

Conestoga College South Campus and Blair Business Park

Sanitary Sewer Servicing Class EA Study Schedule "B"

Cambridge, Ontario

Prepared for:

**Mr. Giancarlo Radicioni, P.Eng.
City of Cambridge
50 Dickson Street, P. O. Box 669
Cambridge, ON
N1R 5W8**

September 30, 2009

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September 30, 2009
File: 1738-200

Mr. Giancarlo Radicioni, P.Eng.
City of Cambridge
50 Dickson Street, P. O. Box 669
Cambridge, ON, N1R 5W8

Dear Mr. Radicioni:

**Re: Conestoga College South Campus and
Blair Business Park - Sanitary Sewer Servicing
Class EA Study – Schedule “B”**

We are pleased to submit the **Conestoga College South Campus and Blair Business Park - Sanitary Sewer Servicing Class EA Study – Schedule “B”** document for your review and approval at Council. This document identifies the alternatives that were considered for the servicing of the Cambridge lands into the Kitchener Wastewater Treatment Plant (WWTP) in Kitchener.

The intent of this EA Study was to identify the **Preferred Alternative** for the sanitary servicing of the Blair Business Park and the Conestoga College South Campus lands into the Kitchener WWTP. The preferred alternative that was selected by the Technical Steering Committee includes the location for a gravity sewer system from the Blair Business Park to the proposed new Blair Pumping Station, which would be located at the northwest corner of Fountain Street and Morningside Drive. As well, the study identified a route location for a new twin forcemain from this pumping station to the Kitchener Wastewater Treatment Plant.

The selection of the Preferred Alternative was based on an evaluation of existing conditions, natural and social environment concerns, economic analysis, as well as public health and safety concerns. This report identified the issues, the alternative solutions, the evaluation methods and the final recommendations of the Technical Steering Committee on this Project.

We would like to take this opportunity to gratefully acknowledge the valuable assistance provided by the City of Cambridge and all members of the Technical Steering Committee on this Project.

Yours truly,

MTE CONSULTANTS INC.

Angelo J. Innocente, C.E.T.
Senior Project Manager
Encl.

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E.0 EXECUTIVE SUMMARY AND RECOMMENDATIONS

E1.0 Executive Summary

In May 2009, the City of Cambridge initiated a Schedule “B” Class Environmental Assessment (EA) Study to identify a sanitary sewage servicing solution for the Blair Business Park and the Conestoga College South Campus. Both sites are located near Fountain Street and Highway #401 in the City of Cambridge.

The Blair Business Park is 31.54 ha in size and is generally bounded by Highway #401 to the west, Fountain Street to the north, Dickie Settlement Road to the east, and Old Mill Road (Cambridge) to the south. The proposed Conestoga College South Campus is 53.49 ha in size and is generally bounded by Highway #401 to the west and north, Morningside Drive to the east, and Fountain Street to the south. Refer to Figure No. 4.0. Both properties are located within the City of Cambridge municipal boundary and are included in the Region’s Official Plan designation for industrial use with a provision for post secondary institution on the College’s lands.

The requirement for this study was identified as a condition of the Region of Waterloo’s Official Plan Amendment No. 24 wherein it states that the lands identified may only be developed upon completion and approval of “an Environmental Assessment to identify the appropriate method of sanitary service from a municipal sewage treatment plant.” MTE Consultants Inc. was subsequently retained by the City of Cambridge to complete the Schedule “B” Class EA Study by evaluating a range of alternatives and, through this process, ultimately selecting the Preferred Alternative. This Class EA Study is being funded through the City of Cambridge.

It should be noted that for this project, sanitary sewage will be generated in the City of Cambridge and will flow into the City of Kitchener to be treated at the Kitchener Wastewater Treatment Plant (WWTP), which is owned and operated by the Region of Waterloo. The sanitary flow from the study lands were identified within the Region’s Wastewater Treatment Master Plan completed in 2007 as being included in the drainage area for the Kitchener WWTP. The study outcome required careful review and discussion with all parties during the EA process. The recommendations include specific items that must be endorsed by the City of Kitchener and approved by the City of Cambridge.

The scope of this EA Study includes the collection and identification of the constraints and opportunities within the study area for evaluation by the project team. Utilizing this information, the project team developed alternative solutions for the servicing of these lands. All solutions were then evaluated in a manner consistent with the Class Environmental Assessment process for Schedule “B” projects, with the primary objective to identify a “Preferred Sanitary Sewage Servicing Solution” for the Blair Business Park and the Conestoga College South Campus.

The problem statement developed for this study is as follows:

To identify the preferred means of providing a sanitary outlet for Conestoga College's South Campus and the Blair Business Park to the Kitchener Wastewater Treatment Plant, including a location for a new sewage pumping station (in Cambridge), and the preferred route location for a sewage outlet from this new pumping station to the Kitchener Wastewater Treatment Plant.

To guide the decision making process for this Class EA Study, a Technical Steering Committee (TSC) was assembled consisting of representatives from the City of Cambridge, City of Kitchener, Ministry of Transportation, Grand River Conservation Authority, Region of Waterloo and the study area primary land owners Millgate Holdings Inc. (majority owner of lands in the Blair Business Park) and Conestoga College South Campus lands. Formal TSC meetings were held throughout the duration of the study to assess pertinent data in addition to various sanitary servicing strategies, public and agency input, property owner comments and public open house materials.

A formal "Notice of Intent and Public Open House" was published in the Waterloo Region Record and Cambridge Times newspapers on June 12, 2009 to invite public review and comment on the identification of a sanitary sewage servicing solution. Drawings of the various alternatives were made available at the Public Information Centre #1 held on June 23, 2009 at the Conestoga College Doon Campus. Feedback received from the Public was considered during the selection of the "Preferred Alternative".

A second "Notice of Public Information Centre #2 – Preferred Alternative" was advertised August 14, 2009 in those same newspapers to invite public review and comment on the preferred alternative. The Information Centre was held on August 27, 2009 again at Conestoga College Doon Campus. The general feedback from the Public was supportive of the "Preferred Alternative".

Based on an evaluation of natural and social environment concerns, economic analysis, as well as public health and safety concerns, it was confirmed that the final "Preferred Alternative" as shown on Figure No. 12 was approved by the Technical Steering Committee.

All correspondence and subsequent responses have been documented in this final Class EA Schedule "B" Study report. The EA Study has been completed in accordance with the Environmental Assessment Act. Following endorsement by the Council of the City of Kitchener and final approval by the Council of the City of Cambridge, a "Notice of Completion" will be advertised and the final report will be placed on record for the 30 day mandatory period.

E2.0 Recommendations

The following recommendations are offered for consideration by the Council of the City of Cambridge, for the Conestoga College South Campus and Blair Business Park Sanitary Sewer Servicing Class EA Study:

- E2.1 The Blair Business Park will be serviced by a gravity sewer routed across Fountain Street, then easterly within the north shoulder of Fountain Street to the proposed new Blair Pumping Station at the northwest corner of Morningside Drive and Fountain Street;
- E2.2 The installation of this gravity sanitary sewer for the Blair Business Park should be included as part of the intersection improvements required for the Conestoga College South Campus access road;
- E2.3 A new Blair Sanitary Sewage Pumping Station will be located at the northwest corner of Fountain Street and Morningside Drive on land currently owned by Conestoga College that will be deeded to the City of Cambridge;
- E2.4 Twin 300 mm diameter discharge forcemain will be required from the new Blair Sanitary Pumping Station in the City of Cambridge to the Kitchener Wastewater Treatment Plant (WWTP);
- E2.5 The discharge forcemain will exit the pumping station and continue northerly along Morningside Drive (in the west driving lane) to a crossing location of Highway #401 west of the existing pedestrian bridge;
- E2.6 The crossing method will utilize trenchless installation technologies, the exact method of which shall be determined during final design once more detailed and current geotechnical conditions of the crossing area are fully known;
- E2.7 Consideration should be made during the final design process to ensure all opportunities are considered to maximize usage of the infrastructure pipe crossing of Highway #401;
- E2.8 After crossing Highway #401, the forcemain will traverse northerly across Conestoga College Doon Campus parking lots and then westerly along Doon Valley Drive to Old Mill Road. The forcemain will continue along Old Mill Road to the existing Old Mill Pumping Station property where it will leave the municipal road right-of-way. The forcemain will then follow the alignment of the existing sanitary forcemain which runs alongside the Grand River, crossing Schneider Creek and following an existing pathway to the Kitchener WWTP, where it will ultimately discharge into the existing raised gravity sewer system;
- E2.9 Municipal consent and all Agency approvals of the final alignment, will be required at the final design stage;
- E2.10 Property requirements/easements to be confirmed during final design include:

