



PORT COLBORNE

**CONTRACT NO. 2009-14**

**CITY OF PORT COLBORNE**

**CATHARINE STREET**

**LARGE DIAMETER WATERMAIN  
REPLACEMENT**

MAYOR: Vance Badawey

DIRECTOR: Ron Hanson, C.E.T.

CITY CLERK: Janet Beckett

**CLOSING DATE: Tuesday, December 1<sup>st</sup>, 2009 at 2:00 p.m. Local Time**

## NOTICE

This contract utilizes the “**Niagara Peninsula Standard Contract Document**” which forms the specification documents excepting the “Standard Instruction to Bidders, Form of Tender, and Supplementary Special Provisions.” The “**Standard Document**” is available on the internet at the “Tenders” section of the Regional Municipality of Niagara website ([www.regional.niagara.on.ca](http://www.regional.niagara.on.ca)).

Contracts issued through tender calls and quotations will reference the “**Standard Document**” and the responsibility for obtaining or having access to the Document will rest with the Tenderer. Once acquired, the “**Standard Document**” can be utilized on all projects which clearly indicate reference and use of the “**Niagara Peninsula Standard Contract Document**”. The “**Standard Document**” is intended to be used as a reference specification and need not be acquired with each tender or quotation call.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-19C**

**Title: Catharine Street – Large Diameter Watermain Replacement**

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THESE DOCUMENTS ARE AVAILABLE FOR PURCHASE AT CITY HALL

**SPECIAL INSTRUCTIONS TO BIDDERS**

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**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**1. Named Parties**

For the purposes of this contract the following parties are identified:

Owner: **The City of Port Colborne**

Engineer: **The City of Port Colborne**

Contract Administrator: **The City of Port Colborne**

Inspector: **The City of Port Colborne**

Contact for Enquiries: **Chris Lee, Manager of Projects & Design**  
**City of Port Colborne**

Telephone No.: **(905) 835 2901 ext: 223** Fax No. **(905) 835 2939**

Contact for Enquiries: **Stefanie DeCicco, Construction Inspector**  
**City of Port Colborne**

Telephone No.: **(905) 835 2901 ext: 225** Fax No. **(905) 835 2939**

**2. Tender Procedure**

The following policy regarding the submission of tenders and the tender opening procedures will be applicable for this project. Tenderer's are requested to adhere strictly to the instructions concerning submission.

:: **All tenders must be sealed and submitted to:**  
Janet Beckett, City Clerk on the First Floor, City Hall  
66 Charlotte Street, Port Colborne, Ontario, L3K 3C8

:: **By the following time:**  
2:00 p.m. local time  
Tuesday, December 1<sup>st</sup>, 2009

Tenders received later than the time specified will not be accepted, regardless of the postal seal date. Tenders must be plainly marked to reveal the contents and the Tenderer's name and address. Tenders received after this time will be unopened and destroyed.

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:: Tenders shall be submitted in the two envelopes supplied, as follows:

i) The first envelope shall contain:

- \* "Agreement to Bond", duly signed and sealed (no copies or facsimiles will be accepted).
- \* Tender deposit in the form of a certified cheque, money order, or an irrevocable letter of credit in the amount of **\$75,000.00**

ii) The second envelope shall contain:

- \* Form of Tender (including addenda if applicable).

Please note that the tender specifications shall not be included in the second envelope. In the event the first envelope does not contain the proper documents, the second envelope will not be opened.

Tenders will be opened the same day that tenders close at **2:15 p.m. local time, Tuesday, December 1<sup>st</sup>, 2009 in Committee Room #2, Second Floor, City Hall.**

Any Firm submitting Tenders will be permitted to attend the Tender opening.

The total tender price will be announced for each tender opened, (excluding G.S.T.).

If you wish clarification of specifications, do not use the envelopes provided as they will not be opened prior to the Tender opening.

For any additional information contact:

**Chris Lee, Manager of Projects and Design**  
Telephone: 905-835-2900 ext 223  
Fax: 905-835-2939  
Email: [chrislee@portcolborne.ca](mailto:chrislee@portcolborne.ca)

**Stefanie DeCicco, Construction Inspector**  
Telephone: 905-835-2900 ext 225  
Fax: 905-835-2939  
Email: [stefaniedecicco@portcolborne.ca](mailto:stefaniedecicco@portcolborne.ca)

The bid must be legible, written in ink, or typewritten. Any form of erasure, strikeout or over-writing must be initialed by the Bidder's authorized signing officer.

All unit prices must be clearly indicated and all extensions written in figures. The bid must not be restricted by a statement added to the Form of Tender or by covering letter, or by alterations to the Form of Tender as supplied by the City of Port Colborne unless otherwise provided herein.

The Form of Tender must be signed and witnessed in the spaces provided on the form, with the signature of the bidder or responsible official of the firm bidding. **If a joint bid is submitted, it must be signed and addressed on behalf of each of the bidders.**

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**3. Submission of Tenders**

Submissions shall not be made by e-mail or facsimile. Adjustment by e-mail, facsimile, letter or otherwise to a Tender already submitted is not permitted.

A bidder will be permitted to withdraw his/her Tender unopened after it has been deposited, if such request is received in writing by the City Clerk prior to the time specified for the opening of Tenders.

More than one Tender from an individual firm, partnership, corporation, or association under the same or different names will not be considered. Within a Tender submission, Bidders must bid on each of the items.

**4. Clarification, Omissions, Discrepancies**

It will be the Bidders responsibility to clarify any details in question before submitting their bid.

Bidders finding discrepancies or omissions in the specifications or other documents or having any doubts concerning the meaning or intent of any part thereof, should immediately request clarification. Written instructions or explanations will then be sent to all bidders in the form of addenda to the Tender documents.

Bidders may inquire into and clarify any requirements of this Tender. Inquiries must be directed to the attention of:

<b>Chris Lee</b> <b>Manager of Projects and Design</b> <b>Telephone: 905-835-2900 ext 223</b> <b>Fax: 905-835-2939</b> <b>Email: chrislee@portcolborne.ca</b>	<b>Stefanie DeCicco</b> <b>Construction Inspector</b> <b>Telephone: 905-835-2900 ext 225</b> <b>Fax: 905-835-2939</b> <b>Email: stefaniedecicco@portcolborne.ca</b>
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Please note that: **No inquiries will be taken on the Closing Date of the Tender.**

Responses, if not already addressed in the Tender, will be addressed in the form of addendum, if required. No oral interpretations will be effective to modify any provisions of the Tender.

Addenda are the responsibility of the Contractor, the Contractor must ensure that all applicable addenda are attached to the Form of Tender prior to submission.

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**Title: Catharine Street – Large Diameter Watermain Replacement**

**5. Errors and Corrections**

City staff may clarify any aspect of a Tender submission with the Bidder at any time after the Tender has been opened. Any such clarification will not alter the Tender and will not be constituted as a negotiation or renegotiation of the Tender. The Corporation of the City of Port Colborne is not required to clarify any part of a Tender. Any clarification of a Tender by a Bidder shall not be effective until confirmation has been delivered in writing.

**6. Estimated Tender Price**

The estimated tender price of the project is as follows (excluding G.S.T.).

Estimated Tender Price ..... **\$1,500,000.00**

**7. Tender Award**

The award of this tender is subject to the Owner obtaining approval from:

**The Council of the City of Port Colborne  
The Ministry of Environment**

Tentatively, construction may commence, but is not guaranteed, by:

**March 15, 2010** see **13. Construction Schedule** for tentative start dates.

**8. Maintenance Holdback**

The following maintenance holdback will apply to this contract: **(2%)** for 1 year after the completion of the works.

The maintenance period and any material or equipment supplied warranties shall commence upon completion of the works in their entirety. Also that there are no outstanding deficiencies.

The Maintenance Holdback shall apply as per Special Provisions - General Section G19.

Special Provisions - General Section G19 (iv) is to be disregarded.

**9. Liquidated Damages**

The liquidated damages for this contract shall be **One Thousand Dollars (\$1000)** for each and every day's delay as outlined in Special Provisions – General – Section G17.



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**10. Additional Insured**

The following parties are identified to be included as additional insured for this project:

**The Region of Niagara  
Kerry T. Howe Engineering Ltd.  
Amec Earth & Environmental**

**11. Workplace Safety & Insurance Board Certificate of Clearance**

A generic and/or specific Certificate of Clearance shall be provided to the Department Director or designate and the Certificate shall be valid for sixty (60) days from the date of the commencement of the project.

All bidders shall furnish the Workplace Safety & Insurance Compensation Board account number in the Form of Tender where indicated. Prior to release of each and every progress draw if the payment falls out of the 60 day validity period, the successful bidder shall be required to provide a new Certificate of Clearance to the Corporation. The Certificate shall indicate that the bidder has complied with the requirements of the Workplace Safety & Insurance Compensation Board and is in good standing in the records of the Board.

**12. Acceptance or Rejection of Tenders**

The Owner reserves the right to reject any bids as the interests of the Owner require, without stating the reasons therefore, and the lowest or any Tender will not necessarily be accepted.

**13. Construction Schedule**

The Contractor shall submit to the Engineer his proposed construction schedule **at the pre-construction meeting.**

**Construction shall commence by no later than April 6, 2010.**

The Contractor has 65 working days after start of construction to complete the contract or July 16<sup>th</sup> 2010, whichever comes first.

**All works must be completed by the allotted working days, excluding Items: 4.3, 4.4c,d & e, 4.5, 4.6, 4.8, 4.10, 4.12 & 4.13, ONLY these items are to be done in the spring of 2010, but MUST be completed by May 30, 2011.** (Refer to Special Provisions General (r). The liquidated damages clause of this contract will be strictly enforced.

Bi-weekly construction progress meetings will be held throughout the duration of the contract with attendance required by the Contractor and City staff.

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**14. Geotechnical Report**

A geotechnical report has been prepared for:

- **Sugarloaf Street** from King Street to Catharine Street
- **Catharine Street** from Sugarloaf Street to Clarence Street
- **King Street** from Sugarloaf Street to the south limit of construction.

See attached for review and reference.

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## **INSTRUCTIONS TO BIDDERS**

(Refer to Niagara Peninsula Standard Contract Documents)

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**Contract No.:2009-14**

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**FORM OF TENDER**

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**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**FORM OF TENDER**

We, the undersigned Contractor(s) have carefully examined the attached documents as herein listed and forming part of this tender.

**DOCUMENTS  
INCLUDED  
IN CONTRACT**

Special Instructions to Bidders  
Instructions to Bidders  
Form of Tender  
Agreement to Bond  
Special Provisions  
General Conditions  
Supplementary General Conditions  
Standard Specifications (as noted)  
Plans (as noted)  
Addenda (if applicable)

and have carefully examined the site and location of the work to be done under this contract. We, the undersigned Contractor(s), understand and accept the said drawings and tender documents, and, for the prices set forth in this Tender, hereby offer to furnish all machinery, labour, tools, apparatus and other means of construction, furnish all materials except as otherwise specified in the Tender, and to complete the work in strict accordance with the drawings and contract documents referred to above, for the total tender price of

\_\_\_\_\_ Dollars.

(\$ \_\_\_\_\_) *excluding G.S.T.*

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**ADDENDA**

We acknowledge that we have received Addendum/Addenda No.\_\_\_\_ to No.\_\_\_\_ inclusive, and that all changes specified in the Addendum/Addenda have been included in the prices submitted

**COMMENCEMENT AND COMPLETION**

We agree to commence work as specified to proceed continuously to the completion and to complete **at the expiration of 65 working days or July 16<sup>th</sup>, 2010.**

**TENDER IS OPEN TO ACCEPTANCE & IRREVOCABLE**

We agree that this tender is to continue open to acceptance and irrevocable until the formal contract has been executed by the successful tenderer for the said work, and the bond or bonds as specified have been executed by the approved surety or sureties, and that the Owner may, at any time, within 40 (fourty) calendar days of closing date, accept this tender without notice, whether any tender has been previously accepted or not.

