaeology Policies of the Ontario Provincial Policy Statement, 2005* (Government of Ontario 2006b)
- Establishes measures to mitigate negative direct or indirect impacts to heritage resources associated with construction and operation of the Project

1.2 PROJECT OVERVIEW

To secure the continued reliable delivery of natural gas and to serve a growing demand for affordable natural gas, Union Gas is proposing to construct an approximately 13 kilometre, 8-inch natural gas pipeline in the Municipality of Chatham-Kent. This proposed pipeline will begin at Union Gas' existing Simpson Road Station near the community of Tupperville and proceed south within the road allowance of Simpson Road and east within the road allowance of Base Line Road to an endpoint just south of the intersection of Base Line and Kent Bridge Road, east of Dresden. Construction is planned to begin as early as Spring/Summer 2019 with an in-service date approximately six months after the start of

construction. This proposed pipeline will meet the growing residential, agricultural, commercial, and industrial market demand for natural gas in Chatham-Kent, including in the fast-growing greenhouse market.

1.3 ACTIVITY SUMMARY

The pipeline construction process includes various activities as described below:

1. Stringing: The stringing crew lays pipe on wooden skids adjacent to the trench area.
2. Pipe Fabrication: Next, the pipe is bent as required and the welding crew welds the pipe into continuous lengths. The pipe welds are non-destructively tested (i.e. x-ray) and coated.
3. Trenching and Lowering: After the pipe is fabricated, a trenching machine or hydraulic hoe can begin excavating a new trench. In agricultural areas, tiles that are cut during the trench excavation are flagged and repaired as quickly as practical. Crews also install pipes under obstacles such as roads or watercourses through a variety of different means.
4. Backfilling: The backfilling crew backfills the originally excavated soils over the pipe in the trench. In stony areas the pipe may be sand-padded to protect the coating. In shallow water table areas the pipeline may be weighted to provide negative buoyancy. In agricultural areas, after the trench is backfilled, a tiling crew repairs disturbed or broken tiles. Landowners with tile drainage are given the opportunity to inspect tile repairs. A tile consultant is retained to oversee tile repairs and the design of a header tile system if required.
5. Hydrostatic Testing: The pipeline is then tested hydrostatically. Water is typically drawn by permit from nearby water sources such as watercourses or lakes, if available. Municipal water may at times also be used for hydrostatic testing. Upon completion of the hydrostatic testing, the pipeline is purged of air and packed with natural gas.
6. Clean-Up and Restoration: The clean-up crew is responsible for the restoration of the right-of-way (RoW) and other work areas. On agricultural land, this may require decompaction of the subsoil (i.e. chisel ploughing) and stone picking to maintain productivity. In natural areas, the clean-up crew undertakes restoration including re-seeding of the RoW and restoring ditch banks, watercourse crossings, and wetland areas, and removing erosion and sediment controls. In developed areas the clean-up crew undertakes landscaping plans developed for site restoration.

2.0 METHODOLOGY

2.1 REGULATORY REQUIREMENTS

The study methodology is broadly based on guidelines provided by MTCS within InfoSheet #5 (Government of Ontario 2006b). As discussed briefly in Section 1.0, the *OEB Environmental Guidelines* make provisions for the consideration of heritage resources in the pipeline development planning stage of the Project. The *OEB Environmental Guidelines* stipulate that pipeline proponents are responsible for demonstrating the appropriate level of due diligence regarding heritage resources. This involves both the identification of heritage resources and the assessment of impacts of the Project on these resources. According to the *OEB Environmental Guidelines*, due diligence should be exhibited by:

- *Recognizing cultural heritage resources that may be affected by pipeline development, identifying significant cultural heritage resources and understanding their cultural heritage value or interest*
- *Assessing the effects or impacts that could result from proposed pipeline development*
- *Protecting cultural heritage resources by appropriate conservation, avoidance and mitigation*

(OEB 2011:34)

In addition to requirements outlined in the *OEB Environmental Guidelines*, provisions made under the revised 2014 *Provincial Policy Statement* (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 2014: 29)

In response to requirements outlined within Infosheet #5, the *OEB Environmental Guidelines*, and the PPS, Stantec has identified built heritage resources and cultural heritage landscapes; evaluated the impacts of the proposed undertaking on the resources and landscapes; and provided options to mitigate those impacts and to conserve protected properties, if applicable.

The CHAR 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 was consulted to identify the presence of structures, settlements, and other potential heritage resources in advance of the field program. Mapping from 1876, 1881, 1913, 1924, 1931, 1939, and 1974 was reviewed.

2.2 MUNICIPAL AND AGENCY CONSULTATION

Listings of provincially and locally designated properties, districts and easements for each municipality were collected from the Municipality of Chatham-Kent, the Ontario Heritage Trust (OHT), and the MTCS. Consultation with 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. A property can be designated or listed under the OHA as well as registered municipally. These properties are considered to be protected heritage properties and protected properties, respectively.

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. Specific requirements pertaining to protected properties are described within the *OEB Environmental Guidelines* which emphasize that early identification allows the proponent to consider the impact the Project may have on protected heritage properties.

2.3 FIELD PROGRAM

A vehicular windshield survey was conducted by Stantec on May 15 and May 28, 2018 from publicly accessible roadways, unless specified otherwise. During the survey, the Study Area was surveyed for potential heritage resources, including both potential built heritage resources and components of 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 their locations recorded.

In general, buildings and structures of more than 40 years of age were screened 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 cultural heritage interest or value. This practice does not imply that all buildings and structures 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 are 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 CHR (Cultural Heritage Resource) number and the property was determined to contain a heritage resource. Evaluations for each property are contained within Appendix B.

2.4.1 Ontario Regulation 9/06

In order to identify cultural heritage value or interest 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).

2.5 ASSESSMENT OF PROJECT IMPACTS

Where a heritage resource was identified within or across the Study Area, an assessment of potential impacts as a result of the Project was undertaken. The assessment of potential impacts was undertaken according to InfoSheet #5. Seven potential negative impacts have been identified, including, but not limited to:

- *Destruction of any, or part of any, significant heritage attributes or features*
- *Alteration that is not sympathetic, or is incompatible, with the historic fabric and appearance*

- *Shadows created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden*
- *Isolation of a heritage attribute from its surrounding environment, context or a significant relationship*
- *Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features*
- *A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces*
- *Land disturbances such as a change in grade that alters soils, and drainage patterns that adversely affect an archaeological resource*

(Government of Ontario 2006b)

Indirect impacts resulting from land disturbances apply to archaeological resources, which are beyond the scope of this assessment. An Archaeological Assessment has been prepared under a separate cover, which addresses the archaeological potential of the Study Area and includes recommendations for further work (Stantec 2018). No further consideration to archaeological resources is provided in this report and the recommendations of the Stage 1 Archaeological Assessment should be followed to mitigate impacts related to land disturbance (Stantec 2018).

In addition to direct impacts related to destruction, this report also evaluates the potential for indirect impacts resulting from construction vibrations and the transportation of Project components and personnel. To establish appropriate buffer zones to capture vibration related impacts resulting from typical road construction activities, Shahram Siavash, Geotechnical Engineer with Stantec, was consulted.

Ground movements induced by construction vibration are found to dissipate with distance from the source. The severity of soil movements depends primarily on type and compactness/consistency of the surrounding soils particularly between the source, receiver, and groundwater levels. The source, duration, frequency of occurrences of vibration, and the foundation-footing interaction also contribute to the strains induced in structures. In the absence of *in situ* soil data and considering the typical vibration levels induced by anticipated construction equipment associated with the proposed pipeline construction, a 15 metre buffer is recommended as an appropriate distance from pipeline construction activities. Vibration monitoring is recommended where CHRs are located within 15 metres of the proposed work.

2.6 MITIGATION STRATEGIES

Mitigation strategies were prepared based on guidelines provided by both the MTCS and the OEB. The MTCS suggest methods of minimizing or avoiding negative direct or indirect impacts including, but not limited to:

- *Alternative development approaches*
- *Isolating development and site alteration from significant built and natural features and vistas*
- *Design guidelines that harmonize mass, setback, setting, and materials*
- *Limiting height and density*

- *Allowing only compatible infill and additions*
- *Reversible alterations*
- *Buffer zones, site plan control, and other planning mechanisms*

(Government of Ontario 2006b)

In the case of pipeline projects, as discussed in more detail in Section 5.4 buffer zones and site plan controls are often the most appropriate method of mitigation when used in combination with alternative development approaches.

3.0 HISTORICAL DEVELOPMENT

3.1 INTRODUCTION

The Study Area is located in southwestern Ontario within the Municipality of Chatham-Kent (Figure 1). The Study Area extends from the existing Union Gas Simpson Road Station (near the community of Tupperville) on Simpson Road, south to Base Line, then extends east along Base Line to just south of the intersection of Base Line and Kent Bridge Road (Figure 2).

The Study Area spans across the following historical lots and concessions of the former Township of Camden, within the former County of Kent, now the Municipality of Chatham-Kent:

- Lot 1, Concession 1 Camden Gore
- Lot 1, Concession 2 Camden Gore
- Lot 1, Concession 3 Camden Gore
- Lot 1, Concession 4 Camden Gore
- Lot 1, Concession 5 Camden Gore
- Lot 1, Concession 6 Camden Gore
- Lot 1, Concession 7 Camden Gore
- Lot 1, Concession 7

The Study Area also spans across the following historical lots and concessions of the former Township of Chatham, within the former County of Kent, now the Municipality of Chatham-Kent:

- Lots 25 to 30, Concession 1 Chatham Gore
- Lots 21 to 24, Concession 8
- Lots 19 to 24, Concession 9
- Lots 20 to 22, Concession 10
- Lots 18 to 20, Concession 11
- Lots 15 to 18, Concession 12
- Lots 13 to 15, Concession 13
- Lots 11 to 13, Concession 14

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 across two physiographic regions, the St. Clair Clay Plain and the Bothwell Sand Plain (Chapman and Putnam 1984). The physiography of these regions highly influenced the late settlement and farming in the County of Kent, until more advanced artificial drainage was implemented in the late 19th century.

The St. Clair Clay Plains is an extensive area of clay plains covering 5,880 square kilometres in Essex, Kent, and Lambton counties. 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 (Chapman and Putnam 1984: 147). The region is mostly of underlying limestone, with some areas of black shale. In the Township of Chatham, a shallow surface layer of sand on the clay is prevalent, except for the Chatham flats which are a small region of highly fertile soils (Chapman and Putnam 1984: 150).

Situated to the south of the St. Clair Plain is the Bothwell Sand Plains. The region is the delta of the Thames River, and is positioned between approximately 185 to 215 metres above sea level. As the water table is so close to the surface, the landscape depressions are swampy or wet areas. The region is covered by thinly spread sand over a clay floor, where water regularly collects before slowly percolating into the clay below (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 landowners for the construction of drains in southwestern Ontario (Burr 2006: 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 and several drains (Plate 1 to Plate 4).



Plate 1: Drainage ditch at the intersection of Base Line and Connection Road



Plate 2: Drain west of Simpson Road north of Base Line



Plate 3: Drain east of Simpson Road north of Base Line



Plate 4: Drain south of Base Line between Greenvalley Line and Lindsay Road

3.3 SURVEY AND SETTLEMENT

The American Revolution concluded in 1783 with the signing of the Treaty of Paris, formally recognizing American independence. During the war and afterwards, an influx of United Empire Loyalists entered Quebec, which included land in present-day Ontario. Frederick Haldimand, Governor of Quebec, proposed formally settling the Loyalists in southern Quebec, writing the new settlers “would be attached to the interests of Great Britain and capable of being useful upon many occasions” (Craig 1963: 5). Guy Carleton succeeded Haldimand as Governor and in 1788 divided the province into four districts, Lunenburg, Mecklenburg, Nassau, and Hesse. Each district was to have a court system and land board (Craig 1963: 12). The Study Area was located within Hesse District.

The Hesse District Land Board held its first meeting on June 19, 1789. In the summer of 1790, Patrick McNiff, Deputy Surveyor, was instructed to survey the vast tract of land along Lake Erie from Detroit to Long Point. McNiff reported the steep banks of Lake Erie between Point Pelee and Long Point made

settlement centred around the lake impractical. The Land Board decided to front the townships along the Thames River (Hamil 1951: 16). When McNiff was completing his survey, he noted 28 log houses in the Chatham region. Early squatters on the lots that fronted the Thames River included people from Detroit, United Empire Loyalists and some French Canadians (Lauriston 1952: 49). McNiff, recognizing the land rights of these squatters, wrote to the Land Committee of the Executive Council protesting that they should be able to keep their already cultivated lots, instead of being moved to lots further north of the river. The squatters also petitioned the Land Committee and were granted the lots along the river (Hamil 1951: 17).

McNiff began laying out the roughly 200-acre lots fronting the Thames River in the Townships of Dover East, Chatham, Raleigh, Harwich, and parts of Howard and Camden. Both the townships of Chatham and Camden, except for the Camden-Gore, were surveyed using the single-front survey system, with each concession comprised of long and narrow lots that were approximately 200 acres in size (Plate 5). The Camden-Gore was laid out using the double-front survey system, that created a rectangular pattern of 100-acre lot allowances surrounded by road allowances (Plate 6).

The *Constitution Act* of 1791 divided the Province of Quebec into Upper and Lower Canada. The division was created at the behest of the United Empire Loyalists who wished to live under the same English customs and legal procedures they had lived under in Britain and the former 13 Colonies (Craig 1963: 17). John Graves Simcoe was appointed the first Lieutenant Governor of Upper Canada. In July 1792, Simcoe renamed the districts and divided the province of Upper Canada into 19 counties, including the County of Kent, within the renamed Western District (Archives of Ontario 2015).



Plate 5: Single-Front Survey System (Dean 1969)

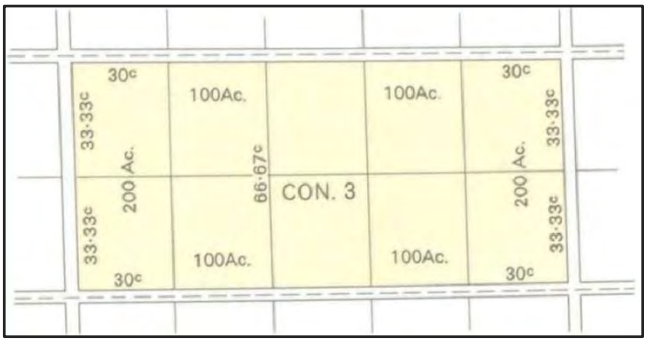

Plate 6: Double-Front Survey System (Dean 1969)

While surveying the forks of the Thames River, at the current-day downtown core of Chatham-Kent, McNiff realized the potential for an excellent town site (Lauriston 1952: 29). Simcoe, who visited the site in 1793, also saw great potential in the location, envisioning Chatham as a strategic naval base for the protection of the Thames waterway that led to his proposed capital of Upper Canada at London, Ontario.

Under Simcoe's order in 1795, approximately 600 acres were set aside for the town plot of Chatham as well as a military reserve (Charles 1979: 6). The original town plot consisted of Lots 1 and 2, of Concession 1, the Township of Harwich, and Lot 24, Concession 1, in the Township of Raleigh.

By 1795, McNiff had fallen out of favour with colonial administrators and was succeeded by Abraham Iredell, a Deputy Surveyor for the Western District, in June 1795 (Hamil 1951: 24). For his work, Iredell was granted a lot in Chatham and built one of the first log houses within the town site. Iredell surveyed the Townships of Chatham and Camden beginning in 1804, with the assistance of surveyor William Hambly. The surveys of the townships were not completed until 1809 or 1810 (Kent Historical Society 1939:31).