- Property will be required from Conestoga College for the Pumping Station Site Plan footprint located at the northwest corner of Fountain Street and Morningside Drive. The site area is approximately 0.3 ha (0.74 acres); and,
- Easements will be required through: the Conestoga College South Campus near Highway #401; the Conestoga College Doon Campus parking lots; and, the open space area between Old Mill Road and the Kitchener WWTP, which includes lands owned by the City of Kitchener and the Region of Waterloo.

E2.11 That an agreement be prepared between the City of Cambridge and the City of Kitchener to outline: operational and maintenance requirements; any easement or encroachment requirements; and the cross-border sewer rate charge for the sewage flow from Cambridge into Kitchener; and,

E2.12 The City of Cambridge will make arrangements to facilitate a public open house meeting with the affected property owners (in both Cambridge and Kitchener) to present the detailed design and construction staging. The open house meeting should be scheduled a minimum of two weeks prior to the commencement of construction.

1.0 INTRODUCTION

1.1 General

In May 2009, the City of Cambridge initiated a Schedule “B” Class Environmental Assessment (EA) Study to identify a sanitary sewage servicing solution for the lands of the Blair Business Park and the Conestoga College South Campus located near Fountain Street and Highway 401. This study is being funded by the two major landowners affected, being Millgate Holdings Inc. and Conestoga College. The requirement for this study was identified as a condition of the Region of Waterloo’s Official Plan Amendment No. 24 wherein it states that the lands identified may only be developed upon completion and approval of “an Environmental Assessment to identify the appropriate method of sanitary service from a municipal sewage treatment plant.” MTE Consultants Inc. was subsequently retained to complete the Schedule “B” Class EA by evaluating a range of alternatives through the Class EA process. The intent was to lead the Technical Steering Committee to ultimately select a preferred alternative solution.

The Blair Business Park totals 31.54 ha and is comprised of six parcels of land. The largest land parcel of land is known as the Blair Business Park, which is owned by Millgate Holdings Inc. The Blair Business Park is generally bounded by Highway 401 to the west, Fountain Street to the north, Dickie Settlement Road to the east, and Old Mill Road (Cambridge) to the south. The Conestoga College South Campus is 53.49 ha comprising of two parcels of land, the largest being the parcel held by the College. It is generally bounded by Highway 401 to the west and north, Morningside Drive to the east, and Fountain Street to the south. Both development parcels are located within the municipal boundary of the City of Cambridge. Refer to Figure No. 1.0 and 4.0 for the exact location of these two blocks of land.

The Region of Waterloo Wastewater Treatment Master Plan, which was completed in 2007, identified that the preferred sanitary outlet for the study lands is the Kitchener Wastewater Treatment Plant (WWTP). It was deemed in this report that the closer Preston Wastewater Treatment Plant had limited spare servicing capacity and limited potential for expansion, whereas the Kitchener WWTP was running at 60% capacity.

The general topography of the study lands in relation to the Kitchener WWTP rule out the option of directing the sanitary flows by gravity sewer and dictate the need for pumped sanitary flows and hence a sanitary sewage pumping station.

1.2 Purpose and Objective of the Study

The purpose of this Sanitary Sewer Servicing Class EA is to summarize all information collected and alternatives developed and evaluated, in a manner consistent with the Class Environmental Assessment process for Schedule “B” projects. The primary objective is to identify the “Preferred Sanitary Sewage Servicing Solution” for the Blair Business Park and the South Campus of Conestoga College based on an evaluation of natural and social environment concerns, economic analysis, as well as public health and safety concerns.

2.0 STUDY APPROACH

2.1 Class Environmental Assessment

The Sanitary Sewer Servicing Class EA has been planned as a Schedule “B” undertaking in accordance with the document entitled “Class Environmental Assessment for Water and Wastewater Projects” published by the Municipal Engineer’s Association. For Schedule “B” projects, the proponent shall apprise specific agencies and potentially affected members of the public of the situation and proposed solution with two mandatory points of contact.

This project conforms to the Class EA planning process (Refer to Figure No. 2.0) and is described under Section 3 of the *Class EA Document* as a “new sewage facility” to accommodate growth and development. The study process consists of three of the five Phases of Planning and Design Process. Phases 1 and 2 will be covered in this document.

If the project is approved, it would then proceed to Phase 5, which includes the final design and construction. Phase 5 is not part of this Study.

2.2 Study Organization

MTE Consultants Inc. received City of Cambridge Council approval to proceed with the Study on May 11, 2009. The study schedule was extremely aggressive and designed to meet the scheduled commitments of Conestoga College with respect to the Federal and Provincial Infrastructure spending program. A Technical Steering Committee was assembled comprising of various stakeholders and review agencies as follows:

Technical Steering Committee (TSC) Members

Mr. Carlo Radicioni	City of Cambridge – Project Manager
Mr. Jeff Robinson	City of Cambridge
Mr. Miron Docev	City of Cambridge
Mr. Jim Kirchin	City of Cambridge
Mr. Karl Kiefer	City of Cambridge Councilor
Mr. Jeff Prince	City of Kitchener
Ms. Melissa Larion	Grand River Conservation Authority
Mr. Scott Reid	Ministry of Transportation
Mr. Kevin Boudreau	Ministry of Transportation
Mr. Steve Sieunarine	Region of Waterloo
Mr. Nathan Morris	Region of Waterloo
Mr. Mike Milloy	Millgate Holdings Inc.
Mr. Tim Schill	Conestoga College
Mr. Kevin Mullan	Conestoga College
Mr. Raymond Chung	Conestoga College
Ms. Rebecca Kerr	MTE Consultants Inc., Consultant
Mr. Angelo Innocente	MTE Consultants Inc., Consultant Project Manager

Formal Technical Steering Committee Team meetings were held throughout the duration of the study to assess pertinent data, to develop alternative concepts, to solicit public/agency

input, and to prepare for the two public open house meetings. Minutes of meetings and relevant Technical Team correspondence have been included in Appendix “B” of this report.

2.3 Public Consultation

From the outset of this project, public involvement was recognized as being important to the overall success of the project. Two Public Information Centres were planned. A formal “Notice of Intent and Public Open House” was published in the Waterloo Region Record and in the Cambridge Times newspapers on June 12, 2009, to invite public comment on the identification of a sanitary sewage servicing solution for the study lands (refer to Appendix “C” for copies of all notices). In addition to the public notices in the local newspapers, notices were also hand delivered to the residents along Morningside Drive as they were recognized as the residents most likely to be affected by the various options to be considered.