\* to be filled in by Tenderer.

**OFFERED ON BEHALF OF THE CONTRACTOR**

Insert Workplace Safety And Insurance Board Account No.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Address

\_\_\_\_\_  
Contractor's Seal

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Date

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**NOTE:**

- (a) If the Tenderer is a Corporation, the Corporate seal must be affixed under the signature of a duly authorized officer or officers of the Corporation.
- (b) If the Tenderer is not a Corporation or a Partnership, the Tenderer must sign in the presence of a witness who must also sign.
- (c) If the Tenderer is a Partnership, each member of the Partnership must sign in the presence of a witness who must also sign.

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**Title: Catharine Street – Large Diameter Watermain Replacement**

**SCHEDULE OF QUANTITIES:**

**SECTION 1: GENERAL**

Item	Spec. No.	Description	Est. Quantity	Unit	Unit Price	Amount
1.1	SPCD-A1 SPSCI-1	Bonding – All works	1	LS	\$ _____	\$ _____
1.2	SPCD-A2 SPSCI-2	Preconstruction Survey	1	LS	\$ _____	\$ _____
1.3	SPCD-A4 SPSCI-3	Construction Layout	1	LS	\$ _____	\$ _____
1.4	SPCD-A8 SPSCI-4a	Allowance for construction signs, traffic control & traffic management plan	1	LS	\$ _____	\$ _____
1.5	SPSCI-4b	Allowance for Construction Schedule and Proposed Procedures	1	LS	\$ _____	\$ _____
<b>TOTAL SECTION 1: GENERAL</b>					\$ _____	

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Contract No.:2009-14

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SCHEDULE OF QUANTITIES:

SECTION 2: WATERMAIN REPLACEMENT

Item	Spec. No.	Description	Est. Quantity	Unit	Unit Price	Amount
2.1	SPCD-D1 SPSCI-5	Supply & install watermain PVC Class 150 DR-18 pipe by open cut –				
		a) 150mm	50	m	\$ _____	\$ _____
		b) 200mm	200	m	\$ _____	\$ _____
		c) 250mm	6	m	\$ _____	\$ _____
		d) 300mm	100	m	\$ _____	\$ _____
		Supplay & install watermain PVC Class 235 DR -18 pipe by open cut –				
2.2	SPCD- D4,D5,D6, D7 & D8 SPSCI-6	e) 400mm	40	m	\$ _____	\$ _____
		f) 500mm	750	m	\$ _____	\$ _____
2.2	SPCD- D4,D5,D6, D7 & D8 SPSCI-6	Replace or install water service with Municipex water service pipe by open cut –				
		a) 25mm	480	m	\$ _____	\$ _____
2.3	SPCD- D4,D5,D6, D7 & D8 SPSCI-6	b) 50mm	90	m	\$ _____	\$ _____
		Supply & install –				
		a) 25mm curb stop & box	48	Ea	\$ _____	\$ _____
		b) 25mm main stop	48	Ea	\$ _____	\$ _____
2.4	SPCD-D2 SPSCI-7	c) 50mm curb stop & box	8	Ea	\$ _____	\$ _____
		d) 50mm main stop	8	Ea	\$ _____	\$ _____
		i) Supply & install water valve including Water Box				
		a) 150mm gate valve	3	Ea	\$ _____	\$ _____
		b) 300mm gate valve	2	Ea	\$ _____	\$ _____
		Install water valve including Water Box				
		c) 200mm pratt butterfly valve (in chamber)	1	Ea	\$ _____	\$ _____
		d) 300mm pratt butterfly valve (in chamber)	2	Ea	\$ _____	\$ _____
e) 400mm pratt butterfly valve (in chamber)	2	Ea	\$ _____	\$ _____		
f) 500mm pratt butterfly valve (in chamber)	14	Ea	\$ _____	\$ _____		
2.4	SPCD-D2 SPSCI-7	ii) Valve Chamber- installation including all appurtenance not included in other items.				
		a) Chamber “B” (King St at Water Tower)	1	Ea	\$ _____	\$ _____
		b) Chamber “C” (King St at Sugarloaf)	1	Ea	\$ _____	\$ _____
		c) Chamber “D”(Sugarloaf at Catharine)	1	Ea	\$ _____	\$ _____

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Title: Catharine Street – Large Diameter Watermain Replacement

**SCHEDULE OF QUANTITIES:**

**SECTION 2: WATERMAIN REPLACEMENT**

Item	Spec. No.	Description	Est. Quantity	Unit	Unit Price	Amount	
2.4	SPCD-D2 SPSCI-7	d) Chamber "E" (At Adelaide)	1	Ea	\$ _____	\$ _____	
		e) Chamber "E" (At Victoria)	1	Ea	\$ _____	\$ _____	
		f) Chamber "E"(At Kent)	1	Ea	\$ _____	\$ _____	
		g) Chamber "E" (At Charlotte)	1	Ea	\$ _____	\$ _____	
		h) Chamber "A" (At Clarence)	1	Ea	\$ _____	\$ _____	
		iii) Supply & install air release valve (in chamber)					
		a) Chamber "C"	1	Ea	\$ _____	\$ _____	
		b) Chamber "A"	1	Ea	\$ _____	\$ _____	
		iv) Drain Valve – including tee, piping, bends, cap (in chamber)					
		a) Chamber "B"	1	Ea	\$ _____	\$ _____	
		b) Chamber "E"	4	Ea	\$ _____	\$ _____	

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**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**SCHEDULE OF QUANTITIES:**

**SECTION 2: WATERMAIN REPLACEMENT**

Item	Spec. No.	Description	Est. Quantity	Unit	Unit Price	Amount
2.5	SPCD-D3 SPSCI-8	Supply & install hydrant assembly	7	Ea	\$ _____	\$ _____
2.6	SPCD-D10 SPSCI-9	Cathodic protection –	56	Ea	\$ _____	\$ _____
		a) water services	7	Ea	\$ _____	\$ _____
2.7	SPCD-D11 SPSCI-10	Removals & disposals				
		a) watermain – 400mm CI – removal	750	m	\$ _____	\$ _____
		b) watermain - 300mm CI – removal	850	m	\$ _____	\$ _____
		c)watermain – 250mm CI – removal	200	m	\$ _____	\$ _____
		d)watermain – 200mm CI – removal	6	m	\$ _____	\$ _____
		e)watermain 150mm CI - removal	50	LS	\$ _____	\$ _____
		f) hydrants	7	Ea	\$ _____	\$ _____
		g) valves	37	Ea	\$ _____	\$ _____
h) valve chambers	1	Ea	\$ _____	\$ _____		
2.8	SPCD-D13 SPSCI-11	Watermain disinfection & testing	1	LS	\$ _____	\$ _____
2.9	SPCD-D12 SPSCI-12	Temporary water supplies	1105	m	\$ _____	\$ _____
2.10	SPCD-D9 SPSCI-13	Insulation of watermain where required	100	m <sup>2</sup>	\$ _____	\$ _____
2.11	SPS-CI14	Capping of watermains on existing lines to remain in service upon connection of new watermain	3	Ea	\$ _____	\$ _____
2.12	SPCD-G28 SPS-CI15	Watermain connections – Night Work				
		a) Sugarloaf & Catharine	1	LS	\$ _____	\$ _____
		b) King @ Water Tower	1	LS	\$ _____	\$ _____
2.13	SPSCI-16	Special Connection – Clarence Street (600mm)	1	LS	\$ _____	\$ _____
<b>TOTAL SECTION 2: WATERMAIN REPLACEMENT</b>					<b>\$ _____</b>	

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Title: Catharine Street – Large Diameter Watermain Replacement

**SCHEDULE OF QUANTITIES:**

**SECTION 2: WATERMAIN REPLACEMENT**

Item	Spec. No.	Description	Est. Quantity	Unit	Unit Price	Amount
2.14		Temporary interconnection of 400mm A.C. watermain to 300mm C.I. watermain including all restraints (Sugarloaf at Catharine)	1	LS	\$ _____	\$ _____
<b>TOTAL SECTION 2: WATERMAIN REPLACEMENT</b>					\$ _____	

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Title: Catharine Street – Large Diameter Watermain Replacement

**SCHEDULE OF QUANTITIES:**

**SECTION 3: STORM & SANITARY SEWER REPLACEMENT**

Item	Spec. No.	Description	Est. Quantity	Unit	Unit Price	Amount
3.1	SPCD-C1, C2 & C5 SPSCI-17	Replace or install storm sewer, catch basin leads Ring-tite DR35 PVC pipe by open cut – Including removal of existing storm sewer and connections				
		a) 450mm (at Clarence)	17	m	\$ _____	\$ _____
		b) 600mm (Adelaide to Victoria)	70	m	\$ _____	\$ _____
		c) 250mm (Adelaide to Victoria) complete with frame and grate OPSD400.100	30	m	\$ _____	\$ _____
		d) 200mm C.B leads	30	m	\$ _____	\$ _____
3.2	SPCD-C6 SPSCI-18a	Replace or install				
		a) standard cb (600 x 600mm)	2	Ea	\$ _____	\$ _____
		b) CBMH 1200mm manhole complete with flat top and frame and grate OPSD 400.100	1	Ea	\$ _____	\$ _____
3.3	SPCD-C1, C2 & C5 SPSCI-17	Replace or install sanitary lateral PVC, SDR 35 pipe by open cut –				
		a) 100mm	60	m	\$ _____	\$ _____
3.4	SPSCI-18b	Replace sanitary forcemain at Charlotte Street with 20m of 300mm DR-11 HDPE pipe including connections and all control of sewage flows	1	LS	\$ _____	\$ _____
<b>TOTAL SECTION 3: STORM &amp; SANITARY SEWER REPLACEMENT</b>						\$ _____

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**SCHEDULE OF QUANTITIES:**

**SECTION 4: RESTORATION**

Item	Spec. No.	Description	Est. Quantity	Unit	Unit Price	Amount
4.1	SPCD-B3 SPSCI-19	Granular 'A' material for all infrastructure, pipe bedding/cover, backfill & restoration purposes	20,000	t	\$ _____	\$ _____
4.2	SPCD-B2 SPSCI-20	Removals & disposal in trench				
		a) asphalt & concrete road deck	3516	m <sup>2</sup>	\$ _____	\$ _____
		b) asphalt driveways, aprons & approaches	105	m <sup>2</sup>	\$ _____	\$ _____
		c) concrete driveways, sidewalks & housewalks	285	m <sup>2</sup>	\$ _____	\$ _____
		d) concrete curbs	150	m	\$ _____	\$ _____
4.3	SPCD-B11 SPSCI-21	Asphalt Milling	10000	m <sup>2</sup>	\$ _____	\$ _____
4.4	SPCD-B14&B15 SPSCI-22	Asphalt road & driveway restoration				
		a) HL8 HS - trench 140mm	270	t	\$ _____	\$ _____
		b) HL8 HS – trench 90mm	725	t	\$ _____	\$ _____
		c) HL3A - driveways residential	78	m <sup>2</sup>	\$ _____	\$ _____
		d) HL3A – driveways commercial	27	m <sup>2</sup>	\$ _____	\$ _____
		e) HL3 HS – resurfacing – 40mm	1010	t	\$ _____	\$ _____
4.5	SPCD-B17 SPSCI-23	Interlocking paving stone restoration	25	m <sup>2</sup>	\$ _____	\$ _____
4.6	SPCD-B16 & B8 SPSCI-24	Concrete restoration –				
		a) concrete any width 150mm thick	85	m <sup>2</sup>	\$ _____	\$ _____
		b) concrete any width 100mm thick	200	m <sup>2</sup>	\$ _____	\$ _____
		c) concrete sw with bricks	20	m <sup>2</sup>	\$ _____	\$ _____
		d) concrete curb & gutter	150	m	\$ _____	\$ _____
4.7	SPSCI-25	Cold Mix Asphalt	180	m <sup>2</sup>	\$ _____	\$ _____
4.8	SPCD-B21 SPSCI-26	Topsoil & sod	500	m <sup>2</sup>	\$ _____	\$ _____