3.4 19TH CENTURY DEVELOPMENT

3.4.1 Township of Chatham

The first significant numbers of Euro-Canadian settlers arrived in Chatham Township in the 1790s. The earliest recorded settler in Chatham Township was William Baker. Baker was granted land in present-day Chatham in 1794 and tasked with construction of a naval shipyard to guard the Thames River. Baker was from Brooklyn, New York and worked at the Brooklyn Navy Yard for the Royal Navy while the British occupied Manhattan and Long Island during the American Revolution. Baker's naval yard employed 23 men during the 1790s, but the shipbuilding program was abandoned when the decision was made to transfer Upper Canada's capital to York (present-day Toronto) instead of London (Belden 1881: 51).

Other early settlers to Chatham Township included George Sicklesteele, a former Hessian soldier and veteran of the American Revolution, and the Arnold, Everett, Blackburn, and French families, who were United Empire Loyalists from Pennsylvania. They arrived at Chatham Township after Michigan was returned to the United States (Belden 1881: 57). Settlement in the Township of Chatham remained focused along the rivers as the soil in the floodplain was fertile, and the rivers were utilized for transportation, as concession roads were not opened until later in the century (Lauriston 1952: 359). Until the 1830s the vast majority of settlement in Chatham Township occurred in the first and second concessions (Belden 1881: 57). Some of the first settlers in the back concessions of Chatham Township were a group of settlers from Scotland who formed what was known as the "Scotch Settlement". Immigrants from Scotland would become a sizable number of new settlers to Chatham Township during the mid-19th century (Lauriston 1952: 361-362).

The first municipal meeting was held in Chatham Township in 1832. The meeting was held at a schoolhouse on the riverfront and township assessors, roadmasters, tax collectors, town wardens, a town clerk, and town pound-keeper were appointed. In 1850, the first Township council was formed (Lauriston 1952: 365).

The year 1850 also saw an expansion of Chatham Township when the County of Lambton was created. The area now called Chatham-Gore was originally part of the adjacent Sombra Township. Settlers in the gore conducted most of their business to the south (Lauriston 1952: 367), so the gore was transferred to

Chatham Township and remained in Kent County instead of becoming part of the new Lambton County (Belden 1881: 57). The enlarged township encompassed 84,139 acres (or 34,049 hectares) (Lauriston 1952: 359).

By the late 19th century, the major settlements in Chatham Township were the Town of Chatham and the Village of Wallaceburg. In the 1840s, the Town of Chatham had a population of about 1,500. Its located on the Thames River, made it a primary location for the shipment of agricultural products in Kent County. In 1844, products exported from Chatham included flour, peas, ash, barley, staves, walnut timber, hides, and smaller amounts of oats, corn, potatoes, cranberries, timothy seed, lard, and butter (Hamil 1951: 271). Wallaceburg, founded by Scottish immigrants, was the other centre of trade in Chatham Township, and was incorporated as a village in 1875 (Belden 1881: 57).

Settlement in Chatham Township and Kent County became more dispersed following the *Ontario Drainage Act* in 1873, which provided funding assistance to the county in developing drainage and allowing for better land cultivation (Matt 1979: 11). This was followed by the *Drainage Tiles Act* and an *Act Respecting Ditches and Watercourses* that was passed in 1874. Through these acts farmers could apply to the townships for funding in assisting with the tiling and drainage of their land. An extensive network of drains was constructed throughout the Townships of Chatham and Dover, specifically along the Dover Town Line, and Prince Albert Road (Belden 1881: 57). Drain construction was greatly beneficial to farming, as it allowed for the removal of excess water over the land, while it also helped with the development of road allowances becoming turned into useful secondary roads.

3.4.2 Township of Camden

The first settler in Camden Township was Joshua Cornwall of Connecticut. He was a United Empire Loyalist who settled on Lot 14 along the river. Other Loyalists who came to Camden Township before the outbreak of the War of 1812 included Absalom Shaw and Lemuel Sherman, who emigrated from Connecticut (Belden 1881: 55). In 1820, a group of settlers received land between Dawn Mills and Florence. They had originally intended to settle in Harwich Township, but discovered the lots they had been promised were already granted.

The first gristmill opened in Camden Township at Dawn Mills in 1830. The mill was built by William Taylor and James Smith on the south bank of the Sydenham River. Prior to the opening of this mill, due to the lack of accessible roadways and thick forests most settlers travelled to Detroit for milling purposes (Belden 1881: 56). Dawn Mills developed into the major village of Camden Township, though it began to decline with the arrival of the Great Western Railway to the south at Chatham in 1854 (Lauriston 1952: 370).

Just north of the Study Area in Concession 4, Reverend Josiah Henson helped to establish a Black settlement in 1841. Henson was born into slavery in Charles County, Maryland. He escaped slavery in 1830 and travelled northwards to Upper Canada using the Underground Railroad. Henson purchased 200 acres north of the Study Area to build a self-sufficient community, known as the Dawn Settlement for fugitives from slavery. This community grew up around a school, called the British-American Institute that

was established in 1842. By the 1850s, the settlement was taken over by the British and Foreign Anti-Slavery Society, and with the closure of the school in 1868, the majority of the residents returned to the United States where slavery had been abolished (OHT n.d.).

The community of Dresden was east of the Dawn Settlement. By the 1860s, Dresden had a gristmill, two sawmills, four stores, and a population of 350. Much of Dresden's population was African Canadian (Belden 1881: 56).

In 1850, the County of Lambton was created. Until 1850, the present-day gore of Camden Township was part of Dawn Township. Settlers in the southern portion of Dawn Township wished to remain in Kent County, and the southernmost lots of Dawn were transferred to Camden Township as Camden Gore. James Smith was elected the first reeve of the newly enlarged township (Lauriston 1952: 367). The construction of the Great Western Railway through Camden Township gave rise to the village of Thamesville. David Sherman, who owned one lot along the new railway, surveyed part of his farm as a village site and established Thamesville. Numerous stores soon opened and Thamesville was incorporated as a village in 1873 (Belden 1881: 56).

3.5 20TH CENTURY DEVELOPMENT

Throughout the early 20th century new innovations were utilized in establishing effective drainage throughout the county to facilitate improved agriculture. Still seen on the landscape today are numerous pump houses, windmills used to move water, deep ditches, dykes, and canals. The majority of the land in Camden and Chatham Townships continued to be used for agricultural purposes throughout the 20th century. The Town of Chatham developed a substantial industrial sector in the 20th century. The automotive industry became a major part of Chatham's economic activity (Lauriston 1952: 738). The infrastructure of Kent County was modernized during the early 20th century, with the paving of rural roads commencing, and the arrival of rural telephone and electricity service. Camden and Chatham townships were severely affected by the Thames River flood of April 1937. The 1937 flood caused $2,000,000 worth of damage through the entire Thames River watershed (Miller 1996: 36). In 1960, the Lower Thames Valley Conservation Authority was created to address land conservation and flood control issues in Kent County (Miller 1996: 39).

As municipal services and government expanded in the mid-20th century, new municipal buildings were opened. In Chatham Township, a new municipal building was opened in 1953 and a new Township Hall was opened in 1967. In Camden Township, new municipal offices were opened in 1958 in Dresden (Miller 1996: 222)

King's Highway 401 was constructed through Ontario in stages during the 1960s and runs south of the Study Area. The completion of Highway 401 through Kent County gave local residents, businesses, and industry quicker access to Windsor and London (Bevers 2018). The 45 kilometre link through Kent County between Tilbury and Ridgetown was opened to traffic on September 20, 1963. This was the second to last link of Highway 401 to be completed, only a 12.8 kilometre break remained between Lancaster, Ontario and the Quebec border (Globe and Mail 1963).

Important crops in the mid-20th century in Kent County included hybrid corn, soybeans, tobacco, and dairy. Companies such as Libby's and Domino Sugar contracted some farmers to grow crops for their factories in Chatham (Lauriston 1952: 758-759). Libby's had farmers grow tomatoes and Domino Sugar purchased sugar beets from farmers (Miller 1996: 200-201).

In the 1990s, the provincial government embarked on a program of municipal amalgamations. In 1997, Dr. Peter Meyboom, the appointed provincial restructuring commissioner, announced in a binding decision that the separate 22 municipalities of Kent County, including Chatham Township and Camden Township, would be merged into a single municipality named Chatham-Kent. The announcement of Kent County's amalgamation was not well received by local politicians, the mayor of Blenheim stated, "it certainly isn't what the majority of people wanted" (Ross 1997). The amalgamation of Kent County into the single tier municipality of Chatham-Kent was completed in 1998 (Francis 2012). The population of Chatham-Kent in 2016 was 102,042, a decrease of 2% since 2011 (Statistics Canada 2018).

3.6 SITE HISTORY

A site history for the Study Area was prepared by consulting historical mapping and the Directory and Biography sections of the *Illustrated Historical Atlas of the Counties of Essex and Kent* (Belden 1881). The maps that were consulted included Shackleton and McIntosh's 1876 *Map of the County of Kent in the Province of Ontario, Dominion of Canada* (Figure 3), and H. Belden's 1881 maps of the townships of Chatham and Camden, which appeared in Belden's *Illustrated Historical Atlas of the Counties of Essex and Kent* (Figure 4). In discussing the late 19th century historical mapping it must be remembered that 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).

3.6.1 Lot 1, Concession 1, Camden Gore, Camden Township

Shackleton and McIntosh's 1876 map of Kent County does not list an owner for Lot 1, Concession 1, Camden Gore (Figure 3). However, the map notes that a schoolhouse is present at the southwest corner of the lot. Belden's 1881 map of Camden Township depicts three structures present on the lot (Figure 4), one church at the southwest corner, and two residences, belonging to Sarah Nevills and N.C. Kirk. Kirk was a farmer and Camden Township councilor. Kirk was an early settler in Kent County, arriving in 1827 (Belden 1881: 104). Sarah Nevills was a farmer and owned 41 acres in Lot 1, Concession 1, Camden Gore. She moved to Kent Count in 1833 (Belden 1881: 105). Belden's map also depicts the Erie and Huron Railway running along the northern border of the lot.

3.6.2 Lot 1, Concession 2, Camden Gore, Camden Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 1, Concession 2, Camden Gore as being divided in half between T. Runciman and A. Watson (Figure 3). Watson also owned lands in the adjacent Lot 2, Concession 2. Thomas Runciman was a freeholder (Belden 1881: 90). No owners or structures are

present on the lot in Belden's 1881 map of Camden Township (Figure 4). The Huron and Erie Railway is shown running along the northern border of the lot.

3.6.3 Lot 1, Concession 3, Camden Gore, Camden Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 1, Concession 3, Camden Gore, as owned by N. Innis (northwest quarter), W. Bell (southwest quarter), and Mrs. Myres (east half) (Figure 3). No owners or structures are present on the lot in Belden's 1881 map of Camden Township (Figure 4). The Huron and Erie Railway is shown running along the northern border of the lot.

3.6.4 Lot 1, Concession 4, Camden Gore, Camden Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 1, Concession 4, Camden Gore, as divided in half between J. Black and S.H. Davis (Figure 3). No owners or structures are present on the lot in Belden's 1881 map of Camden Township (Figure 4). The Huron and Erie Railway is shown running along the northern border of the lot.

3.6.5 Lot 1, Concession 5, Camden Gore, Camden Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 1, Concession 5, Camden Gore, as being owned by J. Thompson (Figure 3). John Thompson owned 50 acres in both Lots 1 and 2 of Concession 5. Thompson was born in Ontario in 1842 and settled in Camden Township in 1860. No owners or structures are present on the lot in Belden's 1881 map of Camden Township (Belden 1881: 105) (Figure 4). The Huron and Erie Railway is shown running along the western part of the Lot. The railway has a junction point in the lot, with one branch continuing north to Dresden and another branch west.

3.6.6 Lot 1, Concession 6, Camden Gore, Camden Township

Shackleton and McIntosh's 1876 map of Kent County lists three owners for Lot 1, Concession 6, Camden Gore (Figure 3). The northwest quarter was owned by J. McKay, the southwest quarter by A. Trerice, and the east half by W. and C. Prangley. No structures or owners or listed for the lot in Belden's 1881 map of Camden Township (Figure 4).

3.6.7 Lot 1, Concession 7, Camden Gore, Camden Township

Shackleton and McIntosh's 1876 map of Kent County lists two owners for Lot 1, Concession 7, Camden Gore (Figure 3). The west half is owned by W. and C. Prangley and the east half is owned by W. Chambers (Shackleton and McIntosh 1876). No structures or owners for the lot are listed in Belden's 1881 map of Camden Township (Figure 4).

3.6.8 Lot 1, Concession 7, Camden Township

Shackleton and McIntosh's 1876 map of Kent County lists no owner for Lot 1, Concession 7, Camden Township (Figure 3). No structures or owners for the lot are listed in Belden's 1881 map of Camden Township (Figure 4)

3.6.9 Lot 25, Concession 1, Chatham Gore, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists the owners of Lot 25, Concession 1, Chatham Gore as W.T. Waddle and J. Simpson (Figure 3). Belden's 1881 map of Chatham Township lists the owner of the lot as J. Simpson and a structure is depicted at the northeast corner of the lot (Figure 4).

3.6.10 Lot 26, Concession 1, Chatham Gore, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists the owner of Lot 26, Concession 1, Chatham Gore as E. Morrison (Figure 3). Belden's 1881 map of Chatham Township also lists the lot owner as E. Morrison and depicts a church or schoolhouse, and another structure as being present on the northern portion of the lot adjacent to the road allowance (Figure 4). Edward Morrison owned a total of 100 acres in Chatham Township and was born in Canada in 1840, he settled in Kent County in 1865 (Belden 1881: 106).

3.6.11 Lot 27, Concession 1, Chatham Gore, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists the owners of Lot 27, Concession 1, Chatham Gore, as being divided three ways between B. Holmes (northwest quarter), W. Arnold (south half), and H. Taylor (northeast quarter) (Figure 3). Belden's 1881 map of Kent County does not depict any structures or list an owner of the lot (Figure 4). The map does show the Erie and Huron Railway running through the northeast corner of the Lot.

3.6.12 Lot 28, Concession 1, Chatham Gore, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists two owners of Lot 28, Concession 1, Chatham Gore (Figure 3). The north half of the lot was owned by D.H. Everett, and the south half by C.A. Butler. The map depicts the east branch of the Sydenham River along the northeast border of the lot. Charles A. Butler was a farmer and butcher who also owned land in Lot 13, Concession 14. Butler was born in Ohio in 1838, and came to Canada with his family in 1842 (Belden 1881: 105). Belden's 1881 map of Chatham Township does not list an owner on the lot (Figure 4). The map does note that C.A. Butler owned a cheese factory in the adjacent south lot. Belden's map also shows the Wallaceburg Branch of the Erie and Huron Railway as running through the north portion of the Lot.

3.6.13 Lot 29, Concession 1, Chatham Gore, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists no owners or structures present on Lot 29, Concession1, Chatham Gore (Figure 3). The Sydenham River and a road is shown running through the

Lot. Belden's map of Chatham Township shows D. Fletcher owning a structure on the lot adjacent to the roadway (Figure 4). D.M. Fletcher owned 80 acres of the lot and was born on the farmstead in 1845 (Belden 1881: 105). Belden's map also shows the railway running through the lot.