The intent of the Public Information Centre (PIC) #1 was to present to the Public the alternative solutions being considered by the Project Team. Due to the complexity of the alternatives this project was broken down into three main components:

- Selection of a Pumping Station Location in Cambridge
- Selection of a Highway #401 Crossing Location
- Selection of a Forcemain Routing in both Cambridge and Kitchener

PIC #1 was held on June 23, 2009 between 4:00 pm and 8:00 pm at Conestoga College Doon Campus, Room 1E04 “E” Wing – Main Building. There were approximately 16 individuals who attended PIC #1 (refer to Appendix “C” for the sign-in sheet and comments) to view the alternatives that were developed for the Sanitary Sewer Servicing Class EA. An Information Package was prepared for public hand out, along with a Study Comment Sheet, asking the public to provide comments on the alternatives as well as communicate their personal concerns and expectations of the project.

The formal “Notice of Public Information Centre #2 – Preferred Alternative” was published in the Waterloo Region Record and in the Cambridge Times newspapers on August 14, 2009. At PIC #2 the Consultant presented the Preferred Alternative as determined by the Technical Steering Committee. The public were invited to provide comments as well as communicate their personal concerns and expectations of the Preferred Alternative.

Public Information Centre #2 was held on August 27, 2009 at the Conestoga College Doon Campus from 5:00 pm to 8:00 pm. Approximately 40 individuals attended PIC #2 (21 signed in) and provided feedback to the Project Team (refer to Appendix “C” for a copy of the sign-in sheet and one comment sheet). In addition to the public notices in the local newspapers, notices were also hand delivered to 150 residents along Morningside Drive in Cambridge and along Doon Valley Drive and Old Mill Road in Kitchener. These were the residents who were recognized as the most likely to be affected by the preferred alternative.

Comments and recommendations received from both Public Information Centres were considered by the Technical Steering Committee and implemented where appropriate.

Generally, all respondents who provided comments throughout the duration of the study were in favour of the preferred alternative. Verbal comments from PIC #2 were more concerned with possible inconvenience during construction, possible tree loss along the route, and ensuring there would be proper road restoration. These comments have been addressed in this study report.

2.4 Agency Consultation

Full communication and participation by the review agencies (both directly and indirectly involved) in the Study was encouraged from the outset of the project. Each of the following review agencies were either contacted directly by phone or received a letter confirming that a Schedule “B” Class EA was being conducted and requesting their comment and input to the Study (refer to Appendix “C” for list of contacts):

Ministry of Transport Canada, Navigable Waters Protection
Ministry of Environment, Guelph District Office
Six Nations of the Grand River Territory and
Grand River Conservation Authority (part of Technical Steering Committee)

Appendix “C” contains general, municipal and agency correspondence. As evident, a number of comments were received from various interested parties. All issues have been addressed and no outstanding concerns were noted.

3.0 NEED AND RATIONALE

The City of Cambridge is experiencing growth and has confirmed a need to service both the Blair Business Park and the new Conestoga College South Campus. Increasing enrollment at Conestoga College in a more diverse variety of programs requires increased building space to house class rooms and support facilities. This, coupled with the need for servicing of the Blair Business Park, required a servicing solution to accommodate the anticipated sanitary flows that would be generated from both parcels of land. These lands, as designated under the Region of Waterloo Wastewater Treatment Master Plan, are to be directed to the WWTP located within the City of Kitchener.

4.0 EXISTING CONDITIONS

4.1 Physical Environment

4.1.1 Physiography and Topography

Generally the highest topography of the study area is to the north and east, towards the Grand River. Along the north and east limits of the study area the Grand River bends thus changing direction from flowing to the east to flowing toward the south. Schneider Creek travels in a south to north direction through the study area with land to the west and east generally sloping toward it.

Because the study area encompasses such a large area, individual areas can be summarized. The Blair Business Park and the Conestoga College South Campus generally slope to the east toward the intersection of Fountain Street and Blair Road and then to the Grand River. Highway #401 acts as a drainage divide to the west as does Morningside

Drive to the north. Lands to the west generally slope northerly toward the Grand River and lands to the north of Morningside Drive slope toward the Grand River

4.1.2 Geotechnical Conditions

The existing soil conditions within the Blair Business Park and the Conestoga College South Campus are comprised of sand, sand silt and sand gravel overlain with sandy and clayey silt. There are pockets of sand and gravel as well as perched and high water tables depending on the high and low points within the study area. For the purpose of this study the soil conditions are generally sound and sufficient for founding soils.

More detailed investigations will be needed along the final design route, in particular for the sewer pumping station location and as well the trenchless crossing location at Highway #401. Based on information received from the MTO (see Figure No. 9.0) the existing soil and water table conditions will be critical to the design solutions selected for the trenchless crossing.

4.2 Natural Environment (Refer to Figure No. 3.0 for Location Areas)

MTE Consultants Inc. undertook several field investigations and evaluated the natural environment within the study area. Based on the evaluations, MTE provided recommendations for mitigating measures and construction limitations for all potentially affected locations of significance within the study. Refer to Figure No. 3.0 which illustrates the environmental constraints and summarizes the key inventory within the study area.

4.2.1 Location 1: Old Mill Road Pumping Station to Kitchener WWTP

The area behind the Old Mill Road Pumping Station to the Grand River has been clear cut in the past. This section is presently covered with weedy vegetation typical for disturbed sites. The proposed twin forcemain will be located on the northwest side of the existing Old Mill pumping station. It will be laid down the embankment paralleling the existing Old Mill Forcemain as it reaches the Grand River trail edge. The forcemains will then be installed across the Schneider Creek and along a hiking trail and further west along a grassed WWTP / Lagoon service trail. Vegetation on either side of the hiking trail and south of the service trail is part of a mature, deciduous woodlot.

Vegetation Communities

Vegetation between the Old Mill Road Pumping Station and the Kitchener Wastewater Treatment Plant includes Manitoba maple (*Acer negundo*), sumac (*Rhus typhina*), willow (*Salix* sp.), sugar maple (*A. saccharum*), black walnut (*Juglans nigra*), trembling aspen (*Populus tremuloides*), poplar (*Populus* sp.), white ash (*Fraxinus americana*), basswood (*Tilia americana*), dogwood (*Cornus racemosa*), curly dock (*Rumex crispus*), musk mallow (*Malva mochata*), Canada thistle (*Cirsium arvense*), bull thistle (*C. vulgare*), burdock (*Arctium minus*), dandelion (*Taraxacum officinale*), jewelweed (*Impatiens carpensis*, *I. pallida*), Canada goldenrod (*Solidago canadensis*), wild mustard (*Sinapis arvensis*), Queen Ann's lace (*Daucus carota*), Canada fleabane (*Conyza canadensis*), wild red raspberry (*Rubus idaeus*), common blackberry (*R. allegheniensis*), teasel (*Dipsacus fullonum*), elecampagne (*Inula helenium*), yarrow (*Achillea millefolium*), purple loosestrife (*Lythrum salicaria*), strawberry (*Fragaria virginiana*), yellow hawkweed (*Hieracium caespitosum*), Philadelphia fleabane (*Erigeron philadelphicus*), ragweed (*Ambrosia artemisiifolia*), plantain

(*Plantago lanceolata*), chicory (*Cichorium intybus*), nettle (*Urtica dioica*), butter and eggs (*Linaria vulgaris*), poison ivy (*Toxicodendron radicans*), red clover (*Trifolium pretense*), common milkweed (*Asclepias syriaca*), wild cucumber (*Echinocystis lobata*), Virginia creeper (*Parthenocissus quinquefolia*), vetch (*Vicia cracca*), timothy (*Phleum pratense*), reed canary grass (*Phalaris arundinacea*), fowl meadow grass (*Poa palustris*) and other grasses. A small wetland pocket fed by a drainage ditch is located near the Wastewater Treatment Plant on the south side of the service trail. Vegetation includes cattail (*Typha latifolia*), purple loosestrife, red-osier dogwood (*C. sericea*), willow, jewelweed, swamp milkweed (*A. incarnata*) and Joe Pye weed (*Eupatorium maculatum*).