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**SCHEDULE OF QUANTITIES:**

**SECTION 4: RESTORATION**

Item	Spec. No.	Description	Est. Quantity	Unit	Unit Price	Amount
4.9	SPSCI-27	Rock excavation by hoe ramming	350	m <sup>3</sup>	\$ _____	\$ _____
4.10	SPCD-B3 SPSCI-28	Granular 'M' – shouldering	15	t	\$ _____	\$ _____
4.11	SPCD-B24 SPSCI-29	Application of water for dust control	500	m <sup>3</sup>	\$ _____	\$ _____
4.12	SPCD-B13 SPSCI-30	Adjustment of existing appurtenances				
		a) Manholes	15	Ea	\$ _____	\$ _____
		b) Water Valves	30	Ea	\$ _____	\$ _____
		c) Catch Basins	10	Ea	\$ _____	\$ _____
4.13	SPSCI-31	Line Painting				
		a) Centreline	1300	m	\$ _____	\$ _____
		b) Stop Bars	14	Ea	\$ _____	\$ _____
		c) Cross walks	14	Ea	\$ _____	\$ _____
		d) Parking stalls	12	Ea	\$ _____	\$ _____
<b>TOTAL SECTION 4: RESTORATION</b>					\$ _____	

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**SCHEDULE OF QUANTITIES:**

**TENDER SUMMARY**

<b>SECTION</b>		<b>AMOUNT</b>
<b>1</b>	<b>GENERAL</b>	\$ _____
<b>2</b>	<b>WATERMAIN REPLACEMENT</b>	\$ _____
<b>3</b>	<b>STORM &amp; SANITARY SEWER REPLACEMENT</b>	\$ _____
<b>4</b>	<b>RESTORATION</b>	\$ _____
<b>5</b>	<b>CONTINGENCY</b>	<b>\$ 30,000.00</b>
<b>TOTAL TENDER PRICE</b>		<b>\$ _____</b>

**NOTE: The above TOTAL TENDER PRICE shall exclude GST, and shall be entered on pages FT 1 and FT 15 of the Form of Tender.**

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL



**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**STATEMENT “A”**

**LIST OF SUB-CONTRACTORS**

The bidders shall list hereunder the names of all sub-contractors intended to be used in the execution of this work subject to the approval of the Contract Administrator.

All work not performed directly by the Contractor's forces shall be included in this list. Unless this list is properly completed, the Tender may be disqualified. All changes to this list must be approved by the Contract Administrator.

SUB-TRADE	NAME OF SUB-CONTRACTOR	ADDRESS OF SUB-CONTRACTOR

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**STATEMENT “B”**

**TENDERER'S EXPERIENCE IN SIMILAR WORK**

<b>YEAR COMPLETED</b>	<b>DESCRIPTION OF WORK</b>	<b>FOR WHOM WORK PERFORMED</b>	<b>VALUE</b>

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**STATEMENT “C”**

**(a) Federal Goods and Services Tax:**

The Contractor shall **NOT** include any amount in his tender price for the Goods and Services Tax (G.S.T.). Any amount to be levied with respect to the G.S.T. will be included as a separate item on the payment certificate. The appropriate G.S.T. levy will be paid to the Contractor in addition to the amount approved by the Contract Administrator for work performed under the contract and will, therefore, not affect the amount of the contract. The contractor will be required to make the appropriate remittance to Revenue Canada in accordance with the legislation.

- i) Total Tender Price \$ \_\_\_\_\_
- ii) Estimated Cost of Goods and Services Tax \$ \_\_\_\_\_
- iii) Total Contract Amount [(i) + (ii)] \$ \_\_\_\_\_
- iv) G.S.T. Registration Number: \_\_\_\_\_

\_\_\_\_\_  
**Company Name** **Contractor's Signature(s)**

\_\_\_\_\_  
**Address** **Contractor's Seal**

Witnesses: \_\_\_\_\_  
\_\_\_\_\_

**AGREEMENT TO BOND**

We, the undersigned, hereby agree to become bound as Surety for:

.....  
.....

in a bond totaling One Hundred Per Cent (100%) of the contract amount, and conforming to the Instruments of Contract attached hereto, for the full and due performance and maintenance of the works shown as described herein if the Tender for

.....  
.....

is accepted by the Owner. We also agree to a bond as surety for the payment of the cost of all labour and materials for an amount equal to 100% of the contract amount used by the Contractor in due performance of his work.

It is a condition of this Agreement that if the above mentioned Tender is accepted, application for a Performance Bond, must be completed with the undersigned within fourteen (14) days of acceptance of the tender related thereto, otherwise this Agreement shall be null and void.

Dated this        day of        , 2010.

Name of Bonding Company

Signature of Authorized Person Signing for Company

(Company Seal)

Position

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**Schedule of Drawings**

1. Contract Drawings

60-548	Title
60-548a	King Street
60-548b	King Street
60-548c	Sugarloaf Street
60-548d	Catharine Street
60-548e	Catharine Street
60-548f	Catharine Street
60-548g	Catharine Street
60-548h	Catharine Street
60-548i	Catharine Street
60-548j	Catharine Street
60-548k	Catharine Street

2. O.P.S.D. (Not Included in Contract Documents)

Contractor to construct in accordance with all relevant O.P.S.D.'s as indicated on the Contract Drawings and in these Specifications unless otherwise directed by the Engineer.

3. Municipal Standard Drawings (If Applicable)

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**AGREEMENT BETWEEN OWNER AND CONTRACTOR**

**This Agreement** made on the \_\_\_\_\_ day of \_\_\_\_\_ in the year two thousand and ten.

**by and between**

**THE MUNICIPAL CORPORATION OF THE CITY OF PORT COLBORNE  
66 CHARLOTTE STREET  
PORT COLBORNE, ONTARIO.  
L3K 3C8  
hereinafter called the "Owner"**

**and**

**hereinafter called the "Contractor"**

**witnesses:** that the parties agree as follows

**ARTICLE A-1 THE WORK**

The Contractor shall:

- (a) perform the Work required by the Contract Documents for Contract 2009-14 Catharine Street – Large Diameter Watermain Replacement, which have been signed by the parties, and which were prepared by the City of Port Colborne, acting as hereinafter called the Engineer.
- (b) do and fulfill everything indicated by this Agreement, and
- (c) commence the Work by the \_\_\_\_\_ day of \_\_\_\_\_ 2010 and attain completion of the Work, as certified by the Contract Administrator, the City of Port Colborne.

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

## **ARTICLE A-2 CONTRACT DOCUMENTS**

The following is an exact list of the Contract Documents referred to in Article A-1 of this Agreement. This list is subject to subsequent amendments in accordance with the provisions of the Contract and agreed upon between the parties.

Special Instructions to Bidders

Instructions to Bidders

Form of Tender

- Form of Tender Declaration
- Schedule of Tender Unit Prices
- Agreement to Bond
- Statement A - List of Sub-Contractors
- Statement B - Tenderer's Experience in Similar Work
- Statement C - Federal Goods and Services Tax

Agreement between the Owner and Contractor (Form of Contract Agreement)

Schedule of Drawings

Special Provisions - General (Refer to Niagara Peninsula Standard Contract Documents)

Special Provisions - Contract Items (Refer to Niagara Peninsula Standard Contract Documents)

Special Provisions - Supplementary Contract Items

Special Provisions - Labour Conditions and Fair Wage Schedule (If Applicable)

Standard Drawings - Comprising Ontario Provincial Standard drawings and Municipal Standard drawings

Supplementary General Conditions of Contract

(Refer to Niagara Peninsula Standard Contract Documents)

OPS General Conditions of Contract (Refer to Niagara Peninsula Standard Contract Documents)

Geotechnical Report (see attached)

Appendix "A" (see attached)

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**ARTICLE A-3 CONTRACT PRICE**

- (a) The quantities shown in the Schedule of Tender Unit Prices are estimated. The Contract Price shall be the final sum of the products of the actual quantities that are incorporated in, or made necessary by the Work, as confirmed by count and measurement, and the appropriate Tender Unit Prices, together with any adjustments that are made in accordance with the provisions of the Contract Documents.
- (b) The Estimated Tender Price shall be the sum of the products of the estimated quantities and the appropriate Tender Unit Prices in the Schedule.
- (c) Schedule of Tender Unit Prices, as per pages FT 1 and FT 13, included as part of this contract,
- (d) Based on the Schedule of Tender Unit Prices, refer to in article A-3 (c) the tender price is:  
\$ \_\_\_\_\_ in Canadian  
Funds  
*Excluding G.S.T.*

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL



**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**ARTICLE A-4 PAYMENT**

- (a) The Owner shall pay the Contractor in Canadian funds for the performance of the Contract, the amounts being determined by actual measured quantities of the individual work items contained in the Schedule of Tender Unit Prices in Article A-3 (c) of this Agreement, and measured in accordance with the methods of measurement given in the specifications.
- (b) Subject to applicable legislation and the provisions of the Contract Documents, and in accordance with legislation and statutory regulations respecting holdback percentages and, where such legislation or regulations do not exist or apply, subject to a holdback of ten percent ( 10 %), the Owner shall:
- (1) make monthly payments to the Contractor on account of the work performed as certified by the Contract Administrator, and
  - (2) upon completion of the Work as certified by the Contract Administrator pay to the Contractor the unpaid balance of holdback monies then due, and
- (d) If the Owner fails to make payments to the Contractor as they become due under the terms of this Contract or in an award by arbitration or court, interest of five percent (5%) per annum on such unpaid amounts shall also become due and payable until payment. Such interest shall be calculated and added to any unpaid amounts monthly.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

#### **ARTICLE A-5 RIGHTS AND REMEDIES**

- (a) The duties and obligations imposed by the Contract Documents and the rights and remedies available there-under shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.
- (b) No action or failure to act by the Owner, Contract Administrator or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach there-under, except as may be specifically agreed in writing.

#### **ARTICLE A-6 RECEIPT OF AND ADDRESSES FOR NOTICES**

Communications in writing between the parties or between them and the Contract Administrator shall be considered to have been received by the addressee on the date of delivery if delivered by hand to the individual or to a member of the firm or to an officer of the corporation for whom they are intended or if sent by fax, to have been delivered within five (5) working days of the date of mailing , or dispatch when addressed as follows:

The Owner at:                      66 Charlotte Street  
Port Colborne, Ontario, L3K 3C8

The Contractor at:

#### **ARTICLE A-7 LAW OF THE CONTRACT**

The law of the Place of the Work shall govern the interpretation of the Contract.

#### **ARTICLE A-8 LANGUAGE OF THE CONTRACT**

This Agreement is drawn in English at the request of all parties hereto.