3.6.14 Lot 30, Concession 1, Chatham Gore, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 30, Concession 1, Chatham Gore, as divided in half between W. Daly (west half) and P. Glasgow (east half) (Figure 3). The Sydenham River and a roadway is shown running through the north half of the lot. Belden's 1881 map of Chatham Township shows two structures on the Lot, one on the northwest corner owned by J.C. Simpson and another along the eastern border owned by Peter Glasgow (Figure 4). Glasgow owned 78.5 acres on Lot 30, Concession 1 and 25 acres on Lot 9, Concession 11. He was born in Haddington, Scotland in 1828 and settled in Kent County in 1863 (Belden 1881: 105). Belden's map also shows a railway and road running through the lot.

3.6.15 Lots 21 to 24, Concession 8, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists Lots 21 to 23, Concession 8, as being owned by the Stevens family, and Lot 24 is blank (Figure 3). Lots 21 to 22 were owned by W. H. Stevens (also spelled Stephens) and Lot 23 by A.P. Stevens. By 1881, according to Belden's map of Chatham Township, W.H. Stephens owned Lots 21 to 24. Belden's map depicts a structure present on the north part of Lot 22 (Figure 4). W.H. Stephens was likely the preferred spelling, and this was the spelling used in his biographical sketch. Stephens was a major landowner, owning 1,500 acres in the township. In the 1880s, he served as Township Reeve, Township Clerk, Assessor, and Justice of the Peace. Stephens was born in Ontario in 1823 and moved to Kent County in 1853 (Belden 1881: 106).

3.6.16 Lot 20, Concession 10, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 20, Concession 10 as being owned by A. Richardson (north half) and W. Logan (south half) (Figure 3). In Belden's 1881 map of Chatham Township, only William Logan is depicted on the property, and a structure is shown on the southern portion of the lot (Figure 4).

3.6.17 Lots 21 to 22, Concession 10, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 21, Concession 10 as owned by G. Long and E. Bower (Figure 3). No owner is shown for Lot 22. In Belden's 1881 map, George Long is shown as the owner of the lot and a structure is depicted approximately on the border between Lots 21 and 22 (Figure 4). Lot 22 is a small irregular sized lot, and Long likely owned both Lots 21 and 22, since a structure is depicted straddling both lots. Long was born in London, England in 1805 and moved to Kent County in 1830 (Belden 1881: 105). Belden's map also shows the Erie and Huron railway running through Lot 21, though the map indicated it was not operating.

3.6.18 Lots 18 to 20, Concession 11, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 18, Concession 11 as owned by C.P. Watson; no owners are depicted for Lots 19 and 20. Lots 19 and 20 are irregular sized small lots (Figure 3). Belden's 1881 map of Chatham Township lists no owners or structures present on Lots 18 to 20, Concession 11 (Figure 4).

3.6.19 Lot 15, Concession 12, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 15, Concession 12 as owned by S. Sager Colbert (Figure 3). No owners or structures are present on the lot in Belden's 1881 map of Chatham Township (Figure 4).

3.6.20 Lot 16, Concession 12, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists Lot 16, Concession 12 as owned by W. Ross (Figure 3). Belden's 1881 map of Chatham Township lists the owner as W.W. Taylor. No structures are depicted present on the property (Figure 4). Taylor was born in the United States in 1814 and moved to Kent County in 1850 (Belden 1881: 106).

3.6.21 Lot 17, Concession 12, Chatham Township

Lot 17, Concession 12 is an irregular shaped lot approximately 75 acres in size. Shackleton and McIntosh's 1876 map of Kent County lists the owner of Lot 17, Concession 12 as the Canada Company (Figure 3). Belden's 1881 map of Chatham Township lists that the owner of the lot was D.S. Murney (Figure 4). Belden's map depicts a structure present on the eastern edge of the lot.

3.6.22 Lot 18, Concession 12, Chatham Township

Lot 18, Concession 12 is a small wedge-shaped lot approximately five acres in size. No owners are listed on the lot in either Shackleton and McIntosh's 1876 map or Belden's 1881 map (Figure 3 and Figure 4).

3.6.23 Lot 13, Concession 13, Chatham Township

Lot 13, Concession 13 has no owners listed or structures depicted in either Shackleton and McIntosh's 1876 map of Kent County or Belden's 1881 map of Chatham Township (Figure 3 and Figure 4).

3.6.24 Lot 14, Concession 13, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists the owners of Lot 14, Concession 13 as W. Daly (north half) and T. Johnston (south half) (Figure 3). No owners or structures are depicted on the lot in Belden's 1881 map of Chatham Township (Figure 4).

3.6.25 Lot 15, Concession 13, Chatham Township

Lot 15, Concession 13 is an irregular wedge-shaped lot approximately 50 acres in size. Shackleton and McIntosh's 1876 map of Kent County lists J. Roberts as the owner of Lot 15, Concession 13 (Figure 3). No owners or structures are depicted on the lot in Belden's 1881 map of Chatham Township (Figure 4).

3.6.26 Lot 11, Concession 14, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists the owners of Lot 11, Concession 14 as D. McArthur (west half) and T. McKean (Figure 3). No owners or structures are depicted on the lot in Belden's 1881 map of Chatham Township (Figure 4).

3.6.27 Lot 12, Concession 14, Chatham Township

Shackleton and McIntosh's 1876 map of Kent County lists the owners of Lot 12, Concession 14 as B. Holmes (west half) and D. Ribble (east half) (Figure 3). No owners or structures are depicted on the lot in Belden's 1881 map of Chatham Township (Figure 4).

3.6.28 Lot 13, Concession 14, Chatham Township

Lot 13, Concession 14 has no owners listed or structures depicted in either Shackleton and McIntosh's 1876 map of Kent County or Belden's 1881 map of Chatham Township (Figure 3 and Figure 4).

4.0 RESULTS

4.1 AGENCY AND MUNICIPAL CONSULTATION

In order to identify heritage resources, the MTCS, OHT, and the Municipality of Chatham-Kent were consulted. A Study Area with a 120-metre buffer surrounding the Project Location was used during agency and municipal consultation to determine any presence of protected properties in close proximity to the Project Location. The Study Area was refined to a 50-metre buffer for this CHAR.

At the provincial level, Thomas Wicks, Heritage Planner with the OHT, reported that Uncle Tom's Cabin Historic Site is situated within the larger Study Area and is owned and operated by the OHT. The OHT property at 29251 Uncle Toms Road is open to the public and operates an interpretative centre and museum. The site is significant for its association with the Underground Railroad and the settlement of refugee slaves in southwestern Ontario. The site is located one kilometre north of the Project Location. Karla Barboza, Team Lead, Heritage, MTCS also confirmed the provincial heritage property of Uncle Tom's Cabin Historic Site. No other provincial heritage sites or properties designated by the Minister of Tourism, Culture and Sport were reported within or adjacent to the larger Study Area.



Plate 7: Uncle Tom's Cabin Historic Site looking southeast



Plate 8: Uncle Tom's Cabin looking northeast

At the municipal level, staff was consulted to determine the presence of municipally protected properties. Greg Houston, Planner II, Municipality of Chatham-Kent, identified two properties as heritage resources within the Study Area: Uncle Tom's Cabin, designated under Part IV of the OHA, and 9112 Glasgow Line, a listed property on the Chatham-Kent Municipal Heritage Register. The identified listed property is located approximately 620 metres north of the Project Location.



Plate 9: 9112 Glasgow Line looking south

Table 1: Identified and Protected Heritage Resources with the Study Area

Agency/Municipality	Location/Municipal Address	Level of Recognition	Relationship to the CHAR Study Area
OHT	29251 Uncle Toms Road	OHT Property	Outside of Study Area
Municipality of Chatham-Kent	29251 Uncle Toms Road	Designated under Part IV of the OHA	Outside of Study Area
Municipality of Chatham-Kent	9112 Glasgow Line	Listed on municipal register	Outside of Study Area

4.2 FIELD PROGRAM

4.2.1 Potential Heritage Resources

As described in Section 2.3, a windshield survey of the Study Area was undertaken to identify potential heritage resources situated within the Study Area and confirm the presence of previously identified protected properties. Where identified, the site was photographically documented from publicly accessible roadways.

During the course of the survey, a total of 41 individual sites were identified as containing potential heritage resources (Figure 5). Of those identified, none had been previously listed by municipal heritage staff on their municipal heritage register. A summary of these potential heritage resources is contained in Table 3 and Appendix B.

The majority of the potential heritage resources identified were constructed in the late 19th to early 20th century, while the others date to the mid to late 20th century prior to the 1974 and 1975 topographic mapping. More specifically, the majority of residences were constructed between 1882 and 1913 and are of a similar Ontario vernacular architecture style. Most of the structures from this period are similar one and a half storey residences, with either an L-shaped plan or a front facing gable roof with a lower side gable roof addition. The majority of the structures have been modified with the addition of vinyl cladding or modern windows and doors. Four of the potential heritage resources identified are farmsteads comprised of a residential structure and associated farm outbuildings.

Adjacent to Base Line in the Study Area between Oldfield Line and Lindsay Road for an approximately four kilometre stretch are tree lines of eastern white cedar and Norway spruce trees (Plate 10 and Plate 11). The cedar trees are about 30 years old, while the spruce trees are 40 to 50 years old.



Plate 10: Base Line east of Bush Line looking east



Plate 11: Base Line at King's Ferry Road looking west

4.2.2 OEB Guideline Indicators

Based on the field program, resources representing three of the indicators of CHVI according to Section 4.3.4 of the *OEB Environmental Guidelines* were identified (see Table 2). Where potential heritage resources are identified, evaluation of the CHVI according to O. Reg. 9/06 is required to confirm the presence of heritage resources. Where heritage resources are identified, the impacts of the Project on these resources must be assessed.

Table 2: Indicators of CHVI According to Section 4.3.4 of the *OEB Environmental Guidelines*

Indicators	Identified within the Study Area
Property designated under Part IV of the OHA	Not identified
A bridge on Ontario Heritage Bridge List	Not identified

Indicators	Identified within the Study Area
Property within a Heritage Conservation District designated under Part V of the OHA	Not identified
Property with an OHT or municipal heritage conservation easement	Not identified
Property with a provincial or federal plaque	Not identified
A National Historic Site	Not identified
Property containing a registered archaeological site	Not Applicable*
Property with archaeological potential	Not Applicable*
Property listed on a municipal heritage register or provincial heritage register	Not identified
Property adjacent to an identified heritage property	Not identified
Property that has buildings or structures over 40 years old	Identified
Property within a Canadian Heritage River watershed	Not identified
Property associated with a renowned architect or builder	Not identified
Property containing or adjacent to a burial site or cemetery	Not identified
Parkland	Not identified
Land with distinctive landforms or geographic features	Not identified
Historic transportation corridors (such as navigational canals, rail lines or trails, traditional Métis portage routes, etc.)	Identified
Other human-made alterations to natural landscapes (such as earthworks, plantings, etc.)	Identified

*An Archaeological Assessment has been undertaken under separate cover. Archaeological potential is considered beyond the scope of the current study.

4.3 EVALUATION OF CULTURAL HERITAGE VALUE OR INTEREST

Where a potential heritage resource was identified within the Study Area, an evaluation of the CHVI of the property was undertaken. Detailed evaluations are contained within Appendix B. As described in Section 2.4, each potential heritage resource was screened according to O. Reg. 9/06, the criteria for determining CHVI. There were 41 potential heritage resources identified, 29 of which were determined to contain cultural heritage resources (Figure 6). Table 3 summarizes the findings.

Table 3: Summary of Determination of CHVI

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
29060 Simpson Road	No	Residence		Residence: Two storey structure, medium-pitched hip roof, shed dormers, red brick exterior, and covered wrap around porch (west and south elevations).	Yes	CHR-1	Outside Project Location
8649 Base Line	No	Barn		Barn: Timber frame structure, side gable roof, and attached side gable roof addition.	Yes	CHR-2	Outside Project Location
8793 Base Line	No	Farmstead		Residence: Two storey structure, high-pitched hip roof, brick chimney, brick exterior, and central entrance. Landscape: Mature deciduous trees and surrounding agricultural fields.	Yes	CHR-3	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
26872 Centre Side Road	No	Barn		Barn: Timber frame structure and side gable roof.	Yes	CHR-4	Outside Project Location
8959 Base Line	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, brick chimney, red brick exterior, wood fixed window flanked by 1/1 wood windows and fixed wood transom, and brick voussoirs. Landscape: Mature spruce trees.	Yes	CHR-5	Outside Project Location
9037 Base Line	No	Residence		Landscape: Mature maple trees. Contextual: Connection to the rural character of the surrounding area.	Yes	CHR-6	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
9094 Base Line	No	Residence		None identified.	No	N/A	Outside Project Location
8894 Base Line	No	Residence		None identified.	No	N/A	Outside Project Location
10506 Bush Line	No	Farmstead		Residence: One and a half storey structure, and medium-pitched front cross gable rood, high-pitched gable dormers, and red brick exterior. Outbuilding: vertical wood exterior, and side gable roof. Landscape: Mature maple trees and surrounding agricultural fields.	Yes	CHR-7	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
10423 Bush Line	No	Residence		Landscape: Mature spruce trees and surrounding agricultural fields. Contextual: Connection to rural character of the surrounding area.	Yes	CHR-8	Outside Project Location
10315 Bush Line	No	Farmstead		Residence: One and a half storey structure, and medium-pitched front facing gable roof. Landscape: Laneway, mature maple trees, and agricultural fields.	Yes	CHR-9	Outside Project Location
29009 King's Ferry Road	No	Farmstead		Residence: One and a half storey structure, and medium-pitched front facing gable roof, and brick chimney.	Yes	CHR-10	Outside Project Location
9444 Base Line	No	Residence		Residence: One and a half storey structure, and medium-pitched front cross gable roof. Landscape: mature cedar trees.	Yes	CHR-11	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
9418 Base Line	No	Residence		None identified.	No	N/A	Outside Project Location
9669 Base Line	No	Residence		None identified.	No	N/A	Outside Project Location
29006 Van Allen Road	No	Residence		Residence: One storey structure, high-pitched front facing gable roof, red brick exterior, shed dormer, decorative vertical and horizontal brick banding, brick voussoirs with central keystone and label stops, and rusticated stone foundation. Landscape: Mature cedars and spruce trees.	Yes	CHR-12	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
9668 Base Line	No	Residence		None identified.	No	N/A	Outside Project Location
29076 Uncle Tom's Road	No	Farmstead		Residence: One and a half storey structure, medium-pitched cross gable roof, and 2/1 windows. Outbuilding: vertical wood cladding, and high-pitched side gable roof. Landscape: Long laneway and surrounding agricultural fields.	Yes	CHR-13	Outside Project Location
29074 Uncle Tom's Road	No	Residence		Residence: Gable roof, and horizontal wood siding. Landscape: Mature spruce trees, and shared laneway with 29076 Uncle Toms Road.	Yes	CHR-14	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
9808 Base Line	No	Residence		None identified.	No	N/A	Outside Project Location
10893 Union Line	No	Residence		None identified.	No	N/A	Outside Project Location
11074 Union Line	No	Residence		Landscape: Long laneway, and mature coniferous trees.	Yes	CHR-15	Outside Project Location
10117 Base Line	No	Residence		None identified.	No	N/A	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
10155 Base Line	No	Residence		Residence: One and a half storey structure, and medium-pitched cross gable roof, brick exterior, segmental window frames, and brick voussoirs.	Yes	CHR-16	Outside Project Location
Outside Project Location 10211 Base Line	No	Residence		Landscape: Mature spruce and cedar trees. Contextual: Connection to rural character of the surrounding area.	Yes	CHR-17	Outside Project Location
1396 North Street	No	Residence		Residence: One and a half storey structure, and medium-pitched front facing gable roof, L-shaped plan, and covered partial wood porch.	Yes	CHR-18	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
25878 North Street	No	Residence		None identified.	No	N/A	Outside Project Location
10256 Base Line	No	Residence		None identified.	No	N/A	Outside Project Location
10345 Base Line	No	Residence		Contextual: Connection to the rural character of the surrounding area.	Yes	CHR-19	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
10365 Base Line	No	Residence		None identified.	No	N/A	Outside Project Location
Former Railway Line (Base Line)	No	Former Railway Line		Former Railway Line: Layout of the former Erie & Huron Railway Line.	Yes	CHR-20	Outside Project Location
10402 Base Line	No	Residence		Residence: Two storey structure, high-pitched cross gable roof, brick exterior, brick voussoirs, three-bay front façade, semi-circular wood window, and L-shaped plan.	Yes	CHR-21	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
10330 Base Line	No	Residence		Residence: Two storey structure, medium-pitched front facing gable roof with lower side gable roof section, L-shaped plan, and stone foundation.	Yes	CHR-22	Outside Project Location
10513 Base Line	No	Residence		Residence: Two storey structure, medium-pitched hip roof, metal fish-scale shingles, brick chimney, brick exterior, covered partial brick porch with wood columns and metal fish-scale shingles, brick voussoirs, and L-shaped plan. Landscape: Mature cedar and spruce trees.	Yes	CHR-23	Outside Project Location
10845 Base Line	No	Outbuildings		Barn: Timber frame structure, gambrel roof, ventilators, hay hood, and wood windows and doors. Two outbuildings: Wood exterior, side gable roof, ventilators,	Yes	CHR-24	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
				and wood windows and doors.			
10895 Base Line	No	Farmstead		Residence: One and a half storey structure, medium-pitched front facing gable roof, and shed dormer. Barn: Timber frame structure and gambrel roof. Outbuilding: vertical wood, side gable roof, and ventilators. Smaller outbuilding: wood exterior and side gable roof. Landscape: laneway and surrounding agricultural fields.	Yes	CHR-25	Outside Project Location
10574 Base Line	No	Residence		Residence: One and a half storey structure, high-pitched pyramidal roof, brick chimney, two storey tower with pyramidal roof, brick exterior, front facing gable peak, wood door surround with pilasters, and	Yes	CHR-26	Outside Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
				rusticated stone foundation.			
25430 Kent Bridge Road	No	Residence		None identified.	No	N/A	Outside the Project Location
25428 Kent Bridge Road	No	Residence		Residence: One and a half storey structure, medium-pitched cross gable roof, high-pitched gable dormer, and L-shaped plan.	Yes	CHR-27	Outside the Project Location
25406 Kent Bridge Road	No	Residence		Contextual: Connection to the rural character of the surrounding area.	Yes	CHR-28	Outside the Project Location