Wildlife Species

Mammals and Birds

The woodlot provides habitat and cover for mammals and birds. Mammals and birds most likely present would be those typical for woodlots, water courses and riparian areas and, because of the relatively close proximity to subdivisions nearby, urban areas. Mammalian species likely to be present would include deer, raccoons, porcupine, squirrels, chipmunks, rats, voles and mice. Bird species expected to occur would be forest birds and water birds. No mammals or birds were observed during the site visit.

Reptiles and Amphibians

The small wetland pocket fed by the drainage ditch and areas in the vicinity of the Grand River/Schneider Creek have the potential to provide habitat to amphibians. The vegetation of the woodlot and the riparian areas have the potential to provide habitat to reptiles. No reptiles or amphibians were observed during the site visit.

Fisheries and Fish Habitat

Schneider Creek is classified as a warm water stream and is the storm sewer outlet for a large drainage area of the southern areas of the City of Kitchener. No fish were observed during the site visit.

Corridors and Linkages

Wildlife can move freely through the woodlot and along Schneider Creek and the Grand River basin.

Constraints and Mitigation Measures

Schneider Creek enters the Grand River near the Old Mill Road Pumping Station and a crossing is required for the new sewer line. For this location an open cut crossing for the sewer line is feasible, provided appropriate mitigation measures are implemented. These should include, but are not limited to: time restrictions for construction during fish spawning periods (to be determined by the GRCA); temporary creek diversion and maintenance of flow; re-vegetation of banks; and, installation and maintenance silt fencing. Tree removal and disturbance during construction should be kept to a minimum. A Mitigation Plan should be developed as part of the Detailed Design Phase prior to construction.

Section 1 - Pumping Station to Creek: The existing open clearing area below the Old Mill Pumping Station should be utilized for the new forcemains. This will reduce the need for tree removals to an absolute minimum.

Section 2 - Creek to Wastewater Treatment Plant: The vegetation community along the existing public hiking trail on the west side of the Creek is part of a mature woodlot. It is recommended that the forcemains be installed on or close to this hiking trail and to keep tree removal and disturbance to a minimum. If tree removals are required, removal of trees should be considered on the north side of the hiking trail. There is an existing forcemain already on that south edge of the trail. Silt fencing must be installed during construction as a mitigation measure. This will protect the north edge and sloped areas which are closest to the Grand River, from erosion and increased siltation.

Along the existing grassed service path, which parallels the fence at the Wastewater Treatment Plant (north side), it is recommended to run the sewer line either on the path or on the north side of the path (beyond the fence line). This ensures that only minimal tree removal will be required and the mature woodlot would remain undisturbed. Trees that have to be removed during construction should be replaced as part of the re-vegetation plan.

4.2.2 Location 2: Homer Watson Blvd - Schneider Creek and Pumping Station

If an option is chosen along Homer Watson Boulevard, a crossing of Schneider Creek would be required for the forcemains to either enter the existing Homer Watson Pumping Station or to continue northerly to Kitchener WWTP. A wetland pocket with common reed is located on the east side of Schneider Creek.

Vegetation Communities

Vegetation at this creek crossing location includes Manitoba maple, poplar, willow, red-osier dogwood, teasel, grey dogwood, common reed (*Phragmites australis*), purple loosestrife, goldenrod, swamp milkweed, Joe Pye weed, buttercup (*Ranunculus acris*), butter and eggs, Queen Ann's lace, black-eyed Susan (*Rudbeckia hirta*), thistle, vetch, Virginia creeper, fleabane, wild mustard and grasses.

Wildlife Species

Mammals and Birds

Habitat for mammals is limited at this location due to the presence of the major road Homer Watson Boulevard. The riparian vegetation which consists of a number of mature trees provides potential habitat for birds. No mammals or birds were observed during the site visit.

Reptiles and Amphibians

The large wetland pocket has the potential to provide habitat to amphibians. There is potential for reptile habitat in the immediate vicinity of Schneider Creek. No reptiles or amphibians were observed during the site visit.

Fisheries and Fish Habitat

Schneider Creek is known to provide warm water fish habitat. No fish were observed during the site visit.

Corridors and Linkages

This location is unlikely to be part of a major corridor due to the proximity of Homer Watson Boulevard. In order to move from north to south wildlife must utilize the underpass.

Constraints and Mitigation Measures

For this location an open cut crossing of Schneider Creek for the twin forcemain is also feasible, provided appropriate mitigation measures are implemented (refer to comments for Location 1).

4.2.3 Location 3a: Fountain Street at Highway 401, South West Corner of Conestoga College South Campus

This location is adjacent to the MTO on-ramp for east bound traffic on Highway #401. It is located at the south west corner of the Conestoga College South Campus lands. It represents an area of high past disturbance from filling and grading by highway improvement work.

Vegetation Communities

The future site of Conestoga College South Campus itself is currently an agricultural field with soy beans. A wetland pocket is present in the south west corner of the field. This wetland pocket is connected to an open water drainage ditch that is fed by a culvert underneath Fountain Street and extends to a second culvert approximately 50 metres to the west. The shallow drainage ditch is developing into a small wetland and aquatic vegetation is present. Vegetation in the drainage ditch includes cattail, water plantain (*Alisma plantago-aquatica*), duckweed (*Lemna* sp.) and pondweed (*Potamogeton* sp.). Sedges and rushes are growing close to the open water. These include path rush (*Juncus tenuis*), soft rush (*J. effusus*), soft stem bulrush (*Scirpus validus*) and black bulrush (*S. atrovirens*).

Vegetation surrounding the drainage ditch is patchy and sparse in places and includes common weeds and grasses typical of disturbed sites and road sides. It includes Queen Ann's lace, chicory, curled dock, white sweet clover (*Melilotus alba*), thistle, goldenrod, teasel, evening primrose (*Oenothera biennis*), meadow horsetail (*Equisetum pratense*), plantain, fleabane, red clover and grasses. A number of sumac saplings are present close to the fence near the second culvert.

A small number of dead or dying landscape trees were noted at this location.

Wildlife Species

Mammals and Birds

This location is unlikely to be significant habitat for larger mammals and birds. It provides no shelter as there are no mature trees present and the vegetation cover is very sparse in places. It is likely that smaller mammals such as mice and voles may be present. Birds may be visiting the site. However, use of the drainage ditch by water fowl is unlikely because of its small size and shallow depth. No birds or mammals were observed during the site visit.

Reptiles and Amphibians

The wetland pocket and the drainage ditch area have the potential to provide habitat to amphibians. Potential for reptile habitat is limited because of the scarcity of vegetation cover in the immediate vicinity of the drainage ditch. No reptiles or amphibians were observed during the site visit.

Fisheries and Fish Habitat

The drainage ditch is stormwater fed from the culvert underneath Fountain Street. It is very shallow and possibly intermittent and therefore unlikely to provide fish habitat. No fish were observed during the site visit.

Corridors and Linkages

This location is unlikely to be part of a major corridor due to the proximity of Highway #401 and the Interchange at Homer Watson Boulevard and Fountain Street. There is an existing fence which surrounds the agricultural field. There are no natural features in the immediate vicinity that would be linked through this area and would provide a travel corridor for wildlife species.

Constraints and Mitigation Measures

The presence of the wetland pocket puts some constraints on the route of the proposed twin forcemain. However, since the drainage ditch is fed by stormwater and is very shallow, it is unlikely to provide significant fish habitat. It is recommended to keep disturbance to the drainage ditch to a minimum during construction. Significant residual effects are not expected.

4.2.4 Location 3b: Fountain Street, Culvert Crossing, Southern Site Boundary, Conestoga College South Campus

This location is within the municipal right of way for Fountain Street which carries traffic to and from Highway #401. Residential dwellings are located and backlot onto the south side of Fountain Street.