#### **ARTICLE A-9 SUCCESSION**

The General Conditions of the Unit Price Contract hereto annexed, and the other aforesaid Contract Documents, are to be read into and form part of this Agreement and

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

the whole shall constitute the Contract between the parties and subject to law and the provisions of the Contract Documents shall ensure to the benefit of and be binding upon the parties hereto, their respective heirs, legal representatives, successors and assigns.

**In witness whereof** the parties hereto have executed this Agreement under their respective corporate seals and by the hands of their proper officers there unto duly authorized.

SIGNED, SEALED AND DELIVERED  
in the presence of:

**OWNER**

**CITY OF PORT COLBORNE**

\_\_\_\_\_  
signature

**VANCE BADAWEY, Mayor**

\_\_\_\_\_  
signature

**JANET BECKETT, Clerk**

**CONTRACTOR**

\_\_\_\_\_  
signature

\_\_\_\_\_  
name and title

\_\_\_\_\_  
signature

\_\_\_\_\_  
name and title

\_\_\_\_\_  
witness

\_\_\_\_\_  
name and title

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**SPECIAL PROVISIONS - GENERAL**

(Refer to Niagara Peninsula Standard Contract Documents)

**SPECIAL PROVISIONS – CONTRACT ITEMS**

(Refer to Niagara Peninsula Standard Contract Documents)

**SPECIAL PROVISIONS – SUPPLEMENTARY CONTRACT ITEMS**

(If Applicable)

**SPECIAL PROVISIONS – SUPPLEMENTARY SPECIAL PROVISIONS**

(If Applicable)

**SPECIAL PROVISIONS – LABOUR CONDITIONS & FAIR WAGE  
SCHEDULE**

(If Applicable)

**STANDARD DRAWINGS**

(Refer to Niagara Peninsula Standard Contract Documents)

**SUPPLEMENTARY GENERAL CONDITIONS OF CONTRACT**

(Refer to Niagara Peninsula Standard Contract Documents)

**OPS GENERAL CONDITIONS OF CONTRACT**

(Refer to Niagara Peninsula Standard Contract Documents)

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**SPECIAL PROVISIONS - GENERAL**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

- (a) This contract encompasses the provision of all labour, materials and equipment necessary for the removal of existing watermain, installation of new watermains, storm sewer, all appurtenances and restoration of road and sidewalk on:

**CATHARINE STREET** – CLARENCE STREET – SUGARLOAF STREET  
**SUGARLOAF STREET** – CATHARINE STREET – KING STREET  
**KING STREET** – SUGARLOAF STREET – 300 METERS SOUTH

The above description is general only and shall not be construed as limiting the scope of the contract.

- (b) The successful bidder shall note that **only** the following words **“or from blasting or vibration from pile driving or caisson work”** may be deleted on the following clause of the Certificate of Insurance:

*“No exclusions for damage or loss from the removal or weakening of support of any property, building or land whether such support be natural or otherwise or from blasting or vibration from pile driving or caisson work.”*

- (c) The contractor shall provide a construction schedule and proposed procedures one week prior to the pre-construction meeting.
- (d) The contractor shall provide a chlorine residual and bacteriological test sampling plan for approval as stipulated in the Niagara Peninsula Standard Contract Documents at the pre-construction meeting. All work completed by the Contractor on any existing water system shall be done in accordance with the Safe Drinking Water Act, 2002, Section 12. Section 12 requires that *“No person shall operate a municipal drinking water system or a regulated non-municipal drinking water system unless the person holds a valid operator’s certificate issued in accordance with the regulations.”* Certified City/Region operators must be present to directly supervise all work completed on any drinking water system, and only certified City/Region operators shall operate valves on that system. In addition, disconnection/reconnection of water services must be completed under the supervision of a certified City/Region operator.

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

- (e) Any unreasonable damage to lawns, driveways, etc. shall be repaired or replaced immediately by the contractor at their expense.
- (f) The Contractor shall protect and maintain all service crossings including but not limited to sanitary sewer laterals, water services, storm sewer leads, existing water/sewer mains etc. All damaged services shall be repaired by the Contractor to original condition or better and to the satisfaction of the Contract Administrator with no cost to the City/Region.
- (g) The contractor shall schedule construction operations in such a manner that a storm drainage outlet will always be available. This is to ensure that the exposed sub-grade or granular base will not be subjected to flooding and ponding problems. The unit price bid under the appropriate items shall allow for this requirement and no extra payment shall be made for the excavation and replacement of soft wet areas caused by inadequate drainage.
- (h) The unit price bid shall make due allowance to include root protection to existing trees. This work will consist of cutting all tree roots, of any size to sound wood by lopping shears or sawn cut. They will then be properly sprayed with an approved tree paint. The paint shall be properly dried, prior to any backfilling. Should backfilling not take place immediately, the tree root system shall be covered to protect against root system dying out immediately.
- (i) Unit pricing for all pipe and appurtenance installation shall include: excavation of all types of soil, including asphalt, road base etc., all de-watering, sheathing, shoring and bracing required for the vertical trench, pipe installation and bedding including all connections to existing or new pipes unless otherwise listed in the Form of Tender unit prices.
- (j) Preservation of existing utilities shall be as per OPSS 504. For utilities greater than 300mm diameter the contractor shall submit shop drawings, stamped by a professional engineer licensed to practice in Ontario, to the Engineer detailing the temporary and permanent support. The Contractor shall also advise the Utility owner when he will be working in the vicinity of their plant. No special payment will be made for this item. The cost of utility supports shall be included in the unit price bid for watermains and sewers, etc.  
All procedures in the "Safe Work Procedures for Excavating in the Vicinity of Underground Electrical Plant" guide book must be adhered to. Any associated costs are deemed to be included in the tender items.

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**Title: Catharine Street – Large Diameter Watermain Replacement**

The Contractor shall take all necessary precautions during construction, to prevent damage to any utility services (hydro, gas, bell, fibre optic etc.) The Contractor shall adhere to the safety requirements of the local authorities while working in the vicinity of the utility services. All costs associated with any repairs from undue damage, or supporting poles, cables, bracing etc. shall be the responsibility of the Contractor.

- (k) When a trench box is needed for support of the trench wall, its removal shall be as per OPSS section 538.07.02.
- (l) The contractor shall dispose all surplus excavated material at his cost to the designated landfill site which is within 10km of the construction site. All materials are to be stockpiled separately according to type of material in designated areas, and the site is to be kept in a neat and orderly fashion at the end of each work day. There will be absolutely **NO** disposal of excavated materials to any other location other than the designated site. The designated site is located on Phillips Road in Wainfleet. This is a condition of approval for the project. All acceptable excavated materials suitable for trench backfill, as approved by the Contract Administrator, shall be stockpiled and reused as required. Payment for the material shall be included in the Unit Price for pipe installation and no further compensation for the material will be made. Any other debris removed from the area of excavation, ie. pipe, valve boxes, catch basins, etc. are the property of the contractor unless stated other wise in the contract documents.
- (m) All construction activities must comply with the Ministry of Labour and the Occupational Health & Safety Act. A vertical cut trench complying with the current regulations unless otherwise specified in the Special Provisions Contract Items, shall be employed. In this contract, vertical trench shall mean vertical trench walls up to the existing ground surface. In the event of non-compliance with the vertical trench requirement, the city will pay only the theoretical trench width.
- (n) Any work that is conducted on a Saturday will not be considered as a Contract working day. Work on Saturdays will be subject to approval by the City's representative.
- (o) After the work of any section of the Contract has been completed, all debris, excess materials, etc., shall be removed by the Contractor from the site and disposed of to the satisfaction of the Contract Administrator. The site shall be left in a safe, neat and workmanlike condition as applicable to

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

any present regulations. The Contractor shall include in his rates for cleaning the site.

- (p) The Contractor shall also be responsible for all costs incurred for the supply, installation, maintenance and removal of all de-watering equipment, and any other materials or equipment which may be required to cope with the ground conditions in order to complete the work. It will also be the Contractors responsibility for reinstatement of such areas which were disturbed by their operations to their original condition. All unit prices bid shall include allowances for this under the appropriate item.
- (q) **Absolutely NO work may be done on Fridays** from 12:00am (midnight) until 1:00pm, **in the area of Catharine Street from Charlotte Street to Clarence Street**, so as not to conflict with the City's weekly Farmer's Market. **Fridays will not be considered a working day while the contractor is working directly in this vicinity ONLY.** The site must be kept in a safe and orderly fashion in compliance with all applicable regulations, prior to Market Opening, as not to inhibit any pedestrian/vehicular traffic.
- (r) The contractor shall note that **Items 4.3, 4.4c, d & e, 4.5, 4.6, 4.8, 4.10, 4.12 & 4.13** shall be excluded from the 65 working days if prohibitive weather should occur. These items are to be completed in the Spring of 2010. **The deadline for completion of these items ONLY is May 30, 2011.** If **these** items are not completed by this deadline, the liquidated damages clause **will** be enforced. All other Items will be subjected to the liquidated damages clause at the expiration of working days.
- (s) The City has made provisions for the Contractor to store all construction materials in the vacant City lot on Catharine Street immediately north of the rail road tracks. (With the exception of Granular Materials. Granular Materials may be stored at the Public Works facility on 11 King Street). The Contractor will be required to keep the material storage site secure.
- (t) The Contractor shall give notice to residents/businesses prior to their driveway entrance being interrupted by construction. At the conclusion of each days work, all affected driveways must be made passable. The contractor shall maintain pedestrian access to all abutting businesses/residences at all times.
- (u) Payment for each item listed in the Form of Tender shall be made according to the unit rates specified in the Form of Tender.



**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

(v) The Contractor shall be responsible for providing on site washroom facilities for all staff, and provide power for all construction work activities.

(w) In addition to GC 3.07 the following shall also be amended to include:

.04 If the Work is delayed by labour disputes, strikes or lock-outs including lock-outs decreed or recommended to it's members by a recognized union organization, of which the Owner is a member or to which the Owner is otherwise bound, which are beyond the Owner's control, then the contract time shall be extended in accordance with section GC 3.06. In no case shall the extension of Contract Time be more than the time lost as the result of the event causing the delay, unless a longer extension is agreed to by the Owner. The Contractor shall not be entitled to payment for standby time.

(x) The Contractor is responsible for keeping the roads within the limits of construction graded and free of potholes.

(y) The Contract Administrator shall inspect all materials and appurtenances prior to the installation. Any items deemed unacceptable are to be tagged or otherwise identified as "unacceptable", and removed from site immediately. Replacement item(s) shall be examined for conformance to specifications by the Contract Administrator.

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**Title: Catharine Street – Large Diameter Watermain Replacement**

**SPECIAL PROVISIONS - SUPPLEMENTARY CONTRACT ITEMS  
SECTION 1 - GENERAL**

**SPSCI-1      Item 1.1  
                  SPCD-A1  
                  BONDING**

The conditions stipulated in the Niagara Peninsula Standard Contract Documents shall apply to this item.

**SPSCI-2      Item 1.2  
                  SPCD-A2  
                  PRECONSTRUCTION SURVEY**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

The contractor will provide a complete copy of the preconstruction survey and field reports to the City, together with any subsequent inspection report related to claims investigation forthwith.

The preconstruction survey must, upon the approval of the property owner and any tenants, include the taking of high resolution video or still photos of all properties inspected, and the appropriate records are to be kept of each property.

**SPSCI-3      Item 1.3  
                  SPCD-A4  
                  CONSTRUCTION LAYOUT**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

Included in the cost of this item: the checking of all grades and alignment, re-staking of layout due to destruction or removals; any additional layout within the intent of the contract for minor revisions to the road, sidewalk, water or sewer design etc.