Municipal Address	Previous Heritage Recognition	Resource Type	Photograph	Identified Attributes	CHVI	CHR Number	Relationship to Project Location
25338 Kent Bridge Road	No	Residence		Residence: One and a half storey structure, medium-pitched front facing gable roof, one storey side gable roof section, L-shaped plan, and stone foundation. Landscape: Laneway, mature spruce tree line, and surrounding agricultural fields.	Yes	CHR-29	Outside the Project Location

5.0 EVALUATION OF ANTICIPATED IMPACTS AND MITIGATION OPTIONS

5.1 DESCRIPTON OF UNDERTAKING

Final construction footprint and technique will be determined during the detailed design. As described in Section 1.3, the pipeline construction process involves the following activities:

- Constructing the Proposed Pipeline
  - Stringing
  - Pipe Fabrication
  - Trenching and Lowering
  - Backfilling
  - Hydrostatic Testing
  - Clean-Up and Restoration

It is anticipated that the proposed undertaking will be contained entirely within the Project Location as delineated by the municipal RoW and as depicted on Figure 1 and Figure 2.

5.2 RELATIONSHIP TO PROJECT

Given the proposed undertaking, the evaluation of potential impacts was undertaken where a component of the heritage resource was positioned within the Study Area and within 50 metres of the Project Location. Both built heritage resources and cultural heritage landscape components were considered in determining whether the heritage resource is within the 50-metre buffer. No impacts are anticipated to identified heritage resources beyond the 50-metre buffer and so these are not considered further in the impact assessment presented below in Section 5.3. The positions of heritage resources are outlined in relation to the Study Area in Table 3 and on Figure 6 (Sheets 1 to 5).

No removals of built heritage resources (e.g. residences or barns) or cultural heritage landscape elements (e.g. tree lined driveways or historic fence rows) are planned as construction activity will be within the RoW and temporary work areas. This will need to be confirmed once final construction drawings are available for the project. Accordingly, the anticipated impacts resulting from the proposed undertaking are limited to the potential for construction-related ground vibration on built heritage resources. As discussed in Section 2.5, a 15 metre buffer is recommended as an appropriate distance from pipeline construction activities.

5.3 ANTICIPATED IMPACTS

Where a heritage resource was determined to be situated within the Study Area, the impacts of the proposed Project on identified heritage attributes were evaluated. The impacts, both direct and indirect were evaluated according to InfoSheet #5 (Government of Ontario 2006b). See Section 2.5 for further discussion of the impacts assessed.

Within Table 4: Evaluation of Potential ImpactsTable 4 the following acronyms denote the assessment of impacts: NA = Not Anticipated, A = Anticipated Impact, P = Potential Impact.

Table 4: Evaluation of Potential Impacts

Address	Direct Impact		Indirect Impact					Discussion
	Destruction	Alteration	Shadows	Isolation	Obstruction	Change in Land Use	Land Disturbances	
29060 Simpson Road (CHR-1)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed east of the residence within 50 metres. However, no heritage attributes will be impacted, as the residence is outside the 15 metre vibration buffer zone. **Therefore, mitigation measures are not required.**
8649 Base Line (CHR-2)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed more than 50 metres south of the barn. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
8793 Base Line (CHR-3)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed south of the residence within 50 metres. Heritage attributes within 50 metres of the Project Location include those associated with the residence, the mature deciduous trees, and surrounding agricultural fields. All work is planned within the RoW. Accordingly, the mature deciduous trees and agricultural fields will not be impacted. In addition, no buildings are located within the 15 metre vibration buffer **Therefore, mitigation measures are not required.**
26872 Centre Side Road (CHR-4)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed more than 50 metres northwest of the barn. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**

Address	Direct Impact		Indirect Impact					Discussion
	Destruction	Alteration	Shadows	Isolation	Obstruction	Change in Land Use	Land Disturbances	
8959 Base Line (CHR-5)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed south of the residence within 50 metres. Heritage attributes within 50 metres of the Project Location include those associated with the residence and the mature spruce trees. All work is planned within the RoW. Accordingly, the mature spruce trees will not be impacted. In addition, no buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
9037 Base Line (CHR-6)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. The mature maple trees are within the 50 metre buffer from the Project Location. All other identified heritage attributes are outside the 50 metre buffer. The mature maple trees will not be affected by the construction of the proposed pipeline situated within the adjacent RoW. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10506 Bush Line (CHR-7)	NA	NA	NA	NA	NA	NA	NA	Project components are proposed more than 50 metres north of the residence. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10423 Bush Line (CHR-8)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. The surrounding agricultural lands are within the 50 metre buffer from the Project Location. All other identified heritage attributes are outside the 50 metre buffer. The surrounding agricultural fields will not be affected by the construction of the proposed pipeline situated within the adjacent RoW. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10315 Bush Line (CHR-9)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. The surrounding agricultural lands are within the 50 metre buffer from the Project Location. All other identified heritage attributes are outside the 50 metre buffer. The surrounding agricultural fields will not be affected by the construction of the proposed pipeline situated within the adjacent RoW. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**

Address	Direct Impact		Indirect Impact					Discussion
	Destruction	Alteration	Shadows	Isolation	Obstruction	Change in Land Use	Land Disturbances	
29009 King's Ferry Road (CHR-10)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed south of the residence within 50 metres. Heritage attributes within 50 metres of the Project Location include those associated with the residence and outbuildings. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
9444 Base Line (CHR-11)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed north of the residence within 50 metres. Heritage attributes within 50 metres of the Project Location include those associated with the residence. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
29006 Van Allen Road (CHR-12)	NA	NA	NA	NA	NA	NA	P	The Project Location is positioned in the adjacent RoW. Project components are proposed south of the residence within 50 metres. Heritage attributes within 50 metres of the Project Location include those associated with the residence and the mature spruce trees. All work is planned within the RoW. Accordingly, the mature spruce trees will not be impacted. The position of the residence within 15 metres of the Project Location has the potential for indirect impacts resulting from land disturbance during construction activities. **Therefore, mitigation measures must be prepared to mitigate potential indirect impacts.**
29076 Uncle Toms Road (CHR-13)	NA	NA	NA	NA	NA	NA	NA	Project components are proposed more than 50 metres south of the residence. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
29074 Uncle Toms Road (CHR-14)	NA	NA	NA	NA	NA	NA	NA	Project components are proposed more than 50 metres south of the residence. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
11074 Union Line (CHR-15)	NA	NA	NA	NA	NA	NA	NA	Project components are proposed more than 50 metres north of the residence. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10155 Base Line (CHR-16)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed south of the residence within 50 metres. Heritage attributes within 50 metres of

Address	Direct Impact		Indirect Impact					Discussion
	Destruction	Alteration	Shadows	Isolation	Obstruction	Change in Land Use	Land Disturbances	
								the Project Location include those associated with the residence and the mature spruce and cedar trees. All work is planned within the RoW. Accordingly, the mature spruce and cedar trees will not be impacted. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10211 Base Line (CHR-17)	N A	N A	N A	N A	N A	N A	N A	The Project Location is positioned in the adjacent RoW. The residence is within the 50 metre buffer from the project location. However, no heritage attributes will be impacted, and no buildings are within the 15 metre vibration buffer zone. **Therefore, mitigation measures are not required.**
1396 North Street (CHR-18)	N A	N A	N A	N A	N A	N A	N A	Project components are proposed more than 50 metres south of the residence. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10345 Base Line (CHR-19)	N A	N A	N A	N A	N A	N A	P	The Project Location is positioned in the adjacent RoW. The residence is within the 50 metre buffer from the project location. The position of the residence within 15 metres of the Project Location has the potential for indirect impacts resulting from land disturbance during construction activities. **Therefore, mitigation measures must be prepared to mitigate potential indirect impacts**.
Former Railway Line (Base Line) (CHR-20)	N A	N A	N A	N A	N A	N A	N A	A small portion of the former Erie & Huron railway corridor is positioned within the Project Location, as the pipeline is proposed to run through the corridor. As an abandoned railway line, the only remaining components are the steel rails north and south of the roadway. Construction of the pipeline is not anticipated to alter the heritage attribute, that of the layout of the railway line. Work within the project location is temporary and land would be returned to its pre-construction state. **Therefore, mitigation measures are not required.**
10402 Base Line (CHR-21)	N A	N A	N A	N A	N A	N A	P	The Project Location is positioned in the adjacent RoW. The residence is within the 50 metre buffer from the project location. The position of the residence within 15 metres of the Project Location has the potential for indirect impacts resulting from land disturbance during construction activities.

Address	Direct Impact		Indirect Impact					Discussion
	Destruction	Alteration	Shadows	Isolation	Obstruction	Change in Land Use	Land Disturbances	
								Therefore, mitigation measures must be prepared to mitigate potential indirect impacts.
10330 Base Line (CHR-22)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. The residence is within the 50 metre buffer from the project location. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10513 Base Line (CHR-23)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed south of the residence within 50 metres. Heritage attributes within 50 metres of the Project Location include those associated with the residence, laneway, and the mature spruce and cedar trees. All work is planned within the RoW. Accordingly, the laneway, and mature spruce and cedar trees will not be impacted. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10845 Base Line (CHR-24)	NA	NA	NA	NA	NA	NA	NA	Project components are proposed more than 50 metres south of the barn and outbuildings. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10895 Base Line (CHR-25)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. Project components are proposed south of the residence within 50 metres. Heritage attributes within 50 metres of the Project Location include those associated with the residence, barn, laneway, and the surrounding agricultural fields. All work is planned within the RoW. Accordingly, the laneway, and surrounding agricultural fields will not be impacted. In addition, no buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
10574 Base Line (CHR-26)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. The residence is within the 50 metre buffer from the project location. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
25428 Kent Bridge Road (CHR-27)	NA	NA	NA	NA	NA	NA	NA	The Project Location is positioned in the adjacent RoW. The residence is outside the 50 metre buffer from the project location. **Therefore, mitigation measures are not required.**

Address	Direct Impact		Indirect Impact					Discussion
	Destruction	Alteration	Shadows	Isolation	Obstruction	Change in Land Use	Land Disturbances	
25406 Kent Bridge Road (CHR-28)	N A	N A	N A	N A	N A	N A	N A	The Project Location is positioned in the adjacent RoW. The residence is within the 50 metre buffer from the project location. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**
25338 Kent Bridge Road (CHR-29)	N A	N A	N A	N A	N A	N A	N A	The Project Location is positioned in the adjacent RoW. The residence, laneway, mature spruce tree line, and surrounding agricultural lands are within the 50 metre buffer from the Project Location. The landscape elements will not be affected by the construction of the proposed pipeline situated within the adjacent RoW. No buildings are located within the 15 metre vibration buffer. **Therefore, mitigation measures are not required.**

5.3.1 Summary of Impacts

Following the assessment of impacts presented in Table 4 three properties were determined to be situated within 15 metres of planned construction activities and are at risk for indirect, vibration-related impacts:

- 29006 Van Allen Road (CHR-12)
- 10345 Base Line (CHR-19)
- 10402 Base Line (CHR-21)

As the project moves towards detailed design, the identified CHRs will have to be re-evaluated to determine any new potential impacts. At this time, all work is planned with the RoW and no direct impacts to landscape elements are anticipated. Stantec has confirmed with Union Gas that no tree or fence removals within private property are planned as part of this work. Therefore, no impacts to cultural heritage landscape elements are anticipated.

5.4 MITIGATION OPTIONS

Where potential impacts are identified, either direct or indirect, measures to mitigate them have been prepared. The impetus for avoidance of impacts comes from two sources, the *OEB Environmental Guidelines* and the PPS (see Section 2.1). The former requires that cultural heritage resources be

protected by “appropriate conservation, avoidance and mitigation,” while the latter requires conservation of “significant” heritage resources as well as the “heritage attributes of the protected heritage property” (see Section 2.1 for full excerpts of requirements). When combined, precautions are required to conserve heritage resources through avoidance and mitigation where the potential for a Project to impact heritage resources has been identified. Therefore, the below mitigation options have been developed to provide for the conservation of heritage attributes of all heritage resources. These are based on mitigation or avoidance measures developed by the MTCS and contained within InfoSheet #5 (Government of Ontario 2006b). See Section 2.6 for further discussion of the mitigation methods assessed.