Vegetation Communities

A small, open cattail marsh is present in the ditch area on the north side of Fountain Street where the box culvert is located. The marsh was moist at the time of the site visit, but there was no standing water observed. Vegetation at this location includes cattails, staghorn sumac, elm (*Ulmus americana*), grey dogwood, Canada thistle, teasel, goldenrod, Virginia creeper and grasses. A number of dead trees were observed close to the road.

Wildlife Species

Mammals and Birds

Mature trees and shrubs at this location provide potential habitat and breeding opportunities for mammals and birds typical for semi-rural and urban areas. The openness of the small cattail marsh offers limited shelter only. A cardinal (*Cardinalis cardinalis*) was observed during the site visit, but no mammals were seen.

Reptiles and Amphibians

The small cattail marsh and the area of Blair Creek may have some potential to support reptile or amphibian species. However, none were observed during the site visit.

Fisheries and Fish Habitat

Blair Creek has been identified as a coldwater stream by the GRCA. Species in Blair Creek include brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), common stickleback (*Culaea inconstans*), small mouth bass (*Micropterus dolomieu*), darter (*Ethaestoma nigrum*, *E. caeruleum*) and dace (*Rhinichthys atratulus*, *Semotilus atromaculatus*).

Corridors and Linkages

This area is most likely not a significant wildlife corridor or linkage because of the steep embankment from Fountain Street. However, wildlife can travel freely through this area.

Constraints and Mitigation Measures

This location is considered suitable and there are no significant concerns regarding the small cattail marsh or Blair Creek. It is recommended to keep disturbance of the marsh and creek to a minimum during construction. Significant residual effects are not expected.

4.2.5 Location 3c: Fountain Street, South East Corner of Corner of Conestoga College South Campus

The site is the proposed location for the new Sanitary Pumping Station. It is located at the northeast quadrant at the Morningside Drive and Fountain Street roundabout.

Vegetation Communities

The vegetation community is a cultural meadow which appears to be an old agricultural field with trees and shrubs growing at the edge. Vegetation at this location includes Manitoba maple, sugar maple, Eastern white cedar (*Thuja occidentalis*), Eastern red cedar (*Juniperus virginiana*), black locust (*Robinia pseudoacacia*), honey-locust (*Gleditsia triacanthos*), glossy buckthorn (*Frangula alnus*), trembling aspen, willow, dogwood, white mulberry (*Morus alba*), Queen Ann's Lace, biennial lettuce (*Lactuca biennis*), fleabane, ragweed, goldenrod, lambs quarters (*Chenopodium album*), Canada fleabane, thistle, red clover, common St. John's-wort (*Hypericum perforatum*), milkweed, Virginia creeper, evening primrose, wild mustard, tansy (*Tanacetum vulgare*), Viper's bugloss (*Echium vulgare*), yarrow and grasses.

Wildlife Species

Mammals and Birds

Mature trees and shrubs at the edge of the cultural meadow provide potential habitat and breeding opportunities for mammals and birds. Mammals in the area are expected to be typical for rural and urban areas, including deer, raccoons, porcupine, squirrels, chipmunks, rats, voles and mice. Extensive breeding bird surveys have been carried out in the area east of Morningside Drive (North-South Environmental Inc., 2003) and it is expected that a number of species would also frequent the Study Area. These include cardinal, American Robin (*Turdus migratorius*), blue jay (*Cyanocitta cristata*), black-capped chickadee (*Parus atricapillus*), grey catbird (*Dumetella carolinensis*), American goldfinch (*Carduelis tristis*), common grackle (*Quiscalus quiscula*) and sparrow (*Melospiza melodia*)

Reptiles and Amphibians

The site does not support habitat for amphibians and only limited habitat for reptiles. No amphibians or reptiles were observed during the site visit.

Fisheries and Fish Habitat

There are no wetlands or watercourses located on this site.

Corridors and Linkages

Wildlife can move freely across the site in all directions.

Constraints and Mitigation Measures

The vegetation of the cultural meadow consists of common weeds and grasses. There are no constraints regarding the construction of the pumping station on the cultural meadow and there will be no negative impact on the natural environment as no trees have to be removed for the footprint of the pumping station.

A limited number of trees and shrubs may have to be removed to connect the gravity sewer line from Fountain Street to the new pumping station. Trees that may have to be removed include Eastern white cedar, Eastern red cedar, willow, trembling aspen, dogwood, and buckthorn. The long term impact on this section of the vegetation community is considered to be minimal and re-vegetation is expected to occur naturally.

4.2.6 Location 4: Morningside Drive and South Side Highway 401 (ESPA 36)

The proposed route for the twin forcemain would run northerly from the Pumping Station along Morningside Drive and then easterly along the south side of Highway #401. While there are no environmental concerns along Morningside Drive, the route from the north end of Morningside Drive going east along the south side of Highway #401 towards the Grand River runs through significant natural features. This includes a Provincially Significant Wetland (PSW), an Environmentally Sensitive Policy Area (ESPA 36) with has some habitat that are rare, threatened and as well endangered plant and animal species.

Because of the environmental constraints this route is not recommended.

4.2.7 Rare, Threatened and Endangered Species

The Ministry of Natural Resources (MNR) Natural Heritage information Centre (NHIC) website was consulted for information on rare, threatened or endangered species of plants and animals in the general area surrounding the Study Area. Table 1 shows the species list obtained from NHIC.

Table 1: Rare, Threatened and Endangered Species in the Study Area

Species		Rank			Date of Record
Scientific Name	Common Name	Srank	MNR	COSEWIC	
<i>Buteo lineatus</i>	Red-shouldered Hawk	S4B		NAR	1979
<i>Dendroica cerulea</i>	Cerulean Warbler	S3B	SC	SC	1900
<i>Castanea denata</i>	American Chestnut	S2	END	END	1988
<i>Lampropeltis triangulum</i>	Milksnake	S3	SC	SC	1989

Srank= Provincial (sub-national) Rank

S2= imperiled

S3= vulnerable

S3B= vulnerable breeder

S4B= apparently secure breeder

COSEWIC= Committee on the Status of Endangered Wildlife in Canada

NAR= not at risk

SC= special concern

END= endangered

The NHIC does not list any aquatic species as rare, threatened, endangered or of special concern in the Study Area. Additional information on Species at Risk was requested from the Grand River Conservation Authority (GRCA), but to date no information has been received.

4.3 Social Environment

Existing Property Ownership

The existing houses and property ownership within the Study Area are shown on several of the Figures. The property lines reflected on all figures are for illustrative purposes only.

Existing and Future Land Use

Existing land use within the study area is primarily residential with some commercial, educational, and agricultural. The lands were generally developed more than 30 years ago, and no further development is expected within the Study Area aside from the subject parcels of land.

4.4 Natural Heritage Framework

Natural heritage features and areas generally include natural landforms, terrestrial and aquatic ecosystems, native species and communities, and the environmental and social values associated with them.

A natural heritage system represents a landscape network of natural areas and/or features (ie. ESPAs, provincially significant wetland, significant woodlands and corridors, floodplain areas, etc.) which provides an ecological framework to assist in land use planning decisions. Figure No. 3.0 illustrates the natural heritage framework with the Study Area.

Within the Study Area there are three ESPA's: No. 31 Homer Watson Park; No. 35 Doon Pinnacle Hill; and, No. 36 Speed and Grand Confluence. Surface water features include the Grand River, Schneider Creek, Blair Creek, cold water streams, and designated GRCA Wetlands.

4.5 Archeological

The potential for archeological finds within the Study Area is high given the early pioneer settlements within the Village of Blair and Doon as well as the proximity to the Grand River which increases the potential for past Aboriginal use as a travel corridor. Portions of the Study Area are located within the Blair Area Heritage Conservation District. However, all potential construction is located within municipal right-of-ways which were excavated for the construction of the current road system or, in the area of the path leading to the Kitchener WWTP, located within a path way constructed of imported fill material and previously disturbed for the installation of the Old Mill Pumping Station discharge forcemain.