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**Title: Catharine Street – Large Diameter Watermain Replacement**

**SPSCI-4a    Item 1.4**  
**SPCD-A8**

**ALLOWANCE FOR CONSTRUCTION SIGNS, TRAFFIC CONTROL, AND TRAFFIC MANAGEMENT PLAN**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

In addition to the Traffic Protection Plan required under the O.H.S.A., O.T.M. Book 7 and the M.O.L., paid for under the Contract Items, the Contractor shall be responsible for the preparation of a traffic management plan, to be provided to the Contract Administrator for review, within seven (7) days of the contract award. It shall conform to all necessary regulations. This plan shall have details for the following requirements but shall not be limited to:

- traffic flows with regards to work schedule
- traffic management during peak traffic flows
- maximum delay time
- number of flagpersons and communication devices ( minimum two)

Contract rates shall include for traffic control flagging throughout the duration of the project and in accordance with the Manual of Uniform Traffic Control Devices and the requirements of the Construction Safety Association of Ontario. The contractor shall stage his operations to ensure that one lane of traffic remains open at all times. Vehicular and pedestrian access to all businesses, homes and side streets must be maintained at all times. No road closures will be allowed, unless approved by the Contract Administrator. Co-ordination and co-operation from the contractor will be required to ensure minimum disruption during all phases of construction.

The contractor is responsible for the installation and removal of all construction signage and daily maintenance of all signs throughout the duration of the contract.

It shall be the responsibility of the Contractor to notify Emergency Services, the Niagara Region (for household waste and recycling pick up), any school boards which may be affected, when necessary, as to the current status of construction as it pertains to safe passage of traffic within the construction limits.

**SPSCI-4b    Item 1.5**

**ALLOWANCE FOR CONSTRUCTION SCHEDULE, AND PROCEDURES**

For the price bid for Item 1.5, the contractor shall supply a construction schedule and set out his proposed procedures for the work at least one week prior to the preconstruction meeting as set out on the Special Provisions – General Item (c).

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**Title: Catharine Street – Large Diameter Watermain Replacement**

**SPECIAL PROVISIONS - SUPPLEMENTARY CONTRACT ITEMS  
SECTION 2 - WATERMAIN REPLACEMENT**

**SPSCI-5      Item 2.1  
                  SPCD-D1  
                  WATERMANS**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

The unit price bid for all watermains and water service installation shall include saw cutting of the asphalt pavement prior to the excavation of the trench. If the existing asphalt is undermined by the trench excavation saw cutting shall be repeated prior to the asphalt reinstatement of the trench at no additional cost to the City.

All PVC watermains shall be Class 150, DR 18 or Class 235, DR 18 as specified in the drawings and documents, with bell and spigot joints and rubber rings conforming to the requirements of CSA B137.3 and to ASTM B 88. Watermains and services will be installed using the Open Cut Method (OPSS 701). Minimum pipe cover to mains and services shall be 1.50 metres. The contractor should note that hydrant leads are also included in the tendered quantities of this item.

Watermain fittings shall be of approved cement-lined gray, ductile iron or materials with mechanical joints or an approved equivalent. Bolts and nuts for fittings shall consist of corrosion resisting materials such as Cor-Blue T Bolt, 703 Annealed Stelco Roy Rod or approved similar. All fittings shall be in accordance with OPSS 701.05.02. The unit price tendered for the watermain shall be complete compensation for the installation of all fittings and anodes. (24lb anode on watermain fittings is required.)

All fitting types are specified on the Contract Drawings, where a type has not been specified it is assumed to use mechanical joint fitting.

The contractor shall note that the pressure testing, charging and flushing of the watermain and water services is required as part of this item. If the new watermain "fails" any of the required testing it will be the responsibility of the Contractor to rectify the situation at no additional cost to the City so that any re-testing may take place as soon as possible. Chlorination has been accounted for as a separate Contract Item.

All sampling point connections shall be removed upon successful sample completion, and the excavation restored by the Contractor to the Main Stop, confirmed as being in the "closed" position.

**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

The tenderer shall note that where it is necessary to install the new watermain deeper than the depth specified to avoid any conflicts in elevation with any utilities, the unit price bid shall be deemed to include due allowance for this contingency.

The unit price bid shall also include the removal of all abandoned, or to be abandoned underground services/pipes (of any material) in conflict with the new alignment of the watermain.

The existing 400mm dia. watermain serving the water tower must remain in operation until the new 500mm dia. watermain is put in service connecting the existing 600mm dia. C.P.P. watermain on Catharine north of Clarence to the 400mm dia. watermain feeding the water tower. All homes and businesses along the route of the project must be connected to a temporary 50mm P.E. pipe before the existing 300mm dia. distribution main on King, Sugarloaf and Catharine is taken out of service and removed. The watermain's crossing Catharine, Sugarloaf and King Street connecting to this main may be shut off at appropriate valves and capped and removed in order to provide space to install the new valve chamber. This includes Clarence, Charlotte, Kent, Victoria, Adelaide, Sugarloaf at Catharine and Sugarloaf at King. When shutting down the watermains for any reason 24 hours notice must be given to each home/business owner as well as the Contract Administrator. It will be the contractor's responsibility to distribute notice to all of the necessary parties who may be affected by any of the work, a minimum of 48 hours notice must be given before any work is to take place. A list of contact names and numbers will be made available to the contractor, of parties required for notification.

The unit price bid shall also include for the connection to the existing watermains or large water services, unless there is a separate item in the schedule of quantities. This item shall include all labour, material and equipment to make the connections to the existing watermains as per OPSS 701.07.15, 701.07.20. All piping and fittings used shall be disinfected, flushed and de-chlorinated by an approved method. As well the charging of the watermain by an approved method is also to be included in this price.

The contractor shall note that any organics shown in the soils report in the watermain trench are to be removed. All over-excavation has been compensated for in the Granular Quantity.

In accordance with the City's Quality Management System, requirements regarding essential supplier and services, the Contractor shall supply documentation to the Contract Administrator for all materials/fittings etc. ordered, showing that the material/fittings meet the Tender Specifications. These documents shall be filed by the Contract Administrator.

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Payment shall be full compensation for all equipment, labour and materials required to do the work. Payment shall be made by the lineal meter for each pipe size as specified on the contract drawings, or as directed by the Contract Administrator.

**SPSCI-6      Item 2.2 & Item 2.3**  
**SPCD-D4, SPCD-D5, SPCD-D6, SPCD-D7 & SPCD-D8**  
**WATER SERVICES, CURB STOPS, CURB BOXES & MAIN**  
**STOPS**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

OPSS 701.05.01 and 701.07.17 shall also apply to this item.

Water services shall be Municipex (PEXa) pipe conforming to CSA B137.5 and NSF Standard 14 & 61. Installation of this product will be in accordance with manufacturers specifications. (See Appendix "A") or equivalent, previously approved by the Contract Administrator, prior to installation.

For non-metallic services, the Contractor shall include the installation of a 10-gauge, 7 strand insulated wire placed along the spring-line of the service and connect it to the fittings as specified by the manufacturer.

All water services shall have an approved zinc anode installed. The anode will be paid as a separate item for water services only. (12lb anodes on curb boxes are required.) Anodes are not required on main stops.

The contractor is to note that Granular 'A' will be used for backfill in shoulders, driveways, sidewalks and travelled roadways. Native material is to be used in all other areas, such as a boulevard between a curb and sidewalk.

Unless specified otherwise the unit price bid for the supply and installation/replacement of the water services shall cover all connections, fittings, materials and workmanship to complete the installation from the watermain to the property line (curb stop). Main stops, curb stops and curb boxes shall be paid separately under their appropriate item.

Water services will be measured horizontally from the centre line of the watermain to the curb stop, no allowance will be made for the goose-necking, or additional appurtenances or fittings required to carry out this work to connect new 25mm & 50mm services to existing 19mm & 50mm services. Payment shall be made by the lineal meter.

The unit price is also to include de-chlorination of services complete.

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For connection to the new watermain the contractor shall use the required diameter PVC couplings with pre-tapped outlets complete, or stainless steel service saddle with double stainless steel bolts, both include the municipal main stop. OPSS 701 also applies.

Curb stops shall be inverted key type stops. All curb stops will use stainless steel stems to operate the valves. EMCO 17053, or an approved equivalent.

The following is a list of curb stop and main stop parts which have been approved for use by contractors.

MAIN STOP

All main stops consisting of or containing bronze or brass material must conform to AWWA C800-05 and ANSI/NSF61.

Main Stops shall be bronze and the same size as the new service line.

1 INCH MAIN STOP

Shall be Plug Style

Manufacturer	
Ford	Cambridge Brass
Part Number	Part Number
F1000-4-TW-Q	302-A4HE4

1 ½ and 2 INCH MAIN STOPS

Shall be Ball Style

	Manufacturer	
	Ford	Cambridge Brass
Size	Part Number	Part Number
1 ½ inch	FB1000-6-TW-Q	301-A6HE6
2 inch	FB1000-7-TW-Q	301-A7HE7

CURB STOP

All Curb stops consisting of or containing bronze or brass material must conform to AWWA C800-05 and ANSI/NSF61

Curb stops to be the same size as the new service line.

Ball - type valve only.

All curb stops on the open end must be protected with the use of a plastic cap or plug.

	Manufacturer	
	Ford	Cambridge Brass
Size	Part Number	Part Number
1 inch	B44-444-TW-Q	202-H4HE4
1 ½ inch	B44-666-TW-Q	202-H6HE6
2 inch	B44-777-TW-Q	202-H7HE7

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**SPSCI-7**

**Item 2.4**

**SPCD-D2**

**WATER VALVES, TAPPING VALVES & VALVE BOXES**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

City will supply all Pratt Butterfly valves, contractor to pick up at City yard. All gate and air valves and appurtenances to be supplied by contractor.

All pipe sizing and material at tapping valves are to be field verified by the contractor prior to commencement of installation.

The unit price tendered for valve boxes is to include the cost to supply and install approved zinc anodes. (24lb anode on watermain fittings is required.)

All fitting types are specified on the Contract Drawings, where a type has not been specified it is assumed to use mechanical joint fitting.

All flanged valves shall have flanges as specified for the line into which they are to be installed. As a minimum standard a Class 125 rating will be required.

Air release valves are to be automatic float valves designed to exhaust large quantities of air during the filling of the system and allow air to enter during the draining of the system.

The unit rate shall include the careful removal and delivery to the City Yard at 11 King Street, of valves #28, 26 & 23 only.

**VALVE CHAMBERS**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

All valve chambers are to be supplied by the City.

Materials and installation shall be in accordance with all applicable O.P.S.S.'s and O.P.S.D's.

The unit price for each item shall include for the excavation and removal of the existing item or installation of a new item in each case, as shown on the Contract Drawings.



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Item removals where no replacement is required are priced separately in the Schedule of Quantities.

All precast chambers must be watertight. Waterproofing of chambers is to be included in the unit rate. Waterproofing type must be approved by the Contract Administrator prior to application to the chamber. Any and all leaks shall be repaired by the Contractor at no additional cost to the Owner.

All parging required for the chambers is to be included in the unit rate.

Valve box locations in chambers to be cored after installation of valve to ensure stem is vertical and plumb. Valve boxes to be sealed and made watertight. Valve operator in accordance with OPSD 1101.020. To be marked *WATER*.

Frame and cover shall be in accordance with OPSD 402.030, install a "Rainstopper" inflow dish under all covers (or equivalent).