The proposed undertaking involves installation of a pipeline within the municipal RoW and below ground. As the land will be returned to its current state as much as possible, the anticipated impacts are related to the construction phase of the Project. Where potential impacts have been identified, components of heritage resources are positioned within the 50-metre buffer but outside the RoW where project activities are anticipated. Therefore, a preventive approach to mitigation measures will best serve to reduce the risk of indirect impacts. Table 5 contains a summary of the evaluation of mitigation options.

Table 5: Evaluation of Mitigation and Avoidance Options

Methods	Discussion
Alternative Development	The current approach involves minimal land disturbance, and alternative developments are not required.
Isolation of Development	Isolation of Project construction activities from the HRs will prevent unanticipated direct and indirect impacts.
Harmonization of Design Guidelines	The Project will not introduce any above ground features and will return the landscape to current conditions. Therefore, no additional design guidelines are required.
Limitation of Construction	The Project will not introduce any above ground features and will return the landscape to current conditions. Therefore, no limitations on height or density of construction are required.
Compatible Additions	The Project will not introduce any above ground features and will return the landscape to current conditions. Therefore, compatible additions are not required.
Reversible Alterations	The Project will not introduce any above ground features and will return the landscape to current conditions. Therefore, alterations to the landscape do not need to be considered.
Planning Mechanisms	Various planning mechanisms have been introduced to the Project to evaluate impacts of the Project on multiple aspects of the surrounding environment. As these mechanisms pertain to heritage resources, the use of a 50-metre buffer surrounding the Project Location is the most significant planning mechanism. The use of buffer zones on construction maps to indicate where a heritage resource is positioned within the Project Location will indicate to construction crews the need for complete avoidance of construction activities in the vicinity of the resource. The depiction of buffer zones on construction mapping should be used only where a heritage resource has been identified within the 50-metre zone. Where this occurs, physical markers will be used during Project activities to demarcate the appropriate buffer zone.

6.0 RECOMMENDATIONS

6.1 AVOIDANCE OF CULTURAL HERITAGE RESOURCES

The preferred alternative should be designed to avoid the identified CHRs. Staging areas and construction activities should be planned and undertaken in a manner to avoid the built heritage and cultural heritage landscape attributes of the identified CHRs. Should future work require an expansion of the current study area and/or the development of other alternatives, then a qualified heritage consultant should be consulted to confirm impacts of the undertaking on the identified CHRs.

6.2 SITE PLAN CONTROLS

A total of 29 cultural heritage resources was determined to be situated within 50 metres of the Study Area. In order to prevent negative indirect Project Impacts, these heritage resources should be isolated from construction-related activities. It is recommended that site plan controls be put in place prior to construction 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.

As described in Section 5.4, site plan controls should include mapping heritage resources within 50 metres on construction maps and physically demarcating these properties to communicate the presence of these properties to construction crews. Physical protective measures may include the installation of temporary fencing around CHRs, stabilization of built heritage attributes in close proximity to construction work, and the installation of tree protection zones around cultural heritage landscape elements.

6.2.1 Condition Surveys and Vibration Monitoring

A total of three built heritage resources are located within 15 metres of Project activities. The resources identified are:

- 29006 Van Allen Road (CHR-12)
- 10345 Base Line (CHR-19)
- 10402 Base Line (CHR-21)

These resources are at risk for indirect impacts resulting from construction-related ground vibration. It is recommended that activities do not exceed maximum acceptable vibration levels, or peak particle velocity (PPV) levels, as determined by a qualified geotechnical engineer with previous experience working with heritage structures. Where construction activities are anticipated within the 15 metre buffer zone, the following vibration monitoring activities are proposed:

- **Pre-construction condition surveys:** Pre-construction condition survey should be carried out to review the type, age, and vulnerability of the structures and foundations of heritage resources. The

pre-condition survey is used to establish the existing conditions of heritage resources prior to construction.

- **Vibration monitoring during construction:** Assessment of the acceptable peak particle velocity (PPV) limits for the heritage resources within the 15 metres buffer should be carried out prior to commencement of construction. Vibration monitoring consist of monitoring the ground-borne vibration levels, in PPV while construction activities take place. Acceptable PPV should be established for general conditions within the Study Area and in the vicinity of heritage resources identified; not necessarily on a per property basis. At appropriate points, construction within the 15 metre buffer zone should be monitored to confirm that acceptable PPV levels are not exceeded. All construction activities should cease if levels are exceeded until an acceptable solution can be identified. Equal care should be applied during decommissioning activities to safeguard heritage resources.

- **Post-construction condition survey**: Post-construction condition survey should be conducted after completion of construction. The results of the post-construction condition survey will be compared with the data collected from the pre-construction condition survey to establish the presence, or absence, of constructed related impacts.

Vibration monitoring, including pre-construction condition survey, vibration monitoring of PPV during construction, and post-construction condition survey should be carried out by a qualified building condition specialist or geotechnical engineer with previous experience working with heritage structures.

6.3 ENVIRONMENTAL MONITORING AND REPORTING

Union Gas' on-site inspection team should monitor the construction phase of this project so that construction activities do not occur within 15 metres of built heritage attributes of CHRs and that no cultural heritage landscape elements are impacted during construction. Monitoring for impacts should also be carried out by Union Gas during post-construction rehabilitation. It is anticipated that, as a condition of Project approval, the Ontario Energy Board will require post-construction monitoring reports; such reports will document the implementation and effectiveness of environmental mitigation and protective measures, including the installation and maintenance of site plan controls.

6.4 DEPOSIT COPIES

To assist in the retention of historic information, copies of this report should be deposited with local repositories of historic material and municipalities. Therefore, it is recommended that this report be deposited at the following locations:

Chatham-Kent Public Library
120 Queen Street
Municipality of Chatham-Kent, ON
N7M 2G6

Chatham-Kent Municipal Heritage Committee
315 King Street West, P.O. Box 640
Municipality of Chatham-Kent, ON
N7M 5K8

7.0 SOURCES

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May 31, 2018

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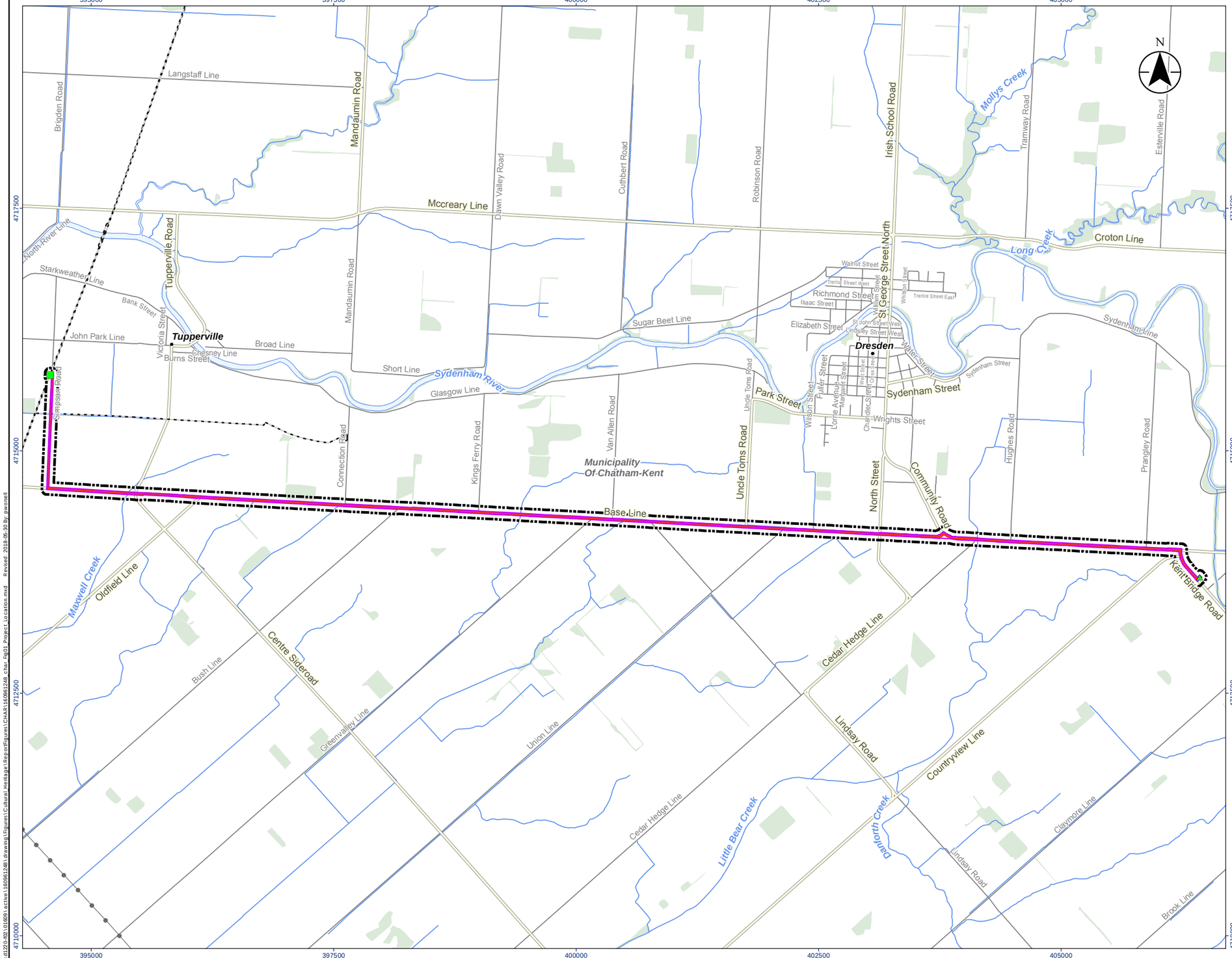
APPENDIX A:
FIGURES



Legend

- Cultural Heritage Study Area
- Project Location
- Start Point
- End Point
- Preferred Route

Existing Features

- Existing Union Gas Pipeline
- Hydro Line
- Major Road
- Minor Road
- Watercourse
- Municipal Boundary, Single/Lower Tier
- Waterbody
- Wooded Area

0 1 2 km

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Notes

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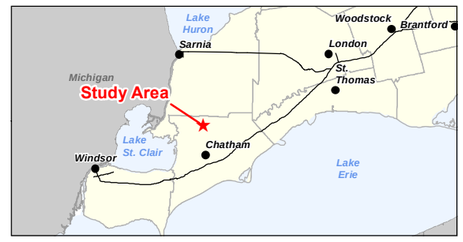

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
1

Title
Project Location

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Stantec

Legend

- Cultural Heritage Study Area
- Start Point
- Preferred Route

Existing Features

- Existing Union Gas Pipeline
- Watercourse
- Property Boundary
- Waterbody

0 100 200 Meters

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Notes

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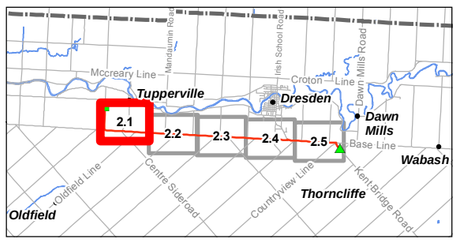

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
2.1

Title
Study Area

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Stantec

Legend

- Cultural Heritage Study Area
- Preferred Route

Existing Features

- Existing Union Gas Pipeline
- Watercourse
- Property Boundary

0 100 200 Meters

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Notes

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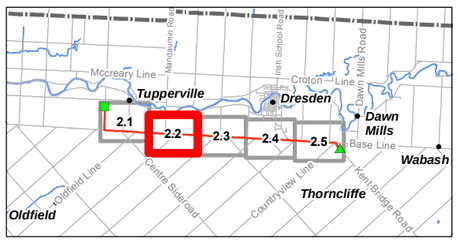

Project Location
Municipality of Chatham-Kent

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Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
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CHATHAM-KENT PIPELINE EXPANSION

Figure No.
2.2

Title
Study Area

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Legend

- Cultural Heritage Study Area
- Preferred Route
- Watercourse
- Property Boundary

0 100 200 Meters

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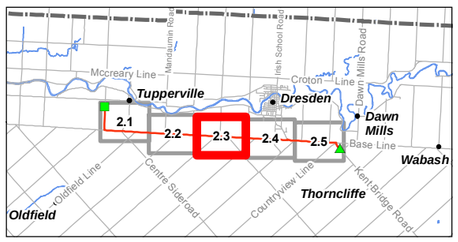

Project Location
Municipality of Chatham-Kent

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Prepared by PW on 2018-05-30
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Client/Project
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CHATHAM-KENT PIPELINE EXPANSION

Figure No.
2.3

Title
Study Area

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Stantec

Legend

- Cultural Heritage Study Area
- Preferred Route
- Watercourse
- Property Boundary

0 100 200 Meters

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Notes

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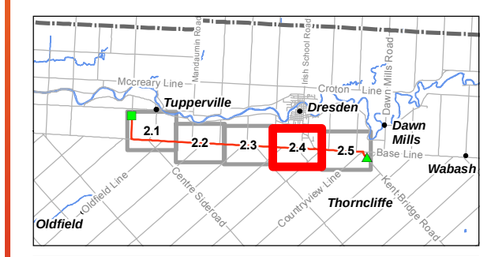

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
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CHATHAM-KENT PIPELINE EXPANSION

Figure No.
2.4

Title
Study Area

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Stantec

Legend
- Cultural Heritage Study Area
- End Point
- Preferred Route
- Watercourse
- Property Boundary
- Waterbody

0 100 200 Meters

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Notes
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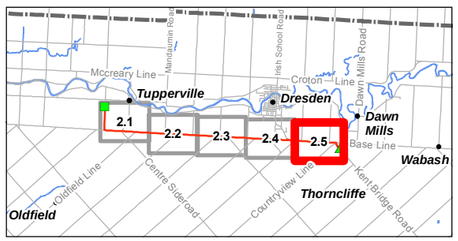

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
2.5

Title
Study Area

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Stantec

Legend
- Cultural Heritage Study Area
- Preferred Route

Notes
1. Map is not to scale.

2. Historic base map source: Shackleton, J.W. & E.J. McIntosh. 1876. Shackleton & McIntosh's Map of the County of Kent. Chatham: J.W. Shackleton & E.J. McIntosh.