An archeological study has been completed for the Millgate Holdings portion of the Blair Business Park lands which has been previously reviewed and approved for zoning and grading permits. It is understood that Conestoga College is exempt from an archeological review, however past practices on this parcel of land included gravel extraction and tilling for agriculture usage.

5.0 BLAIR SANITARY SERVICING CONSIDERATIONS

At present, there are no existing municipal sanitary sewers in proximity of the Blair Business Park or the Conestoga College South Campus Lands, which could service these parcels. All existing nearby residential properties are serviced by individual septic systems.

Under the Region of Waterloo Wastewater Treatment Master Plan, the Blair Business Park and the Conestoga College South Campus lands are designated to drain into the Kitchener WWTP. The nearby Preston WWTP has no capacity, nor growth potential within the foreseeable future.

The problem statement for this Class EA was developed as:

To identify the preferred means of providing a sanitary outlet for Conestoga College's South Campus and the Blair Business Park to the Kitchener Wastewater Treatment Plant, including a location for a new sewage pumping station (in Cambridge), and the preferred route location for a sewage outlet from this new pumping station to the Kitchener Wastewater Treatment Plant.

Alternative servicing schemes

There are several alternatives which have been considered to address the provision of sanitary services for the Blair Business Park and the Conestoga College South Campus.

Because of the complexity of alternatives the overall servicing concepts were broken down into three individual and distinct components as follows:

- Selection of a Pumping Station Location in Cambridge
- Selection of a Highway #401 Crossing Location
- Selection of a Forcemain Routing in both Cambridge and Kitchener

For each of the above components, various options were considered and evaluated in accordance with Tables 1, 2 and 3 which are summarized in Appendix "A".

5.1 Do Nothing Concept

For each component, a "Do Nothing" alternative was considered. The "Do Nothing" alternative would cause no impact to the existing natural, historical, or social environments, but was ultimately ruled out as it did not provide a solution to provide sanitary servicing for the Blair Business Park and the Conestoga College South Campus lands.

5.2 Full Services Concept

Based on the problem statement developed for this study, the lands would require a combination of a gravity sewer system, a pumping station and a twin forcemain to provide full servicing potential. The Blair Business Park and the Conestoga College South Campus Lands are downstream and approximately three kilometres from the Kitchener WWTP. The existing topography over that three kilometre length varies considerable in elevation (up and down).

It was confirmed that a sewage pumping station and a twin forcemain was necessary to convey the sanitary flows.

The land area for the new College College South Campus parcel is 53.49 ha, and for the Blair Business Park is 31.54 ha. The preliminary design calculations have confirmed that when fully developed the pumping station size will need to pump a total peak flow of 166.43 (L/s). Refer to Figure No. 4.0 and Table 4.0 in Appendix "A" for details regarding calculations for the sanitary sewage flows.

The design flow is based on the gross land areas and the industrial flow rate from the City of Cambridge DGSSMS Design Standards Manual. The flows include an infiltration rate of 0.15L/s/ha with peaking factors in accordance with the Ontario Ministry of Environment's (1984) Guidelines for the Design of Sanitary Sewage Works.

The final design of the pumping station and the twin forcemain, will be required to meet City of Cambridge and MOE standards sufficient for approval and permit requirements. This includes confirmation of the pump type, the station configuration, the station operations, the requirements for standby generator, air and vacuum relief and monitoring of the sewage flows.

The preferred pumping station will be located within the boundaries of the designated heritage area as defined within the Blair Area Heritage Conservation District Plan and as such the building appearance will be subject to approval and acceptance of the City of Cambridge Heritage Advisory Committee. It is envisioned that the station design would blend into the community's current architectural landscape.

The distance between the new pumping station and the Kitchener WWTP is approximately three kilometres. Due to this extended distance, twin 300 mm forcemains are being recommended. It is understood that the development of the lands within the Study Area will likely be staged over several years. During the early years, a single forcemain will have sufficient capacity. The second forcemain will not be put into use until growth has necessitated the use of both pipes.

The twin forcemain would also allow for ease of maintenance in the future should one of the pipes be out of service. The sewage flow could be handled by one pipe for short durations while repairs are completed.

5.2.1 Sanitary Pumping Station Location and Gravity Sewer Option

The Technical Steering Committee reviewed four potential locations for the pumping station. Locations (a), and (c) were located on the Conestoga College Lands, Location (d) was situated on the Blair Business Park, and location b) was within the existing municipal right of way at the northwest corner of Fountain Street/Morningside Drive.

Refer to Appendix "A", Figure No. 5.0 and Table 1.0 Evaluation of Pumping Station Location Alternatives.

Location (a): Located on College Lands just west side of Morningside Drive.

This pumping station location is the closest to the existing residents of Morningside Drive and would service 100% of both properties. This option would require the dedication of some property from Conestoga College to the City of Cambridge for the pumping station facility and road access to it. There would be a greater chance for impact to the homeowners. A gravity sewer from Fountain Street can be extended to this location as needed. Comments received from the local residents from both PIC Meetings indicated a preference to not choose this location due to its proximity to the homes along Morningside. The residents clearly stated their preference for a location as far away from their homes as possible.

Location (b): Located at North West corner, Fountain Street and Morningside Drive, entirely within the existing municipally owned right of way.

This location would service 100% of both properties. The station would be situated within the existing municipal right-of-way, but in an area that is currently used as a trail head for the Walter Bean Trail, and includes an existing gravel parking area with a public information board. Locating the pumping station here would require the removal and relocation of the information board, reconfiguration of the parking area, and removal of several mature trees. Also, the depth of the excavation to construct the pumping station wet well, could impact the existing Regional roundabout. While this option is relatively far from the residential homes on Morningside Drive, it would impact the trail parking lot significantly.

Location (c): Located in the South East corner of the College property.

This option would service 100% of both properties and would be located within the south east corner of the Conestoga College lands. This option would require the dedication of some property from Conestoga College to the City of Cambridge for the pumping station facility and road access to it. The proposed pumping station is relatively far enough away from both the residents on Morningside Drive and the Regional Roundabout, to limit impacts on both. As well, this option is located within a meadow where minimal tree removals will be required to connect a gravity sewer from Fountain Street to the pump station.

Storm drainage from the pumping station site would outlet into the existing storm culverts located in the parking lot of the Walter Bean trail head. This option will have minimal impacts to the existing trees and vegetation within this area. A paved access road will be required, with the intent to connect off a new road access planned for Conestoga College from Morningside Drive.

The pumping station should be buffered from view with the use of earthen berms and tree and shrub landscaping.

Location (d): Located at the North East corner of Fountain Street and Dickie Settlement Road within the Blair Business Park Lands.

Locating the pumping station on the Blair Business Park Lands would service 100% of that property, but only 85% (or less) of the College Lands. Due to the topography of the Conestoga College South Campus lands, locating a pumping station at Location (d) would reduce the serviceable land from the College Campus by approximately 8.1 ha. The topography falls away too steeply and could not be serviced into this station location.

As well, locating a pumping station at Location (d) would require a very deep wet well, estimated to be in excess of 10 to 12 metres. The additional costs associated with the deep construction of both a wet well and the gravity sewers from the College Lands make this option undesirable.

Based on the preceding discussion, Location (c) was selected by the Technical Steering Committee as the Preferred Pumping Station location.

Refer to Figures 5.0 and 6.0

Location (c) is the ideal location for a new pumping station. It is at the low end of both sites, and allows sewage from both the College lands and the Blair Business Park lands to travel by separate gravity sewer systems to this pumping station. Cambridge and North Dumfries Hydro have confirmed that sufficient three phase 27.6 kV power is available on Fountain Street at this location. They would supply one three phase 600/347V service to the site. Hydro servicing (location and size) will be confirmed during the final design stage.