Payment shall be full compensation for all equipment, labour and materials required to do the work.

**SPSCI-8      Item 2.5  
SPCD-D3  
HYDRANT SETS**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

The unit price for installing new hydrants shall include the secondary valve and all required fittings and materials and shall be complete of connecting the hydrant to the new main using a 150 mm diameter PVC watermain, Class 150, DR 18 pipe lead. The hydrant lead will be paid under the unit price for item 2.1.

The following is a list of hydrant specifications which have been approved for use by contractors.

Hydrant Sets:

Hydrants shall be either:

- 1) Darling Century
- 2) McAvity M-67-B: (Brigadier)
- 3) American AVK (2708)

Hydrant Specifications:

Shall be manufactured in accordance with AWWA Standard C502.

Dry barrel

Compression Type

Traffic model, complete with safety flanges and stem couplings

Base to Bottom flange (grade 304 Stainless Steel) bolts and nuts

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All Hydrant drains: plugged  
Hydrant opens: left  
Operating Nut Shape: (Square)  
Operating Nut Size: (1 ¼ inch)  
Cap Chains: None  
Colour: Chrome yellow  
Depth of bury: 1.8m (6 Ft)  
Inlet Connection: shall be 6 inch (MJ) Mechanical Joint  
Boot: to be epoxy coated internally and externally.  
Dry Barrel: shall be epoxy coated in compliance with AWWA Standard C502

Nozzle Configuration

Two 64mm / 2 1/2 inch hose outlets with CSA threads  
One 100mm / 4 inch STORZ pumper outlet complete with cap (cap painted black)

Finish grade at hydrants: not less than 4 inch and no more than 6 inch below the ground line / traffic flange.

Where hydrants do not conform to the finished grade the proper length extension will be installed either at the drain ring flange before backfilling or the ground line flange with the proper rod extension. Extensions must be installed in strict accordance to manufacturer's specification.

Should the hydrant require a shorter barrel due to a necessary grade change in the main the proper length barrel will be installed before backfilling the hydrant trench.

All hydrants shall be bagged with a hydrant bag when not in service.

The unit rate shall include the careful removal and delivery to the City Yard at 11 King Street, of all existing hydrants that are being replaced by new hydrants under this contract.

All hydrant sets shall have installed any approved zinc anodes. The anode will be paid as a separate item for hydrant sets only. (24lb anodes on hydrant sets are required.)

**SPSCI-9      Item 2.6**  
**SPCD-D10**  
**CATHODIC PROTECTION**

The conditions stipulated in the Niagara Peninsula Standard Contract Documents shall apply to this item.

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**SPSCI-10    Item 2.7**  
**SPCD-D11**  
**ABANDONMENT & REMOVAL OF WATERMAINS &**  
**APPURTENANCES**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

This item is also to include removal of any surplus material as per Special Provisions General (I) in order to carry out the following works.

All hydrants not specified as being either salvaged or reused by the City shall be disposed of by the contractor.

Removal of all existing 400mm CI watermain shall be paid as a separate item. All reinstatements shall be paid under the appropriate unit rates.

The unit price bid for all abandonment & removals of watermains and appurtenances shall include saw cutting of the asphalt pavement prior to the excavation of the trench. If the existing asphalt is undermined by the trench excavation saw cutting shall be repeated prior to the asphalt reinstatement of the trench at no additional cost to the City.

Payment shall be full compensation for all equipment, labour and materials required to do the work. Payment shall be made by as specified in the contract documents, or as directed by the Contract Administrator.

**SPSCI-11    Item 2.8**  
**SPCD-D13**  
**WATERMAIN DISINFECTION & TESTING**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

The provisions of OPSS 701 and AWWA C651-05 shall also apply except as amended or extended herein.

The Contractor must provide 24 hour notice of when tests will be made.

All methods used for any testing must be outlined to the Contract Administrator and approved prior to the Contractor starting any testing.

The new main or service shall be kept isolated from the active Distribution System by means of a gate valve that can only be operated by a Certified

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City/Region Operator and can only be left in the open position when water is being discharged by means of hydrants or a blow-off at the end of the new main or service. The gate valve must be kept closed at all times when water is not being discharged from the new main or service prior to being commissioned. For security purposes, the gate valve must be provided with a lock device to prevent unauthorized personnel from opening the gate valve to prevent cross contamination to the active Distribution System.

The Contractor must perform all swabbing, flushing, hydrostatic testing, and disinfection of the new watermain, under the direct supervision of the Contract Administrator and/or a Certified Operator.

All sections of watermain shall be wet swabbed, using a minimum of 4 (four) new foam swabs. Swabs shall be polyurethane with a density of 24.7kg/m<sup>3</sup> and shall have a minimum diameter 50mm larger than the diameter of the watermain, and have a minimum length of 1½ times its diameter. Swabs shall be propelled through the watermain using potable water. The swabbing shall continue until discharge water runs clear within ten seconds of the last swab exiting the discharge point. The Contractor shall ensure that water is discharged to an approved outlet ensuring all required erosion and sediment control and de-chlorination measures are followed.

The Contractor is responsible for supplying and installing all fittings and taps for introducing the swabs, filling the main, pressure testing and chlorination. The Contractor is responsible for removing the fittings and taps at completion.

The Contractor shall be liable for the cost associated with damage caused by and retrieving swabs that, for whatever reason, escape into the existing water distribution system. The Contractor shall co-sign the form provided by the Contract Administrator that all swabs were retrieved.

Water required for initial swabbing, filling, pressure testing, chlorination and flushing of the new mains will be provided at no cost to the Contractor. If additional water is required as a result of failure of the initial procedures to provide acceptable results, the additional cost will be charged to the Contractor at the prevailing bulk water charge rate.

The Contractor must furnish all required materials, equipment and labour necessary for completing the tests, which is to be included in the unit rate of this item.

The new main or service shall be kept isolated from the active Distribution System using a physical separation as illustrated per AWWA Standards C651-05 Disinfecting Watermains. The temporary connection between the Distribution System (Hydrant) and the new main or service shall include a cross connection control device (backflow preventer) and shall be disconnected, physically

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separated from the new main during the hydrostatic pressure test and during the disinfection process.

To disinfect the watermain, disinfection shall be carried out in accordance with AWWA C651-05. The free chlorine concentration at any point in the piping shall not exceed 100mg/L. Once the appropriate free chlorine level has been achieved, the piping shall be left charged with the chlorine for a 24 hour period, during which time new valves and hydrants in the treated section shall be operated to ensure disinfection of the appurtenances. At the end of the 24 hour period, the treated water in all portions of the main shall have a residual of not less than 10 mg/L of free chlorine.

Once it has been verified that at least 10mg/L of free chlorine remains in the watermain after 24 hours, flush the treated, super-chlorinated water from the main, with water from the existing distribution system until the free chlorine levels are similar to those found in the distribution system (approx. 0.20mg/L). Water exiting the main, must be de-chlorinated prior to release to the sanitary sewer, using an approved de-chlorination method, to meet the current Ministry of Environment criteria is a free chlorine residual level. The Contract Administrator will monitor the free chlorine in the discharge of wastewater. Should tests show total chlorine residuals greater than allowable levels, the discharge shall be ceased immediately and the neutralization procedure modified to reduce the residual to a level less than the allowable maximum value. If the Contractor plans to discharge the flushing operation into the sanitary sewer system, a minimum of 1 working day notice shall be given to the receiving wastewater treatment plant.

Once the system has been flushed and free chlorine levels are similar to the distribution system are achieved, the water is held for another 24 hours prior to beginning bacteriological testing.

Sample points are to be installed in the new main to ensure a maximum separation of 350 metres between sample points. Water services may be used in lieu of separate sample points, subject to Contract Administrator approval. Fire hydrants shall not be used as sample points.

Sample points not located in chambers are to be installed by tapping the watermain utilizing approved service saddles and main stops. The Contractor shall install sufficient water service pipe to allow sampling of the watermain from the surface.

Upon successful completion of the disinfection and bacteriological testing, the Contractor shall properly abandon all sample points by shutting off the main stop and cutting and capping the copper pipe.

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At each sampling location, the water must satisfy the bacteriological requirements as summarized below:

<b>Membrane Filtration</b>			
Total Coliforms	E.Coli	Background	Heterotrophic Plate Count (HPC)
0	0	0	0

Bacteriological samples must be taken as outlined on the sampling plan. All sampling and handling shall be as per Safe Drinking Water Act, Ontario Regulation 170/03.

Certified City/Region Operators will take chlorine residual and bacteriological samples as per AWWA C651-05. It will be the Contractor's responsibility to provide the Contract Administrator with sufficient notification when arranging for testing to be conducted by the Certified Operator.

All bacteriological samples for analysis shall be submitted to a testing laboratory approved by the City, and shall be accompanied with the appropriate paper work required by the lab. The laboratory shall be contacted by City staff at least 24 hours in advance of the sampling submission.

The Municipality will absorb analytical fees and costs associated with gathering samples for the initial sampling rounds. The Contractor will be responsible for fees related to additional samples submitted due to failed results, plus any costs associated with providing additional water.

The City will review the results of the laboratory testing and shall inform the Contract Administrator of the results who in turn will notify the Contractor. The City shall approve all sampling results prior to the new watermain being connected to the existing system.

The commissioning of the new watermain and services will be determined through microbiological water sample test results from both the new watermain and from the existing watermain that was utilized to charge the new watermain. Sampling of the existing main is to be conducted during the process of charging the new main.

The Contractor is advised that the Contract Administrator has the authority to request a third round of water samples for bacteriological analysis after the final connection has been made to the existing water distribution system to confirm continued quality of the water. In the event that adverse water samples occur, the City will direct the Contractor to take corrective action. The Contractor shall cooperate and participate fully in the corrective actions.

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Measurement for payment will be lump sum.

Payment shall be full compensation for all equipment, labour and material necessary to provide the required sample locations including installation and removal of any temporary equipment.

**SPSCI-12    Item 2.9**  
**SPCD-D12**  
**TEMPORARY WATER SUPPLIES**

In addition to all applicable conditions stipulated in the Niagara Peninsula Standard Contract Document, as illustrated in the contract documents, the following shall also apply.

Temporary water supply lines shall be chlorinated with a 100ppm chlorine solution, similar to the requirements of item 2.8, for a minimum of 24 hours and then flushed to meet existing chlorine levels in City supply. Prior to placing the temporary lines into service, certified City/Region Operators must sample these temporary lines. The Contractor shall give the Contract Administrator 2 days notice for sampling activities and will not put the lines into service until advised to do so by the Contract Administrator.

Limits of the temporary services will be given to the contractor at the pre-construction meeting.

**SPSCI-13    Item 2.10**  
**SPCD-D9**  
**INSULATION OF SERVICES AND WATERMAINS**

In addition all applicable conditions stipulated in the Niagara Peninsula Standard Contract Document, as illustrated in the contract documents, the following shall also apply.

The unit price bid for this item shall include the insulation of the watermain on King Street, as shown on the Contract drawings, or as directed by the Contract Administrator.

Where the minimum 1.5 metres of cover cannot be obtained, the contractor shall provide sufficient insulation to prevent freezing of the specified water main.

The width and thickness of insulation used shall be as follows:

- Depth of Cover (m) - 1.3m – 1.45m
- Width of insulation (m) - 1.2m
- Thickness of insulation (mm) - 50mm



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The insulation material shall be styrofoam HI 40 as manufactured by the Dow Chemical Company or approved equal. The material shall be rigid type high density board with minimum compressive strength of 240kPa as tested in accordance with ASTM D1621-64 or latest revision thereof, and manufactured by the extrusion of expanded polystyrene to produce a board with a maximum water absorption of 0.7% by volume when tested in accordance with ASTM D2842. When installed underground, the insulation shall be protected on both faces by a layer of 6mm plywood, unless installed against a formed surface.