Project Location Municipality of Chatham-Kent	160961248 REVA Prepared by PW on 2018-05-24 Technical Review by DH on 2017-06-01 Independent Review by MK on 2018-05-24

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
3

Title
The 1876 Map of the County of Kent

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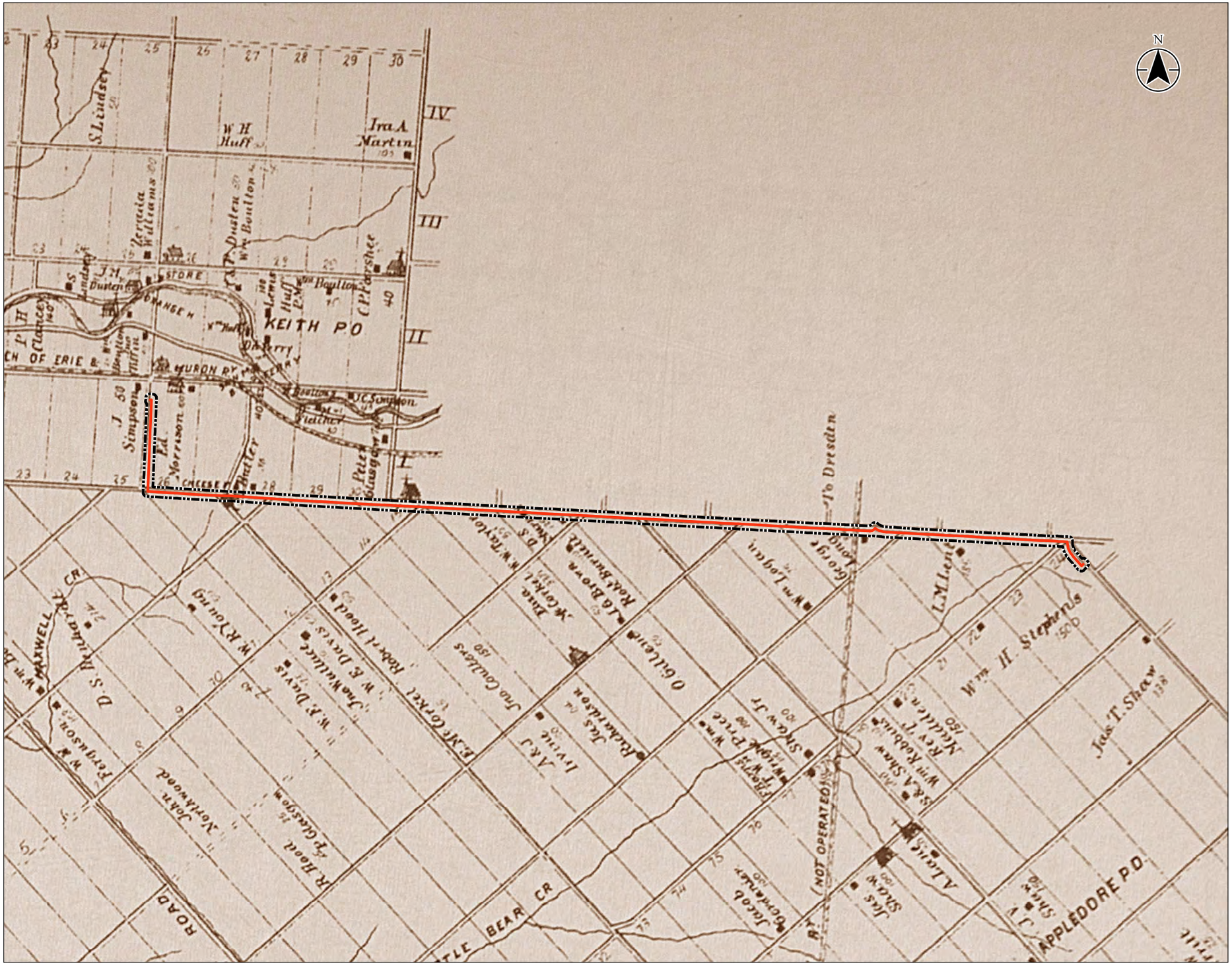

Stantec

Legend

Cultural Heritage Study Area

Preferred Route

Notes

1. Map is not to scale.

2. Historic base map source: Belden, H. & Co. 1881. Illustrated Historical Atlas of the Counties of Essex and Kent. Toronto: H. Belden & Co.

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-25
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-25

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
4.1

Title
The 1881 Map of Chatham Township

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Legend
- Cultural Heritage Study Area
- Preferred Route

Notes
1. Map is not to scale.
2. Historic base map source: Belden, H. & Co. 1881. Illustrated Historical Atlas of the Counties of Essex and Kent. Toronto: H. Belden & Co.

Project Location	160961248 REVA
Municipality of Chatham-Kent	Prepared by PW on 2018-05-25
	Technical Review by DH on 2017-06-01
	Independent Review by MK on 2018-05-25

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
4.2

Title
The 1881 Map of Camden Township

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Stantec

Legend

- Cultural Heritage Study Area
- Potential and Protected Heritage Resource
- Start Point
- Preferred Route

Existing Features

- Existing Union Gas Pipeline
- Watercourse
- Property Boundary
- Waterbody

0 100 200 Meters

1:8,000 (At original document size of 11x17)

Notes

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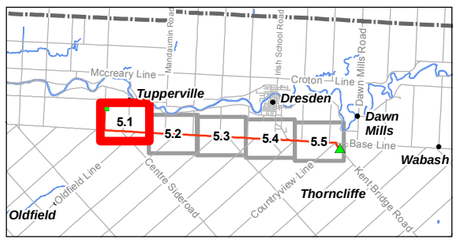

Project Location
Municipality of
Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
5.1

Title
Potential and Protected Heritage Resources

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Stantec

Legend

- Cultural Heritage Study Area
- Potential and Protected Heritage Resource
- Preferred Route

Existing Features

- Existing Union Gas Pipeline
- Watercourse
- Property Boundary

0 100 200 Meters

1:8,000 (At original document size of 11x17)

Notes

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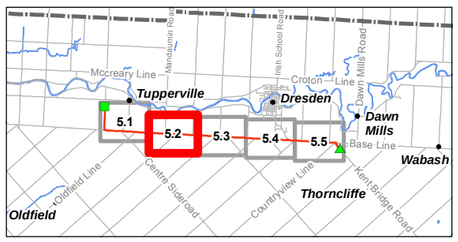

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
5.2

Title
Potential and Protected Heritage Resources

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Stantec

Legend

- Cultural Heritage Study Area
- Potential and Protected Heritage Resource
- Preferred Route
- Watercourse
- Property Boundary

0 100 200 Meters

1:8,000 (At original document size of 11x17)

Notes

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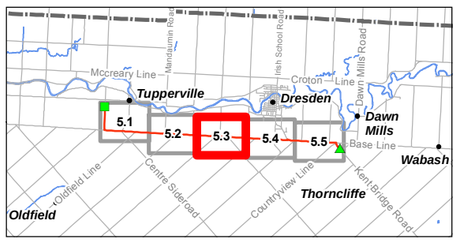

Project Location
Municipality of
Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
5.3

Title
Potential and Protected Heritage Resources

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Legend

- Cultural Heritage Study Area
- Potential and Protected Heritage Resource
- Preferred Route
- Watercourse
- Property Boundary

0 100 200 Meters

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Notes

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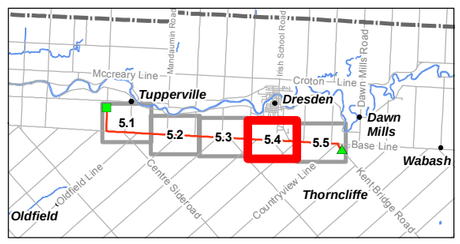

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
5.4

Title
Potential and Protected Heritage Resources

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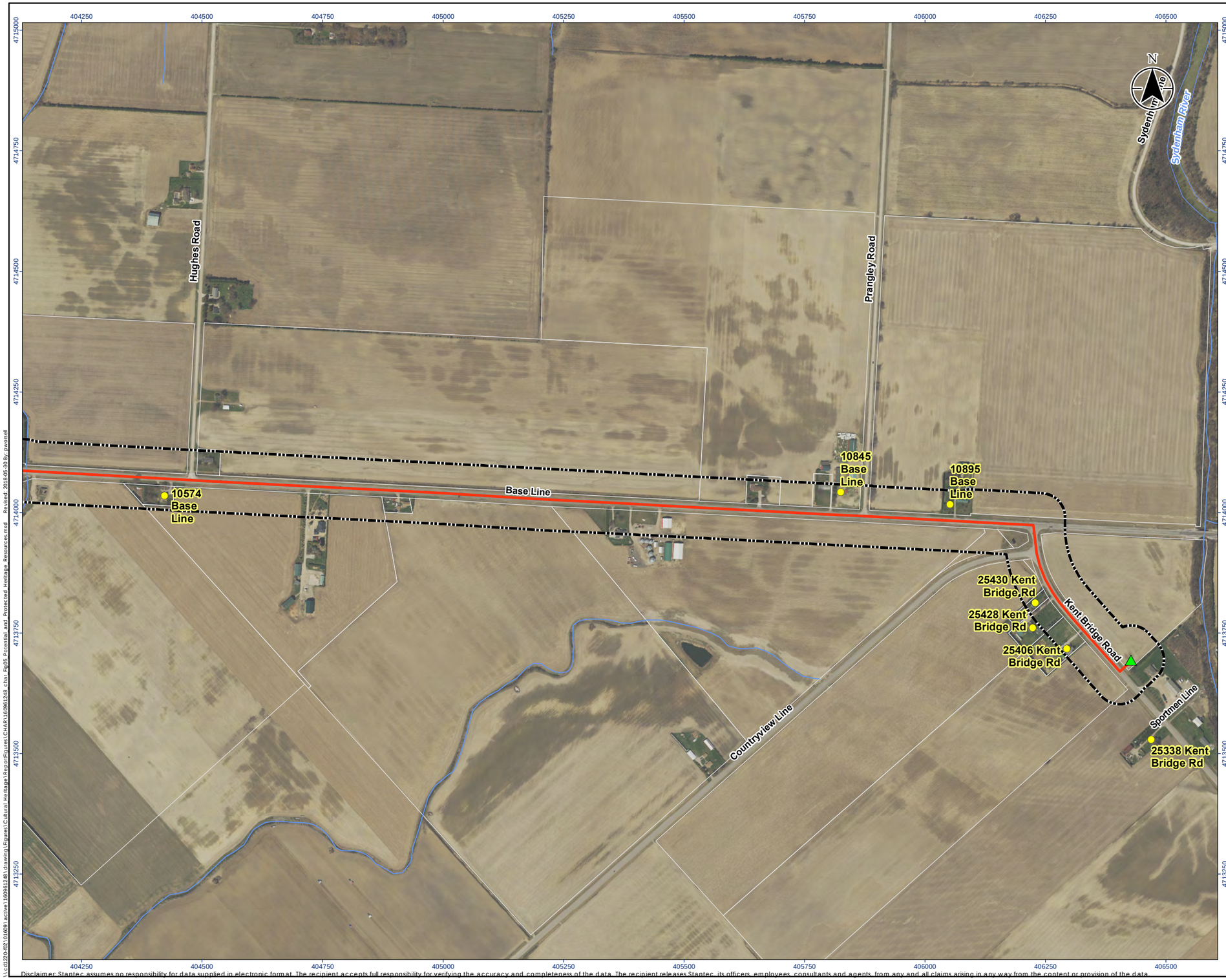

Legend

- Cultural Heritage Study Area
- Potential and Protected Heritage Resource
- End Point
- Preferred Route
- Watercourse
- Property Boundary
- Waterbody

0 100 200 Meters

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Notes

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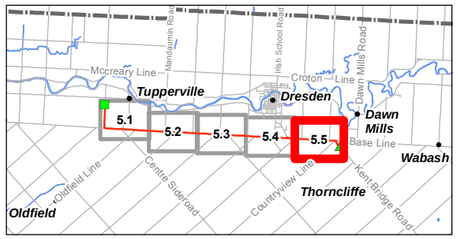

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
5.5

Title
Potential and Protected Heritage Resources

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Stantec

Legend

- Cultural Heritage Study Area
- Identified Cultural Heritage Resource
- Start Point
- Preferred Route

Existing Features

- Existing Union Gas Pipeline
- Watercourse
- Property Boundary
- Waterbody

0 100 200 Meters

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Notes

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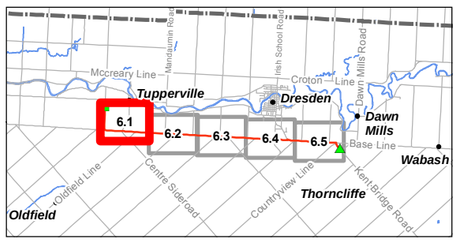

Project Location
Municipality of
Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
6.1

Title
Identified Cultural Heritage Resources

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Stantec

Legend

- Cultural Heritage Study Area
- Identified Cultural Heritage Resource
- Preferred Route

Existing Features

- Existing Union Gas Pipeline
- Watercourse
- Property Boundary

0 100 200 Meters

1:8,000 (At original document size of 11x17)

Notes

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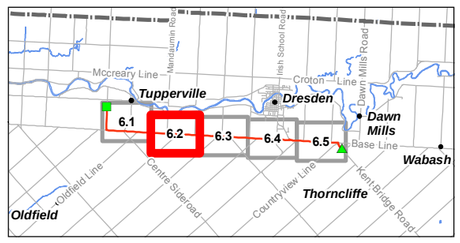

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
6.2

Title
Identified Cultural Heritage Resources

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Stantec

Legend

- Cultural Heritage Study Area
- Identified Cultural Heritage Resource
- Preferred Route
- Watercourse
- Property Boundary

0 100 200 Meters

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Notes

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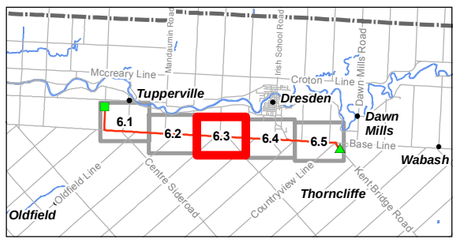

Project Location
Municipality of
Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
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Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
6.3

Title
Identified Cultural Heritage Resources

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Stantec

Legend

- Cultural Heritage Study Area
- Identified Cultural Heritage Resource
- Preferred Route
- Watercourse
- Property Boundary

0 100 200 Meters

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Notes

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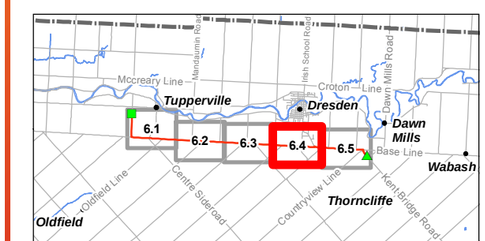

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
Independent Review by MK on 2018-05-30

Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
6.4

Title
Identified Cultural Heritage Resources

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Stantec

Legend

- Cultural Heritage Study Area
- Identified Cultural Heritage Resource
- End Point
- Preferred Route
- Watercourse
- Property Boundary
- Waterbody

0 100 200 Meters

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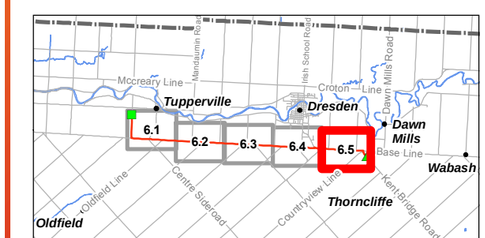

Project Location
Municipality of Chatham-Kent

160961248 REVA
Prepared by PW on 2018-05-30
Technical Review by DH on 2017-06-01
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Client/Project
UNION GAS LIMITED
CHATHAM-KENT PIPELINE EXPANSION

Figure No.
6.5

Title
Identified Cultural Heritage Resources

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APPENDIX B:
CULTURAL HERITAGE INVENTORY FORMS

Municipal Address: 29060 Simpson Road

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1920-1963

Relationship to Project: Within the Study Area



Description: The property contains a residence and outbuilding. The residence is situated on a section of the property that is bordered by cedars and has mature spruce trees. Surrounding the residence is agricultural fields.

The residence is a two storey structure with a high-pitched hip roof with asphalt shingles. The east elevation has a gabled dormer. The red brick exterior has modern windows. The north elevation has an enclosed porch with a wood paneled entrance door. The residence has a rusticated 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: The construction of this two storey residence dates to between approximately 1920 and 1963, determined through 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 Chatham. 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, shed dormers, red brick exterior, and covered wrap around porch (west and south elevations).

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-1
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 8649 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Barn

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area

Description: The property contains a laneway that leads to four outbuildings.

The largest outbuilding is a timber frame barn with a side gable roof that is clad in metal. It has an attached smaller timber frame structure with a side gable roof that is clad in metal. To the east of the barn is a small pumphouse and a side gable outbuilding that has a metal clad roof, and metal clad exterior.