A gravity sewer system to service the Blair Business Park, would be located within the existing gravel shoulder area at the north side of Fountain Street. The sewer would cross Fountain Street at Dickie Settlement Road and travel easterly to the pumping station Location (c). A tributary to Blair Creek crosses Fountain Street along the proposed gravity sewer alignment through a 3.0m x 2.5m concrete box culvert. Due to minimal cover over the box culvert, the proposed gravity sewer would need to pass under this culvert. There is adequate fall along Fountain Street to cross the gravity sewer under this culvert, using trenchless methods. The gravity sewer would leave Fountain Street and cross into the College lands at a location where some existing trees are already dead. This crossing location will therefore minimize the need for live tree removals. Refer to Figures 6.0 and 7.0

5.2.2 Highway #401 Crossing Evaluation

The Technical Steering Committee reviewed five potential location options for the crossing of Highway #401. Two options included attachment to existing bridge structures: Option 1 at the Homer Watson Boulevard Bridge and Option 4 at the Pedestrian Bridge crossing at the end of Morningside Drive.

Crossing Option 2 was a trenchless crossing with various crossing locations along the Highway #401 road corridor, between Homer Watson Boulevard and the Pedestrian Bridge at Morningside Drive. Option 3 was to place ducts inside an existing underutilized concrete box storm culvert crossing of Highway #401. Crossing Option 5 would be installed along the river edge and cross under the existing Highway #401 Bridge at the Grand River.

Refer to Appendix "A", Figures No. 8.0, 9.0, 10.0, 11.0, 12.0 and 13b) and Table 2.0 Evaluation of Highway #401 Crossing Location Alternatives.

Crossing Option 1 - Attachment to the Existing Bridge Structure Crossing Highway #401 at Homer Watson Boulevard / Fountain Street.

This option would require the twin forcemains to be attached to the underside of the existing bridge structure and cross Highway #401. The pipe crossing would have to be insulated against winter freezing and as well special joints would be utilized to provide flexibility from

the bridge movement. This option was not supported by MTO and therefore could not be chosen.

Crossing Option 2 - Trenchless Crossing of Highway #401 between Homer Watson Boulevard Bridge and the Pedestrian Bridge Structure at Morningside Drive.

This option would require the design and installation of a “trenchless” pipe casing under the highway of sufficient diameter to allow for its safe excavation and as well for the installation of the twin forcemain through the pipe casing. The exact location of the Option 2 crossing was moved further east in accordance with instructions from MTO, as they did not want this crossing to interfere with their existing off-ramp at Homer Watson Boulevard. The final crossing location will have to be confirmed by MTO during the detailed design stage. Refer to Figures No. 10, 12 and 13b for an approximate location.

There are many variables which can dictate the success of a trenchless crossing under the highway. Soil conditions, based on historical data obtained during the widening of Highway #401 in 2005, indicated a high water table and the presence of boulders and cobbles throughout the soil structure both of which could significantly impact the success of a trenchless crossing.

The final design of this trenchless crossing will depend on the existing soil and groundwater conditions found at this crossing location. An additional geotechnical investigation will need to be completed to determine the methodology to be used for this trenchless installation. It is expected however that with proper dewatering, a combination “Pipe Jacking and Tunneling” system can be utilized. This Option 2 was supported by MTO and the Technical Steering Committee.

Crossing Option 3 - This Option was to place ducts inside an existing underutilized concrete box storm culvert crossing of Highway #401

This option would utilize an existing concrete open box storm culvert located near the westbound off-ramp to Homer Watson Boulevard. The twin forcemain would be installed within casing pipes buried within the floor of the culvert, and insulated against winter conditions. This option was not supported by MTO and therefore could not be chosen.

Crossing Option 4 - Attachment to the Existing Pedestrian Bridge Structure Crossing Highway #401 at Morningside Drive.

This option would require the twin forcemains to be attached to the underside of the existing pedestrian bridge structure and cross the Highway #401. The pipe crossing would have to be insulated against winter freezing and as well special joints would have to be utilized to provide flexibility from the bridge movement. This option was not supported by MTO and therefore could not be chosen.

Crossing Option 5 - Install Twin Forcemain along the River edge under Existing Highway Bridge Crossing at the Grand River.

This option would utilize an existing maintenance access road that was recently installed by the City of Kitchener to service their golf course located on both sides of the highway. This crossing location seemed positive, but was eventually ruled out because of extend length of

forcemain and added costs and concerns in excavating through ESPA Area 36. This option was not supported by the Technical Steering Committee or MTO.

As the Ministry of Transportation (MTO) is the regulatory authority and owner of Highway #401, all options were presented to the MTO early on in the process. The intent was to seek general support for the various crossing options, so that all alternatives could be evaluated fairly.

MTO policy dictates that utilities cannot be attached to MTO owned structures thus ruling out the possibility of utilizing the existing three bridge structures as crossing Options. As well they had structural concerns with regards to lack of “record drawings” indicating the structural adequacy of their existing concrete box storm culvert. All options to utilize their structures were rejected.

While all alternatives are technically feasible, MTO has indicated they could only support Crossing Option 2.

Based on the preceding discussion, Crossing Option 2 was selected by the Technical Steering Committee as the Preferred Crossing Option of Highway #401 with the Twin Forcemain.

Refer to Figure 10.0

The exact crossing location for this trenchless option will have to be confirmed after additional Geotechnical Investigations are undertaken. The existing soil and groundwater conditions are critical to the success of a trenchless installation method. Special care and considerations must be made to ensure that proper dewatering techniques will be utilized to minimize potential impacts to the surrounding residential and Regional well systems.

5.2.3 Forcemain Discharge and Routing

The Technical Steering Committee reviewed eight potential sewage outlet locations (A to H) and many routing combinations for the forcemain to eventually discharge into the Kitchener WWTP. The options included discharging into existing gravity sewer systems, existing pumping stations and one option went directly into the WWTP.

The options were evaluated with respect to available capacities in both the gravity sewers and as well the existing pumping stations. It became apparent early in the process that the existing sewer and pumping station outlets did not have the available capacities to accept this sewage flow from the Blair Business Park and the Conestoga College South Campus Lands. A new option was developed (H) which has a direct connection to the WWTP, by-passing all of the existing gravity sewers and existing pumping stations.

Refer to Appendix “A”, Figures No. 11.0, 12.0 and 13a to 13e and Table 3.0 Evaluation of Outlet Location Design Alternatives.

Alternative A: Outlet to the Existing Gravity Sewer at the Intersection of Doon Valley Drive and Old Mill Road.

- Alternative B: Outlet to the Existing Gravity Sewer at the Intersection of Conestoga College Boulevard and Homer Watson Boulevard.
- Alternative C: Outlet to the Existing Gravity Sewer at the Extension of Pinnacle Drive and Homer Watson Boulevard.
- Alternative D: Outlet at the Existing Homer Watson Sanitary Pumping Station.
- Alternative E: Outlet to the Existing Gravity Sewer on Old Carriage Drive.
- Alternative F: Outlet to the Existing Schneider Trunk Sanitary Sewer on Pioneer Drive.
- Alternative G: Outlet to the Existing Old Mill (Doon) Sanitary Pumping Station.
- Alternative H: Outlet Directly to the Kitchener Wastewater Treatment Plant.

The majority of the existing infrastructure located within the Study Area was designed and built to accommodate only the immediate area it was to service and did not include provision for the sanitary flows generated by the Blair Business Park and the Conestoga College South Campus Lands. The result is that the potential receiving sewers do not have the capacity to accommodate the additional flows and would require significant upgrades from the point of acceptance from the forcemain and all the way to the Kitchener WWTP.