The quantity of insulation to be paid for will be the number of square metres based on field measurements.

Payment shall be full compensation for all equipment, labour and materials required to do the work.

**SPSCI-14 Item 2.11**

**CAPPING OF WATERMANS ON LINES TO REMAIN IN SERVICE**

In addition all applicable conditions stipulated in the Niagara Peninsula Standard Contract Document, as illustrated in the contract documents, the following shall also apply.

The unit price for this item shall include the capping of existing watermains to remain in service upon completion of installation of the new watermain.

Payment shall be full compensation for all equipment, labour and materials required to do the work. The quantity to be paid for each location as specified on the contract drawings, or as directed by the Contract Administrator.

**SPSCI-15 Item 2.12**

**SPCD-G28  
WATERMAIN CONNECTIONS**

In addition all applicable conditions stipulated in the Niagara Peninsula Standard Contract Document, as illustrated in the contract documents, the following shall also apply.

This item is included to compensate the contractor for any night work required for these particular installations only. These installations **must** be done during the night hours. The installations which will require the Contractor to work at night are as follows:

- 1) The connection of the new 500mm PVC watermain to the existing 300mm & 400mm Cast Iron watermains at Sugarloaf and Catharine Streets.



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2) The disconnection and capping of the existing 400mm water service for the water tower from the 400mm Cast Iron main on King Street.

This item will only be paid out if the contractor completes the installation during the night hours (7:00pm-7:00am). This item is **not** to include the cost of any material or labour etc, as these items will be paid for under their appropriate unit rates.

It will be the contractor's responsibility to distribute notice to all of the necessary parties which may be affected by any of the work, a minimum of **48 hours** notice must be given before any work is to take place. The Niagara Region requires **72 hours** notice before any of their distribution valves may be affected for water isolation.

**SPSCI-16 Item 2.13**

**SPECIAL CONNECTION – CLARENCE STREET**

In addition all applicable conditions stipulated in the Niagara Peninsula Standard Contract Document, as illustrated in the contract documents, the following shall also apply.

This item is included to compensate the contractor for the special equipment and parts required to do the connection to the 600mm Hyprescon pipe at the intersection of Clarence and Catharine Street.

It will be the contractor's responsibility to contact the manufacturer of their choosing to ascertain the method used for re-connection to the existing Hyprescon pipe. Shop drawings must be provided to the Contract Administrator for approval prior to commencement of connection.

The contractor shall field verify the size and class of concrete pressure pipe prior to commencement of construction.

It will be the contractor's responsibility to distribute notice to all of the necessary parties which may be affected by any of the work, a minimum of **48 hours** notice must be given before any work is to take place. The Niagara Region requires **72 hours** notice before any of their distribution valves may be affected for water isolation.

Should the road require multiple days of closure the contractor shall provide 10 days notice to the Contract Administrator, so that the public can be notified of the upcoming road closure.

Payment shall be full compensation for all equipment, labour and material necessary to do the work.

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**SPECIAL PROVISIONS - SUPPLEMENTARY CONTRACT ITEMS  
SECTION 3 - STORM SEWER REPLACEMENT**

**SPSCI-17    Item 3.1 & 3.3  
                  SPCD-C1, SPCD-C2 & SPCD-C5  
                  STORM & SANITARY SEWERS**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

The unit price bid for all storm sewers and storm lateral installation shall include saw cutting of the asphalt pavement prior to the excavation of the trench. If the existing asphalt is undermined by the trench excavation saw cutting shall be repeated prior to the asphalt reinstatement of the trench at no additional cost to the City. Including all connections to existing and new manholes and catch basins.

Storm sewer mains, leads and laterals shall consist of Ring-Tite PVC, DR35, and Concrete Class 50D as indicated on the Contract Drawings. Storm sewer pipe conforming to CSA B182.2 and OPSS 1841 and OPSD 806.040, and any other applicable specifications, all as detailed in the Schedule of Quantities and the Contract Drawings. Catch basin leads shall be 300 mm in diameter Ring-Tite PVC, DR35 unless otherwise specified. Sanitary sewer laterals shall be 100mm PVC, SDR 28 unless otherwise specified.

Pipes shall be supplied complete with all required prefabricated fittings to complete the storm sewer installation in its entirety.

The unit price bid shall also include the removal of all abandoned, or to be abandoned underground services/pipes (of any material) in conflict with the new alignment of the sewer.

Reinstatement costs have been provided for in the Form of Tender.

Included in the price of storm sewer shall be to flush and CCTV all installed sewers prior to the City taking ownership of the work.

Payment shall be full compensation for all equipment, labour and materials required to do the work. Payment shall be made by the lineal meter for each pipe size as specified on the contract drawings, or as directed by the Contract Administrator.

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**SPSCI-18a Item 3.2**  
**SPCD-C6**

**PRE-CAST MANHOLES & CATCH BASINS**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

Materials and installation shall be in accordance with all applicable O.P.S.S.'s and O.P.S.D's.

The unit price for each item shall include for the excavation and removal of the existing item or installation of a new item in each case, as shown on the Contract Drawings.

Item removals where no replacement is required are priced separately in the Schedule of Quantities.

Connections to all storm manholes and catch basins are to be purged with non-shrink grout inside and outside. If manholes are pre-benched, the cavity between the pipe shall be filled and purged flush with the manhole walls. In addition, all manhole rings and risers shall be purged with non-shrink grout inside and outside.

Payment shall be full compensation for all equipment, labour and materials required to do the work.

**SPSCI-18b Item 3.4**  
**SANITARY FORCEMAIN**

The existing forcemain on Charlotte Street crossing Catharine Street is a 250mm dia. cast iron forcemain. Since there will be significant construction activity in this area, it is considered expedient to replace 20m of this pipe with 300mm dia. DR-11 HDPE across the intersection. The price bid for item 3.4 includes excavation, bedding, backfill, supply of pipe, fittings and closure piece with dresser coupling and locating new pipe at an elevation that will allow the installation of the new 500mm dia. Watermain.

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**SPECIAL PROVISIONS - SUPPLEMENTARY CONTRACT ITEMS  
SECTION 4 - RESTORATION**

**SPSCI-19    Item 4.1  
              SPCD-B3  
              GRANULAR 'A'**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

This item is to include material for bedding, cover and backfill of all items for the water distribution system and storm sewer system. Also included in this item are trench backfill under the travelled portion of road, shoulders, sidewalks and driveways all of which shall be Granular 'A' compacted to 100% Standard Proctor Density and placed at a depth as specified in the contract documents, drawings, or as directed by the Contract Administrator. Select native material will be allowed for all other areas and shall be compacted to 95% Standard Proctor Density.

Backfill around all maintenance holes and catch basins shall be Granular 'A' compacted in 300mm lifts to 100% Standard Proctor Density. Trenching, backfilling and compacting shall also be in accordance with OPSS 514. Regarding payment for all compaction testing, Section G9 of the Niagara Peninsula Standard Contract Document shall apply.

Tenderers shall note that payment for all granular backfill materials shall be by the tonne. To control granular costs, the Contract Administrator will be strictly controlling the vertical trench requirement. Granular materials shall be subject to OPSS 314, Construction Specification and Material Specification OPSS 1010. The unit prices tendered for granular materials shall include the supply, haul, placement, grading and compaction to 100% Standard Proctor Density.

The unit price bid per tonne shall include the supply, placing grading and compaction of all Granular 'A' stone required to complete all contract items and all restoration work. Materials and workmanship shall comply to OPSS 314, and 1010.

The contractor will be responsible for maintaining the granular until the restoration work is carried out.

No roadway granular is to be placed until the subgrade elevation has been checked. Payment for all material quantities shall be determined by net weight as recorded by a Government certified weigh scale. The supplier will be responsible for supplying suitable scales for all weighed materials. Triplicate numbered weigh bills shall be provided by the representative for each load of material as soon as delivery has been accepted. Tenders shall note that weigh

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bills for granular materials will only be accepted for payment when delivery is made in the presence of a city inspector. The onus shall be on the supplier to ensure that the Engineer's representative is furnished with all delivery slips and these will form the method of measurement. No payment will be made for delivery slips not signed by the Engineer's representative.

The contractor shall note that any organics shown in the soils report in the watermain trench are to be removed. All over excavation has been compensated for in the Granular Quantity.

**SPSCI-20    Item 4.2**  
**SPCD-B2**  
**REMOVALS**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

OPSS 510 applies to this item.

The unit price bid for these items shall include sawcutting, excavation, separation of material, backfilling with Granular 'A' and reinstating to existing conditions all areas of removals unless the applicable items are included in the schedule of quantities. Thickness of concrete and asphalt will vary. No additional compensation will be made for the various depths of asphalt or concrete.

The paved and concrete road deck on Clarence Street is to be included as one item, there will be no compensation for removal of asphalt and concrete as separate items should the contractor choose to do so in such a manner.

This item is also to include removal of any surplus material as per Special Provisions General (I) in order to carry out the following works.

All limits of removals will be given to the contractor at the pre-construction meeting, or on site with direction from the City's representative.

**SPSCI-21    Item 4.3**  
**SPCD-B11**  
**ASPHALT MILLING**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

Disposal of asphalt millings shall be the property of the City of Port Colborne, and shall be disposed of at the specified site. See Special Provisions – General (I)

The depth of milling is to be 50mm across the entire roadway area unless

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otherwise directed. The area will be marked out prior to any milling taking place by the City's representative.

For step joints, the asphalt milled area should be for a width of 300mm from asphalt removal area to provide a step joint meeting OPSD 509.010 requirements, at specific locations.

Further to this item, no road surfaces shall be left milled for not more than five working days prior to asphalt placement.

Payments will be made based on actual field measurements by the City's representative.

Please see Special Provisions General (r) for further information.

**SPSCI-22    Item 4.4**  
**SPCD-B14 & SPCD B15**  
**HOT-MIX ASPHALT FOR ROADS & DRIVEWAYS**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

All limits of the base asphalt will be given to the contractor at the pre-construction meeting, or on site with direction from the City's representative.

Upon completion of the milled areas base asphalt specified as HL8 HS shall be placed in all trenches for restoration of the roadway. 140 & 90 millimetres of base asphalt are to be placed in the roadway trench to match existing roadway (see Schedule of Quantities for locations of various asphalt thicknesses). All asphalt items will be paid for under their appropriate unit rates listed in the Form of Tender.

After placement and compaction of asphalt, the Contractor shall ensure that all structure covers and grates are free of asphalt and can open with minimal effort.

The unit price bid for this item shall be complete compensation for asphalt restoration for all driveways, aprons, approaches or walkways and will be top asphalt specified as HL3A.

The rate shall cover and include saw cutting of the pavement prior to the trench excavation and again, if required, prior to the asphalt reinstatements.

No extra payment will be made for any hand work involved in spreading compacting the hot-mix asphalt around radius, intersections, trench areas or between the existing asphalt and new gutters, curbs.

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All Granular 'A' required for driveway placement will be paid for under the appropriate unit rate, under item 4.1.

Please see Special Provisions General (r) for further information.

**SPSCI-23    Item 4.5**  
**SPCD-B17**  
**INTERLOCKING PAVING STONE**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

All Granular 'A' required for the interlocking paving will be paid for under the appropriate unit rate, under item 4.1.

Please see Special Provisions General (r) for further information.