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: The construction of this barn dates to between approximately 1882-1913, determined through historic and topographic mapping. It is a representative example of vernacular Ontario farm structure. The barn has the potential to yield information that contributes to an understanding of Township of Chatham. 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: Barn: Timber frame structure, side gable roof, and attached side gable roof addition.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:**
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 8793 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Farmstead

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and farm associated outbuildings. The property has mature deciduous trees near the residence, and an orchard to the east of the residence. Agricultural fields surround the farm outbuildings and residence.

The residence is a two storey structure with a high-pitched hip roof, asphalt shingles, and a brick chimney. The red brick exterior has modern windows and doors. The front (south) elevation has a central entrance with a partial concrete porch with metal railings. The east elevation has a partial enclosed porch. The residence has a rusticated concrete foundation.



The largest farm outbuilding is a side gable barn with a metal clad roof. Its exterior is clad in vertical wood boards and it has a concrete foundation. The barn has a salt box side. Attached to the barn are smaller side gabled outbuildings. Adjacent to the barn is a cast-in-place concrete silo, and two metal clad silos,as well as two to three more side gable outbuildings that are clad in metal.

Indicators of Cultural Heritage Value or Interest from O. Reg. 9/06:

	Yes	No
4. The property has design value or physical value because it,		
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: The construction of this two storey residence dates to between approximately 1882-1913, 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 Chatham. This property supports the late 19th to early 20th century rural character of the area and is physically and historically linked to its surroundings.

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Identified Heritage Attributes: Residence: Two storey structure, high-pitched hip roof, brick chimney, brick exterior, and central entrance. Landscape: Mature deciduous trees and surrounding agricultural fields.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-3
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 26872 Centre Sideroad

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Barn

Associated Dates: 1900-1940

Relationship to Project: Within the Study Area



Description: The property contains a farm associated outbuildings and structures. The outbuildings are surrounded by agricultural fields.

The largest outbuilding is a timber frame barn with a side gable roof that is clad in metal. The structure has a salt box addition and a concrete foundation. Adjacent to the barn is a tall side gable outbuilding that is clad with metal and has an attached grain elevator with metal silos.

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: The construction of this barn dates to between approximately 1900-1940, based on topographic mapping. It is a representative example of vernacular Ontario farm structure. The barn has the potential to yield information that contributes to an understanding of Township of Chatham. This property supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Barn: Timber frame structure and side gable roof.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-4
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 8959 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and modern outbuilding. West of the residence is a line of mature spruce trees.

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 structure has a modern addition on its east and south elevations. The red brick exterior has mostly modern windows, except for a flat fixed window on the lower storey with side 1/1 wood windows and a fixed wood transom. The windows on the original portion of the residence have brick voussoirs. The residence has 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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through 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 Chatham. 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, brick chimney, red brick exterior, wood fixed window flanked by 1/1 wood windows and fixed wood transom, and brick voussoirs. Landscape: Mature spruce trees.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-5
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 9037 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and modern outbuilding. The property has mature maple trees.

The residence is a one and a half storey structure with a medium-pitched front facing gable roof, with metal cladding. Its east elevation has an attached one storey side gable roof section, with a metal clad roof. The exterior of the residence is clad in vinyl siding and has modern windows and doors. The foundation is undetermined. The residence has been heavily altered with modern materials.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through historic and topographic mapping. The original structure has been heavily altered and has no design value. 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: Landscape: Mature maple trees. Contextual: Connection to the rural character of the surrounding area.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-6
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 9094 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1940-1963

Relationship to Project: Within the Study Area



Description: The property contains a residence, a cast-in-place concrete silo, two metal silos, a timber frame outbuilding, and a small horizontal wood outbuilding. The front yard has mature deciduous trees.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles. The front (north) elevation has a front facing gable peak. The residence is clad in vinyl siding and brick and has modern windows and doors. The structure has a concrete foundation.

At the rear of the residence is the timber frame outbuilding with a side gable roof that is clad in metal. The view to the outbuilding is obstructed by the residence and vegetation.

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 18, 2018.

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Municipal Address: 8894 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1940-1963

Relationship to Project: Within the Study Area



Description: The property contains a residence and modern garage.

The residence is a one and a half storey structure with a high-pitched side gable roof with asphalt shingles and a brick chimney. The structure has an attached modern addition with a flat roof on its south elevation. The lower storey of the residence is clad in brick, while the upper storey is clad in stucco with half timbering. The residence has modern windows and doors. The front (north) elevation has two front facing gable peaks. The structure has 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 18, 2018.

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Municipal Address: 10506 Bush Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Farmstead

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence, two modern outbuildings, and a wood outbuilding. The property has mature maple trees and ornamental gardens. The residence and outbuildings and surrounded by agricultural fields.

The residence is a one and a half storey structure with a medium-pitched cross gable roof that is clad with metal. The structure has a modern rear addition. The roofline has high-pitched gabled dormers on the north and west elevations. The red brick exterior has modern windows and doors. The front (west) elevation has an enclosed porch.



The vertical wood outbuilding has a side gable roof that is clad in metal. The structure has 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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through 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 Chatham. This property supports the late 19th to early 20th century rural character of the area and is physically and historically linked to its surroundings.

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Identified Heritage Attributes: Residence: One and a half storey structure, and medium-pitched front cross gable rood, high-pitched gable dormers, and red brick exterior. Outbuilding: vertical wood exterior, and side gable roof. Landscape: Mature maple trees and surrounding agricultural fields.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-7
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 10423 Bush Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Farmstead

Associated Dates: 1920-1950

Relationship to Project: Within the Study Area



Description: The property contains a residence, barn, and outbuilding. The south and north of the residence are mature spruce tree lines. The farmstead is surrounded by agricultural fields.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The residence has a concrete foundation. The residence has been heavily altered with modern materials.

The barn has a side gable roof that is clad in metal and has a hay hood. The barn is clad in vertical wood boards and has modern doors. The outbuilding is a similar side gable roof structure, with a metal clad roof, and vertical wood board exterior.

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: The construction of this one and a half storey residence dates to between approximately 1920-1950, determined through topographic mapping. This farmstead has the potential to yield information that contributes to an understanding of Township of Chatham. This property supports the early to mid-20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Landscape: Mature spruce trees and surrounding agricultural fields. Contextual: Connection to rural character of the surrounding area.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-8
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 10315 Bush Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Farmstead

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a laneway that leads to a residence, modern garage, three metal silos, and two outbuildings. The property has mature maple trees and a tree line south of the residence. The residence and outbuildings are surrounded by agricultural fields.

The residence is a one and a half storey structure with a medium-pitched front facing gable roof, with metal cladding. The structure has a one storey addition on its north elevation with a high-pitched side gable roof that is clad in metal. The residence is clad in vinyl siding and has modern windows within wood surrounds. The structure has a rusticated concrete foundation.



To the rear of the residence is a wood outbuilding with a side gable roof that is clad with metal. Southwest of the outbuilding is another outbuilding with a side gable roof that is clad in metal. Its exterior is clad in vertical wood boards.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through 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 Chatham. This property supports the late 19th to early 20th century rural character of the area and is physically and historically linked to its surroundings.

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Identified Heritage Attributes: Residence: One and a half storey structure, and medium-pitched front facing gable roof. Landscape: Laneway, mature maple trees, and surrounding agricultural fields.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-9
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 29009 King's Ferry Road

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Farmstead

Associated Dates: 1882-1913

Relationship to Project: Within the Project Location



Description: The property contains a residence and farm associated outbuildings. The view of the residence from Base Line is obstructed by cedar and spruce trees.

The residence is a one and a half storey structure with a medium-pitched front facing gable roof with asphalt shingles and a brick chimney. The structure is clad in aluminum siding and has modern windows. The residence has a concrete foundation.



To the rear of the residence are multiple farm associated outbuildings. This includes a timber frame outbuilding with a high-pitched side gable roof that is clad in metal, a long side gable roof outbuilding, that has a metal clad roof, and a small wood outbuilding with a side gable roof that is clad in metal. Adjacent to these outbuildings is a cast-in-place concrete silo, and metal clad silo.

To the northeast of the residence is a wood outbuilding with a side gable roof that is clad in metal. It has a shed roof addition. Adjacent to this outbuilding, are two smaller wood outbuildings with gable roofs that are clad in metal. The outbuildings have wood doors and one has wood windows.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through 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 Chatham. This property

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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, and medium-pitched front facing gable roof, and brick chimney. Outbuilding: Timber frame structure and high-pitched gable roof. Small outbuilding: Wood outbuilding, side gable roof, wood door, and wood windows.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-10
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 9444 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and outbuildings. The property has cedar trees and an ornamental garden.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The front (north) elevation has an enclosed porch. The structure has 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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through 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 Chatham. 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, and medium-pitched front cross gable roof.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-11
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 9418 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Project Location

Description: The property contains a residence.

The residence is a one storey structure with a medium-pitched side gable roof that is clad in metal and has a brick chimney. The exterior is clad in vinyl siding and has modern windows and doors. The structure has an attached single-car garage. The residence has 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 18, 2018.

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Municipal Address: 9669 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Project Location



Description: The property contains a residence and outbuildings. The outbuildings adjacent to the residence are modern. The view of the outbuildings at the rear of the property is obstructed by vegetation. The property has mature spruce and cedar trees.

The residence is a one storey structure with a side gable roof that has asphalt shingles. The structure is clad in vinyl siding and has modern windows and doors. The front (south) elevation has an enclosed partial porch. The residence has a concrete foundation and a rear addition.

A structure is shown on the property on the 1913 topographic map of Wallaceburg, but the current structure appears to date from the mid-20th century.

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 18, 2018.

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Municipal Address: 29006 Van Allen Road

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and modern outbuilding. The residence is a former schoolhouse. The front (south) elevation of the property is bordered in a cedar hedge, while the west elevation has mature spruce trees.

The residence is a one storey structure with a high-pitched front facing gable roof, with asphalt shingles. The east elevation has a shed dormer. The red brick exterior has decorative vertical and horizontal brick banding. The residence has modern windows, with brick voussoirs that have a central keystone and label stops. The structure has a rear modern addition with an attached double-car garage. The residence has a rusticated stone 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: This one and a half storey residence (former schoolhouse) dates to between approximately 1882-1913, based on historic and topographic mapping. It is a representative example of a vernacular Ontario schoolhouse. This former schoolhouse is an institution connected to the Township of Camden and has the potential to yield information that contributes to an understanding of the township. 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 storey structure, high-pitched front facing gable roof, red brick exterior, shed dormer, decorative vertical and horizontal brick banding, brick voussoirs with central keystone and label stops, and rusticated stone foundation. Landscape: Mature spruce trees.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-12
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

Municipal Address: 9668 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1940-1974

Relationship to Project: Within the Project Location

Description: The property contains a residence and outbuildings. The property has mature maple trees.

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 block 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 18, 2018.

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Municipal Address: 29076 Uncle Toms Road

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Farmstead

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and outbuildings. The structures are set back from the roadway off a long laneway. The view of the residence and outbuildings is obstructed by distance and surrounding vegetation. The residence and outbuildings are surrounded by agricultural fields.

The residence is a one and a half storey structure with a medium-pitched cross gable roof, that is clad in metal. The structure is clad in vinyl siding and has a mixture of modern windows and 2/1 windows. The foundation is undetermined.

North of the residence is a wood outbuilding with high-pitched side gable roof that is clad in metal. The structure has an attached shed roof addition and attached side gable addition. West of the residence is a modern outbuilding, and south of the residence is a wood outbuilding with side gable roof that is clad in metal. The outbuilding has a three-bay front (east) façade with wood windows.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through 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 Camden. 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 2/1 windows. Outbuilding: vertical wood cladding, and high-pitched side gable roof. Landscape: Long laneway and surrounding agricultural fields.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-13
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 29074 Uncle Toms Road

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Study Area



Description: The property contains a residence and outbuilding. The view of the residence is obstructed by surrounding vegetation, that includes mature spruce trees. The residence is set back from the roadway and is reached by a long laneway associated with 29076 Uncle Toms Road.

The residence has a gable roof and is clad in horizontal wood siding.

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 residence dates to between approximately 1939-1974, based on topographic mapping. This residence has the potential to yield information that contributes to an understanding of Township of Camden. This property supports the early to mid-20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: Gable roof, and horizontal wood siding. Landscape: Mature spruce trees, and shared laneway with 29076 Uncle Toms Road.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-14
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 9808 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Study Area

Description: The property contains a residence and outbuildings. The property is bordered in a mature cedar hedge and has mature spruce trees.

The residence is a one storey structure with a medium-pitched side gable roof that is clad with metal shingles and has a brick chimney. The structure is clad in brick and has modern windows and doors. The residence has an attached single-car garage and a concrete foundation.

The largest outbuilding has a side gable roof that is clad in metal and has ventilators. Its exterior is clad in vertical wood boards and has a concrete foundation. Behind the outbuilding is a smaller wood outbuilding with side gable roof that is clad in metal. To the rear of the property are four silos.





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 18, 2018.

Municipal Address: 10893 Union Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Study Area

Description: The property contains a residence and outbuildings.

The residence is a one storey structure with a medium-pitched hip roof with asphalt shingles. The structure has a brick exterior with stone cladding and modern windows and doors. The front (east) elevation has two partial concrete porches. The structure has an attached single-car garage and a concrete foundation.

South of the residence is a timber frame barn with a side gable roof that is clad in metal. The structure has 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 18, 2018.

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Municipal Address: 11074 Union Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Study Area

Description: The property contains a laneway that leads to a residence and a modern outbuilding. The view of the residence is obstructed from the roadway by distance and vegetation. The residence is surrounded by mature coniferous trees.



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 residence dates to between approximately 1939-1974, based on topographic mapping. This residence has the potential to yield information that contributes to an understanding of Township of Camden. This property supports the early to mid- 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Landscape: Long laneway, and mature coniferous trees.

Identification of CHVI:	**Cultural Heritage Resource Number:** CHR-15
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 10117 Base Line

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuildings and silos.

The residence is a one storey structure with a medium-pitched hip roof that has asphalt shingles. The exterior is clad in vinyl siding and has modern windows and doors.



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 18, 2018.

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Municipal Address: 10155 Base Line

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and modern outbuilding. The property has mature spruce and cedar trees.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The red brick exterior has modern windows and doors. Exterior windows have segmental frames and brick voussoirs. The front (south) elevation has a partial concrete porch with metal railings. The structure has an undetermined 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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through 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 Camden. 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, and medium-pitched cross gable roof, brick exterior, segmental window frames, and brick voussoirs. Landscape: Mature spruce and cedar trees.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-16
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 10211 Base Line

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Project Location



Description: The property contains a residence and modern outbuilding. The property has spruce and cedar trees.

The residence is a one and a half storey structure with a medium-pitched front facing gable roof with metal cladding. The structure has a one storey addition on its west elevation with a side gable roof that is clad in metal. The exterior is clad in vinyl siding and has modern windows and doors. The original portion of the residence has a rusticated concrete foundation, while the addition has a concrete foundation. The residence has been heavily altered with modern materials.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through historic and topographic mapping. This residence has the potential to yield information that contributes to an understanding of Township of Camden. 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: Contextual: Connection to rural character of the surrounding area.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-17
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

Municipal Address: 1396 North Street

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and two modern outbuildings. The front yard has a mature maple tree.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The residence has an L-shaped plan. The exterior is clad in vinyl siding and has modern windows and doors. The front (east) elevation has a covered partial wood porch. The foundation is undetermined.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through 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 Camden. 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, and medium-pitched front facing gable roof, L-shaped plan, and covered partial wood porch.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-18
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 25878 North Street

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Study Area

Description: The property contains a residence, detached garage, and an outbuilding.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles. The exterior is clad in aluminum siding and stone. The front (east) has a partial wood porch. The structure has a concrete block foundation.