Alternatives A, B, C, and E became very costly and were disruptive to many of the local residents. These alternatives for the sewage outlet were evaluated poorly because of the high costs for upgrades to the existing infrastructure.

Alternative F seemed like a reasonable option if the twin forcemain was routed along Homer Watson Boulevard to Pioneer Drive. There is a direct outlet into an existing gravity trunk sanitary sewer that goes directly to the Kitchener WWTP. There is enough capacity within this pipe to accommodate the discharge flows. This option would bypass and not require any upgrades to the existing Homer Watson Sanitary Pumping Station. The concern with this Alternative F is that Homer Watson Boulevard, a major Regional road, would require restoration work, possible utility relocations and as well a creek crossing of Schneider Creek. The extra length of forcemain for this alternative, is a costly option that is disruptive to local residents and commuters.

Two pumping stations were reviewed as potential discharge locations – Alternatives D and G. Both of these Pumping Stations, Homer Watson and Old Mill are currently operating at or near capacity. Both would require significant upgrading of the pumping station wet well, pumps and discharge forcemains, to accommodate an increased flow. Both stations would have to be equipped with a new Emergency Overflow tank to meet the current City of Kitchener Standards. As a result Alternatives D and G are not financially feasible.

Based on a review of the Alternative Sewer and Servicing Outlets, the Technical Steering Committee chose Alternative H as the Preferred Alternative. Alternative H is a direct forcemain connection from the new Blair Pumping Station in Cambridge to the Kitchener WWTP.

Refer to Figure 12.0

This Alternative avoids upgrading any existing gravity sewers, sanitary pumping stations or existing discharge forcemains. As well, Alternative H generally follows minor local roads minimizing traffic flow disruptions and costs. Portions of the forcemain will cross College Lands and certain easement rights will have to be dedicated to the City of Cambridge and/or Kitchener depending on the wording used in the cross-border agreement between the two Cities. Alternative H solution provides a direct connection from the Cambridge Pumping Station discharging directly to the Kitchener WWTP, without having to go into any other pumping station.

5.2.4 Summary of Preferred Alternative

Sewage from the Blair Business Park Lands would flow by gravity sewers to the new Blair Pumping Station – Location (c) on the southeast corner of the Conestoga College lands;

From the Blair Pumping Station - Location (c) on the Conestoga College lands, sewage would be pumped via a twin sanitary forcemain (300 mm diameter) along the west side of Morningside Drive, then travel westerly on the College lands to a trenchless crossing of Highway #401 - Option 2. The forcemain would then cross the Conestoga College Doon Campus parking lot to the south boulevard location on Doon Valley Drive. The forcemain would continue westerly along Doon Valley Drive and then northerly along Old Mill Road to the west side of the existing Old Mill Sewage Pumping Station. From there the forcemain would leave the municipal right of way and continue parallel with the Grand River along an existing pedestrian and maintenance trail systems, crossing Schneider Creek with an open cut, and connect directly into the Kitchener WWTP, Alternative H. Air release and drain valve chambers will be required at regular intervals along the forcemain.

The proposed Blair Pumping Station will consist of a cast-in-place wet well with three equally sized variable speed submersible pumps. The pumps will have sufficient capacity to meet peak design flow with only two of the three pumps operating. The pumping station will be fully automated and connected to the City's SCADA system. A building will be required to house the electrical system, controls, and the stand-by generator.

The pumping station will have to meet the design requirements of the City of Cambridge and the MOE Design Guidelines for Sewage Works (2008).

Approval requirements for the pumping station and forcemain are summarized as follows:

- City of Cambridge – forcemain, gravity sewer and pumping station
- City of Kitchener – forcemain location only
- GRCA – fill permit for work along Grand River and Blair Creek
- DFO – Schneider Creek crossing
- Transport Canada – Schneider Creek crossing (navigable waterway)
- Ministry of the Environment (MOE) – Certificates of Approval for Sewage and Air

6.0 CONCLUSIONS AND RECOMMENDATIONS

All correspondence and subsequent responses have been documented in this final Class EA Schedule "B" Study report. The Class EA Study has been completed in accordance with the Environmental Assessment Act.

Representatives from the City of Cambridge Development Engineering, Planning and CEAC representatives have reviewed the study findings and have offered their comments into the study process. We are still awaiting final correspondence from CEAC and the Six Nations and will include that documentation once it arrives.

Following approval by the Council of the City of Cambridge, a "Notice of Completion" will be advertised and the final report will be placed on record for the 30 day mandatory period.

The following recommendations are submitted for approval by the Council of the City of Cambridge:

- 6.1 The Blair Business Park will be serviced by a gravity sewer routed across Fountain Street, then easterly within the north shoulder of Fountain Street to the proposed new Blair Pumping Station at the northwest corner of Morningside Drive and Fountain Street;
- 6.2 The installation of this gravity sanitary sewer for the Blair Business Park should be included as part of the intersection improvements required for the Conestoga College South Campus access road;
- 6.3 A new Blair Sanitary Sewage Pumping Station will be located at the northwest corner of Fountain Street and Morningside Drive on land currently owned by Conestoga College that will be deeded to the City of Cambridge;
- 6.4 Twin 300 mm diameter discharge forcemain will be required from the new Blair Sanitary Pumping Station in the City of Cambridge to the Kitchener Wastewater Treatment Plant (WWTP);
- 6.5 The discharge forcemain will exit the pumping station and continue northerly along Morningside Drive (in the west driving lane) to a crossing location of Highway #401 west of the existing pedestrian bridge;
- 6.6 The crossing method will utilize trenchless installation technologies, the exact method of which shall be determined during final design once more detailed and current geotechnical conditions of the crossing area are fully known;
- 6.7 Consideration should be made during the final design process to ensure all opportunities are considered to maximize usage of the infrastructure pipe crossing of Highway #401;
- 6.8 After crossing Highway #401, the forcemain will traverse northerly across Conestoga College Doon Campus parking lots and then westerly along Doon Valley Drive to Old

Mill Road. The forcemain will continue along Old Mill Road to the existing Old Mill Pumping Station property where it will leave the municipal road right-of-way. The forcemain will then follow the alignment of the existing sanitary forcemain which runs alongside the Grand River, crossing Schneider Creek and following an existing pathway to the Kitchener WWTP, where it will ultimately discharge into the existing raised gravity sewer system;

- 6.9 Municipal consent and all Agency approvals of the final alignment, will be required at the final design stage;
- 6.10 Property requirements/easements to be confirmed during final design include:
- Property will be required from Conestoga College for the Pumping Station Site Plan footprint located at the northwest corner of Fountain Street and Morningside Drive. The site area is approximately 0.3 ha (0.74 acres); and,
 - Forcemain easements will be required through: the Conestoga College South Campus near Highway #401; the Conestoga College Doon Campus parking lots; and, the open space area between Old Mill Road and the Kitchener WWTP, which includes lands owned by the City of Kitchener and the Region of Waterloo.
- 6.11 That an agreement be prepared between the City of Cambridge and the City of Kitchener to outline: operational and maintenance requirements; any easement or encroachment requirements; and the cross-border sewer rate charge for the sewage flow from Cambridge into Kitchener; and,
- 6.12 The City of Cambridge will make arrangements to facilitate a public open house meeting with the affected property owners (in both Cambridge and Kitchener) to present the detailed design and construction staging. The open house meeting should be scheduled a minimum of two weeks prior to the commencement of construction.

This report is respectively submitted to the City of Cambridge for their review and file, and for consideration during the final design and construction of the Blair Sanitary Sewage Pumping Station and discharge forcemain. In order to meet the original scheduled deadlines for operation by the spring of 2011, the City of Cambridge must consider expediting the design process immediately this Fall 2009 with late Winter 2010 Tendering.

Report Prepared By:

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