The large outbuilding has a side gable roof that is clad in metal. Its exterior is composed of concrete block and it is clad in metal.





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 18, 2018.

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Municipal Address: 10256 Base Line

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Study Area



Description: The property contains a long laneway that leads to residence and outbuildings.

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 east elevation has a shed dormer. The structure has a one storey rear addition with a side gable roof. The exterior is clad in aluminum siding and has modern windows and doors. The front (east) elevation has a partial concrete porch. The structure has a rusticated 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 18, 2018.

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Municipal Address: 10345 Base Line

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and two modern outbuildings. The front yard has a mature deciduous tree.

The residence is a one and a half storey structure with medium-pitched front facing gable roof. The structure has a one storey addition on its east elevation with a side gable roof. The residence is clad in vinyl siding and has modern windows and doors. The front (south) elevation has a partial wood porch. The structure has a concrete foundation. The residence has been heavily altered with modern materials.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through historic and topographic mapping. 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: Contextual: Connection to the rural character of the surrounding area.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-19
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 10365 Base Line

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1939-1974

Relationship to Project: Within the Study Area

Description: The property contains a residence and modern outbuildings.

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 residence has 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 18, 2018.

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Municipal Address: Railway Line (Base Line)

Former Township: Township of Camden/Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1879-1886

Relationship to Project: Within the Study Area

Description: The property contains the former railway corridor of the Erie & Huron Railway line. Railway components have been removed, except for the steel tracks. The line is grown over with vegetation.

The railway line is depicted on the 1881 Township of Chatham and Township of Camden maps in the Illustrated Atlas of the Counties of Essex and Kent (Figure 4).



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 former railway corridor is associated with the Eire & Huron Railway line that operated across southwestern Ontario and connected Chatham with Sarnia. The railway line was constructed between 1879 and 1886, with station stops in Corunna, Mooretown, Courtright, Sombra, Port Lambton, and Wallaceburg. The line was purchased in 1898 by Hiram Walker and became part of the Lake Erie and Detroit River Railway. In 1947, the line was taken over by the Chesapeake & Ohio System. 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: Former Railway Line: Layout of the former Erie & Huron Railway Line.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-20
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 10402 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1870-1881

Relationship to Project: Within the Study Area



Description: The property contains a residence and two modern outbuildings.

The residence is a two storey structure with high-pitched cross gable roof with metal cladding. The red brick structure has an L-shaped plan. The three-bay front (north) façade has a central entrance. The modern windows are set within segmental frames with concrete sills and brick voussoirs. The east elevation has a wood semi-circular window. The structure has 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: This two storey residence dates to between approximately 1870-1881, based on historic mapping. It is a representative example of a vernacular Ontario farmhouse with Georgian design influence. This residence has the potential to yield information that contributes to an understanding of Township of Chatham. This property supports the late 19th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Residence: Two storey structure, high-pitched cross gable roof, brick exterior, brick voussoirs, three-bay front façade, semi-circular wood window, and L-shaped plan.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-21
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 10330 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1920

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 front facing gable roof with asphalt shingles and concrete chimney. The structure has a lower side gable section, that forms an L-shaped plan. The residence is clad in vinyl siding and has modern windows and doors. The front (north) elevation has a covered partial porch with a gable peak. The structure has a rear shed roof addition and a stone 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: This one and a half storey residence dates to between approximately1882-1920, 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 Chatham. 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: Two storey structure, medium-pitched front facing gable roof with lower side gable roof section, L-shaped plan, and stone foundation.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-22
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 10513 Base Line

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1924-1939

Relationship to Project: Within the Study Area



Description: The property contains a residence and two modern outbuildings. The property has a laneway and mature cedar and spruce trees.

The residence is a two storey structure with a medium-pitched hip roof with metal fish-scale shingles and a brick chimney. The structure has an L-shaped plan. The brick exterior has modern windows and doors. Windows have brick voussoirs and concrete sills. The front (south) elevation has a covered partial brick porch with wood columns and metal fish-scale shingles. The structure has 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: This two storey residence dates to between approximately 1924-1939, based on 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 Camden. 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, metal fish-scale shingles, brick chimney, brick exterior, covered partial brick porch with wood columns and metal fish-scale shingles, brick voussoirs, and L-shaped plan. Landscape: Laneway, and mature cedar and spruce trees.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-23
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

Municipal Address: 10845 Base Line

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Outbuildings

Associated Dates: 1920s-1940

Relationship to Project: Within the Study Area



Description: The property contains a residence, and a mixture of early 20th century and modern outbuildings. The residence and outbuildings are surrounded by agricultural fields.

The residence is a one storey structure with a medium-pitched side gable roof with asphalt shingles and a brick chimney. The residence is clad in brick and has modern windows and doors. The structure has a concrete foundation.

To the rear of the residence is a timber frame barn with a gambrel roof that is clad with metal, has two ventilators, and a hay hood. The structure has wood windows and doors, and a concrete foundation. Next to the barn are two wood outbuildings with side gable roofs that are clad in metal with ventilators. The structures have wood windows and doors, and concrete foundations.

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: The outbuildings date to between approximately 1920s-1940, based on topographic mapping. They are representative examples of a vernacular Ontario farm outbuildings. These outbuildings have the potential to yield information that contributes to an understanding of Township of Camden. This property supports the early 20th century rural character of the area and is physically and historically linked to its surroundings.

Identified Heritage Attributes: Barn: Timber frame structure, gambrel roof, ventilators, hay hood, and wood windows and doors. Two outbuildings: Wood exterior, side gable roof, ventilators, and wood windows and doors.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-24
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

Municipal Address: 10895 Base Line

Former Township: Township of Camden

Municipality: Chatham-Kent

Resource Type: Farmstead

Associated Dates: 1924-1939

Relationship to Project: Within the Study Area



Description: The property contains a laneway that leads to a residence and a mixture of early 20th century and modern outbuildings including three metal silos and one cast-in-place concrete silo. The residence and outbuildings are surrounded by agricultural fields.

The residence is a one and a half storey structure with a medium-pitched front facing gable roof with asphalt shingles. The east elevation has a shed dormer. The residence is clad in vinyl siding and has modern windows and doors. The front (south) elevation has an enclosed porch. The structure has a rusticated concrete foundation.

To the rear of the residence is a timber frame barn with a gambrel roof that is clad in metal, with four ventilators, and a hay hood. The structure has a rusticated concrete foundation. East of the barn is a vertical wood outbuilding with a side gable roof that is clad in metal with two ventilators. The property also has a smaller wood outbuilding with a side gable roof that is clad in metal.

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 one and a half storey residence dates to between approximately 1924-1939, based on 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 Camden. 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 front facing gable roof, and shed dormer. Barn: Timber frame structure and gambrel roof. Outbuilding: vertical wood, side gable roof, and ventilators. Smaller outbuilding: wood exterior and side gable roof. Landscape: laneway and surrounding agricultural fields.

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Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-25
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 10574 Base Line

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and an outbuilding. The residence is a former schoolhouse. The structure is depicted on the 1913 topographic map of the study area as a schoolhouse. The property has a gravel semi-circular driveway and mature cedar trees.

The residence is a one and a half storey structure with a high-pitched pyramidal roof that is clad in metal and has a brick chimney. The northeast corner has a two storey tower with a pyramidal roof that is clad in metal. The front (north) elevation has a front facing gable peak. The structure has a red brick exterior with modern windows. The windows have concrete sills and lintels. The modern windows replaced tall windows, as above the current windows is wood cladding. The tower has two windows set in semi-circular frames with brick voussoirs. The front elevation has a central entrance with a covered partial wood porch. The modern entrance door has a wood surround with pilasters. The structure has a rusticated stone foundation.

To the rear of the residence is a wood outbuilding with a side gable roof that has asphalt shingles.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through historic and topographic mapping. It is a representative example of a vernacular Ontario residence with Italian Villa design influences that displays a high degree of craftsmanship. This residence has the potential to yield information that contributes to an understanding of Township of Chatham. This property supports the late 19th to early 20th century rural character of the area and is physically and historically linked to its surroundings.

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Identified Heritage Attributes: Residence: One and a half storey structure, high-pitched pyramidal roof, brick chimney, two storey tower with pyramidal roof, brick exterior, front facing gable peak, wood door surround with pilasters, and rusticated stone foundation.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-26
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 25430 Kent Bridge Road

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1940-1975

Relationship to Project: Within the Study Area



Description: The property contains a residence and three modern outbuildings. The property is bordered with a cedar hedge with the adjacent property 25428 Kent Bridge Road. The two properties share a central driveway.

The residence is a one storey structure with a medium-pitched hip roof that is clad in metal. The exterior is clad in brick and has modern windows and doors. The residence has 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 18, 2018.

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Municipal Address: 25428 Kent Bridge Road

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and outbuildings. The residence is set back from the roadway. The property is bordered with a cedar hedge with the adjacent property 25430 Kent Bridge Road. The two properties share a central driveway.

The residence is a one and a half storey structure with a medium-pitched cross gable roof with asphalt shingles. The east elevation has a high-pitched gable door. The residence has an L-shaped plan. The north elevation has an enclosed porch. The structure is clad in vinyl siding and has modern windows and doors. The foundation was not determined.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through historic and topographic mapping. It is a representative example of a vernacular Ontario residence. This residence has the potential to yield information that contributes to an understanding of Township of Chatham. 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, high-pitched gable dormer, and L-shaped plan.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-27
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 25406 Kent Bridge Road

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a residence and outbuildings.

The residence is a one and a half storey structure with a medium-pitched front facing gable roof with metal cladding. The structure has attached one storey section with a side gable roof that is clad in metal. The exterior is clad in vinyl siding and has modern windows and doors. The front (east) elevation has a partial wood porch. The residence has an undetermined foundation and a modern rear addition.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through historic and topographic mapping. This residence has the potential to yield information that contributes to an understanding of Township of Chatham. 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: Contextual: Connection to the rural character of the surrounding area.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-28
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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Municipal Address: 25338 Kent Bridge Road

Former Township: Township of Chatham

Municipality: Chatham-Kent

Resource Type: Residence

Associated Dates: 1882-1913

Relationship to Project: Within the Study Area



Description: The property contains a laneway that leads to a residence and outbuildings. The laneway has a mature spruce tree line on its north elevation. The property is surrounded by agricultural fields.

The residence is a one and a half storey structure with a medium-pitched front facing gable roof with asphalt shingles. The structure has attached one storey section with a side gable roof with asphalt shingles. The residence has an L-shaped plan. The exterior is clad in aluminum siding and has modern windows and doors. The front (east) elevation has a partial wood porch. The residence has a stone foundation.

The outbuilding is a one storey structure with a gable roof. The structure is clad in metal. The other outbuildings on the property are modern.

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: The construction of this one and a half storey residence dates to between approximately 1882-1913, determined through historic and topographic mapping. It is a representative example of a vernacular Ontario residence. This residence has the potential to yield information that contributes to an understanding of Township of Chatham. 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 front facing gable roof, one storey side gable roof section, L-shaped plan, and stone foundation. Landscape: Laneway, mature spruce tree line, and surrounding agricultural fields.

Identification of CHVI: Yes	**Cultural Heritage Resource Number:** CHR-29
Completed by (name): Laura Walter	**Date Completed:** May 18, 2018.

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APPENDIX F:
POTENTIAL SOURCES OF CONTAMINATION

The following is a summary of the identified PSOC associated with the proposed pipeline route for the Chatham Kent Rural Pipeline Expansion Project:

Table F-1: Summary of Potential Sources of Contamination

PSOC No.	Description of Potential Source	Location	Distance from Preferred Route	Contaminant of Concern	Potential for Concern	Explanation of Potential for Concern
1	Former Railway Crossings	Base Line, Near Community Road Dresden, ON	0 m	Polycyclic aromatic hydrocarbons (PAHs), Petroleum hydrocarbons (PHCs), Metals	High	Potential for impacted fill materials from use of slag as rail ballast, or leaks or spills from rail traffic.
2	Babcock Supply Ltd.	10357 Baseline Dresden, ON	10 m	PHCs, Metals and Inorganics, Volatile Organic Compounds (VOCs)	High	Registered industrial facility, concrete and metal products. Babcock Supply is registered in the Private and Retail Fuel Storage Tanks database with a storage tank with a capacity of 1,000 L. Discarded drum observed adjacent to the Site.
3	Active Oil Well	One active oil well observed on Base Line near Cedar Hedge Line Dresden, ON	25 m	PAHs, PHCs	High	One active oil well and associated above ground storage tanks (ASTs) were observed on Base Line Road near Cedar Hedge Line
4	Union Gas Metering Station	29210 Simpson Road Tupperville, ON	0 m	PAHs, PHCs, VOCs, Metals and Inorganics	High	Presence of metering equipment. No evidence of soil or groundwater contamination identified through Site observation and historical records review process. Two 55-gallon steel drums were observed on the property. The contents of the drums are unknown. Evidence of fill materials identified during the site reconnaissance. The environmental quality of the fill is unknown.

Table F-1: Summary of Potential Sources of Contamination

PSOC No.	Description of Potential Source	Location	Distance from Preferred Route	Contaminant of Concern	Potential for Concern	Explanation of Potential for Concern
5	Scrap Metal and Discarded Vehicles	10754 Base Line Dresden, ON	15 m	PAHs, PHCs, Metals and Inorganics	Moderate	Discarded materials and vehicles were identified during the site reconnaissance. The nature of the discarded materials is unknown, therefore the PSOC is interpreted to be moderate.
6	ASTs and Fill Materials	1431 North Street Dresden, ON	20 m	PAHs, PHCs, VOCs, Metals and Inorganics	Moderate	Evidence of fill materials and ASTs were identified on North Street near Base Line Road during the site reconnaissance. The environmental quality of the fill materials is unknown. The condition of the ASTs and their contents are unknown, therefore the PSOC is interpreted to be moderate. A building on the property may have been a former vehicle service garage.
7	Scrap Yard	9709 Base Line, Chatham-Kent, ON	45 m	PAHs, PHCs, Metals and Inorganics	Moderate	Evidence of scrap metal and discarded materials identified during the site reconnaissance.
8	Pole Mounted Transformers	Various Locations Across the Site	0 m	PCBs	Low	Pole mounted transformers were observed at various locations along the Site. No spill records were listed for these transformers and no staining was observed at the base of the poles therefore the potential concern of this PSOC is interpreted to be low.
9	Fill Quality	Road allowances within the Site	Various Locations Across the Site	PAHs, PHCs, Metals and Inorganics	Low	Fill materials were likely imported to the Site for road construction. The environmental quality of the imported fill is unknown and represents a PSOC throughout the Site; however, unless the fill material is to be

Table F-1: Summary of Potential Sources of Contamination

PSOC No.	Description of Potential Source	Location	Distance from Preferred Route	Contaminant of Concern	Potential for Concern	Explanation of Potential for Concern
						removed from the Site, the potential concern of this PSOC is interpreted to be low.

Notes: PAHs – polycyclic aromatic hydrocarbons PHCs – petroleum hydrocarbons

PCBs – polychlorinated biphenyls VOCs – volatile organic compounds