**SPSCI-24    Item 4.6**  
**SPCD-B16, SPCD-B8**  
**CONCRETE SIDEWALKS, HOUSE WALKS, DRIVEWAYS & CURBS**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

The contractor shall take due precaution to protect the finished surface of freshly placed concrete from being damaged, marred or defaced. In the event that the freshly placed concrete is damaged, marred or defaced, or any way in which the City's representative finds the work unsatisfactory, the contractor shall replace these sections at their expense. All saw-cutting for concrete works is to be included in the unit rate for each item.

The unit prices bid shall include any additional excavation, sub-grade, forming, pouring, finishing and curing of 30MPa concrete.

Sidewalk thicknesses are 150mm at driveway entrances and 100mm on all others.

House walks and driveways will be constructed to match existing depths and grades.

Commercial driveways shall be 150mm thick and also include reinforcing.

The unit price bid shall also include sidewalk barrier-free ramp installation at all areas to be designated by the City's representative, and shall comply with OPSD 310.03.

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All work is to be completed in compliance with OPSS 351 and any applicable standard drawings.

Concrete curbs are conform with OPSD 600.030 & OPSD 600.040.

All areas of concrete placement will be given to the contractor on site with direction from the City's representative.

The quantity shall be paid per unit price bid per square metre of concrete sidewalk, per lineal metre of concrete curb.

All Granular 'A' required will be paid for under the appropriate unit rate in item 4.1.

Please see Special Provisions General (r) for further information.

**SPSCI-25    Item 4.7**  
**COLD MIX ASPHALT**

In addition all applicable conditions stipulated in the Niagara Peninsula Standard Contract Document, as illustrated in the contract documents, the following shall also apply.

This item is intended as a provisional item only, and should this item not be required no penalty for non-usage shall be applicable.

The unit price bid shall include all work, materials and equipment required to install the cold mix asphalt in the winter, and its removal in the Spring, prior to concrete reinstatement.

All areas of placement will be given to the contractor on site with direction from the City's representative.

**SPSCI-26    Item 4.8**  
**SPCD-B21**  
**TOPSOIL & SODDING**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

The unit price bid shall include all work required to ensure growth within the one year maintenance period.

Please see Special Provisions General (r) for further information.



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**SPSCI-27 Item 4.9**

**ROCK EXCAVATION BY HOE RAMMING**

In addition to the conditions stipulated in the Niagara Peninsula Standard Documents and OPSS 515 and 514, the following shall also apply.

Blasting **will not** be permitted.

Tenderers are advised that the quantities listed for this item on the Form of Tender are estimated and quantities can not be guaranteed. Data has been interpolated from previous works of the location being Tendered. All approximate rock elevations are shown on the drawings. The rock trench is to comply with the Detail in the Tender Drawings.

Excavated rock material **will** be allowed to be used for trench backfill above the pipe cover material 300mm above the pipe obvert, provided that the maximum size does not exceed 150mm in any direction and is approved prior to use by the City's representative.

The City **will not** consider claims for any variance in rock excavation quantities. Payments will be made based on actual field measurements by the City's representative. Compensation **will not** be considered for over breakage.

**SPSCI-28 Item 4.10**

**SPCD-B3**

**GRANULAR 'M' SHOULDERING**

In addition to the conditions stipulated in the Niagara Peninsula Standard Contract Document, the following shall also apply.

This item is to include material for granular shouldering, all of which shall be Granular 'M' compacted and placed at a depth of 150mm and a width of 300mm, or as directed by the City's representative.

All restoration work, materials and workmanship shall comply with OPSS 314, and OPSS 1010.

Payment for all material quantities shall be determined by net weight as recorded by a Government certified weigh scale. The supplier will be responsible for supplying suitable scales for all weighed materials. Triplicate numbered weigh bills shall be provided by the representative for each load of material as soon as delivery has been accepted. Tenders shall note that weigh bills for granular materials will only be accepted for payment when delivery is made in the presence of a city inspector. The onus shall be on the supplier to ensure that the Engineer's representative is furnished with all delivery slips and these will form

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the method of measurement. No payment will be made for delivery slips not signed by the Engineer's representative.

The quantity of shouldering to be paid for will be by the tonne based on weigh scale delivery slips.

Payment shall be full compensation for all equipment, labour and materials required to do the work.

**SPSCI-29    Item 4.11**  
**SPCD-B24**  
**APPLICATION OF WATER FOR DUST CONTROL**

The conditions stipulated in the Niagara Peninsula Standard Contract Documents shall apply to this item.

**SPSCI-30    Item 4.12**  
**SPCD-B13**  
**ADJUSTMENT OF EXISTING APPURTENANCES**

In addition to the conditions stipulated in the Niagara Peninsula Standard Documents, the following shall also apply.

Payment for this item shall be at the unit price bid in the Form of Tender for existing manholes, catch basins, and valve boxes and include all items in the Basis of Payment as specified in OPSS 408.

**SPSCI-31    Item 4.13**  
**LINE PAINTING**

In addition all applicable conditions stipulated in the Niagara Peninsula Standard Contract Document, as illustrated in the contract documents, the following shall also apply.

Pavement marking shall comply to the Manual of Uniform Traffic Control Devices as well as OPSS 532 and Municipal Standards. Pavement markings shall be installed as indicated by the City's Representative. Paint used shall be yellow and white organic solvent based, non -coning high temperature traffic paint, or approved equivalent.

As indicated in the form of tender items shall conform to the Ontario Traffic Manual - Book 11.

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**GEOTECHNICAL REPORT**

(See Attached)

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**Contract No.:2009-14**

**Title: Catharine Street – Large Diameter Watermain Replacement**

**APPENDIX “A”**

(See Attached)

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## **GEOTECHNICAL INVESTIGATION REPORT**

**PROPOSED MUNICIPAL SERVICES INSTALLATION  
AREA 1 - CATHARINE STREET, KING STREET  
AND SUGARLOAF STREET  
CITY OF PORT COLBORNE , ONTARIO**

**Submitted To:  
The City of Port Colborne  
66 Charlotte Street  
Port Colborne, Ontario  
L3K 3C8  
Attention: Stephanie Hussey**

**May 2009  
File: TG93012**

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## APPENDICES

### APPENDIX 'A'

- Figure 1: Site Location Plan
- Figure 2a to 2b: Borehole Location Plan
- General Report Notes
- Record of Borehole Logs

## 1.0 AUTHORITY

Authorization to proceed with this investigation was received from Stephanie Hussey, of the City of Colborne, in a confirmation letter with Purchase Order (PO#) 037249, dated March 25, 2009.

## 2.0 INTRODUCTION

AMEC Earth & Environmental, a division of AMEC Americas Limited ('AMEC'), has carried out a geotechnical investigation for the installation of municipal services on 'Area 1' which consist of the following roadways in the City of Port Colborne, Ontario:

- Catharine Street – between Clarence Street and Sugarloaf Street
- King Street – between Sugarloaf Street and 11 King Street
- Sugarloaf Street – between King Street and Steele Street

The site location is indicated on Figure 1 in Appendix A.

### 2.1 Site and Project Description

It is understood that the project consists of the installation of municipal services. The depths of the municipal services and method(s) of installation are not known at the time of the writing of this report.

This geotechnical investigation has been carried out to provide information on the existing pavement structure, subsurface materials and groundwater conditions, and to provide geotechnical engineering recommendations pertaining to subgrade preparation, soil foundation bearing value for pipe installation, dewatering procedures, trench shoring, and temporary slope stability during construction.

### 2.2 Background Data

Quaternary Geology of the Welland Area, prepared by the Ontario Division of Mines, Preliminary Map P. 796, describes the surficial soils in the area of the investigation as: Glaciolacustrine clay & silt, minor sand underlain by limestone, minor dolostone, sandstone and shale of the Bois Blanc Formation.

Previous works by AMEC in the vicinity of the above project indicate that the general subsurface conditions would consist of fill, over native silty clay, over silt till at depth. In the vicinity of King Street and Charlotte Street, peaty soil was encountered overlying native silty clay.

### 2.3 Terms of Reference

This report was written and prepared based on the assumption that the design will be in accordance with all applicable standards and codes, regulations of authorities having jurisdiction, and good engineering practices. The findings of the investigation, such as details of the work performed and soil encountered, together with the design and construction recommendations of the investigation are presented in this report.

The comments and recommendations AMEC have expressed about any of the construction methods are not intended to direct contractors on how to carry out the construction, but are AMEC's opinions only. Contractors

should also be aware that the all of the interpreted data presented in this report are applicable to this proposed project only.

An ongoing liaison with AMEC must be maintained during both the design and construction phases of the project. This is to ensure that the recommendations in this report have been correctly interpreted. If there is any further clarification and/or discrepancies of the geotechnical aspects of this project, AMEC should be contacted immediately.

### 3.0 GEOTECHNICAL/ PAVEMENT INVESTIGATION AND SOIL DATA

The investigation was carried out at the site by means of sampled boreholes.

#### 3.1 Field Work

The fieldwork for this investigation was carried out on April 16<sup>th</sup> and 17<sup>th</sup>, 2009. It consisted of a total of thirteen (13) machine-drilled boreholes, as indicated on the Borehole Location Plan (Figures 2a to 2b).

The number of boreholes, their approximate locations and depths were provided by the City of Port Colborne as summarized in the table below.

Street	BH/Core	Specified Depth
Catharine Street	BH 1	5.0 m or refusal
	BH 2	7.0 m or refusal
	BH 3	5.0 m or refusal
	BH-4	5.0 m or refusal
	BH-5	5.0 m or refusal
	BH-6	5.0 m or refusal
King Street	BH-7	3.0 m or refusal
	BH-8	3.0 m or refusal
Sugarloaf Street	BH-9	3.0 m or refusal
	BH-10	3.0 m or refusal
	BH-11	3.0 m or refusal
	BH-12	3.0 m or refusal
	BH-13	3.0 m or refusal

AMEC personnel located and marked the borehole locations in the field. Prior to the drilling operation, underground service clearances were completed by the appropriate public utility service companies. The boreholes were put down using a truck-mounted drilling rig equipped with 150 mm solid stem augers. Samples were recovered by driving a standard split spoon sampling device in accordance with the requirements of the Standard Penetration Resistance Test.

Upon completion, all of the recovered samples were examined and placed in appropriate sealed containers for return to our laboratory for further examination and physical testing. The fieldwork was supervised and carried out by experienced AMEC personnel. Preliminary sample identification and borehole logs were also performed on site.



The groundwater conditions in each borehole were monitored during the advancement, and upon completion of the drilling procedure.

Upon completion each of the boreholes was backfilled with auger cuttings and bentonite.

### 3.2 Physical Laboratory Work

The split spoon samples were returned to our laboratory for visual examination and classification. The following analysis was performed:

- Moisture content determination on each sample.

All soil samples will be stored for 3 months upon the completion of this report. The samples will then be discarded unless AMEC is instructed otherwise.

## 4.0 SUBSURFACE CONDITIONS

For detailed descriptions of the soils and groundwater conditions that were encountered, reference should be made to the Record of Borehole Logs in *Appendix A*.

Boreholes 1 through to 13, with the exception of Borehole 5, were put down through the existing paved surface along Catharine Street, King Street and Sugarloaf Street. Borehole 5 was put down through the existing granular shoulder due to the presence of underground utilities below the original location on the paved surface.

The borehole locations are indicated on Figures 2a to 2b in Appendix A.

### Pavement Structure

Approximately 80 to 230 mm of Asphalt was encountered in all of the boreholes with the exception of Borehole 5, underlain by 50 mm to 1.2 of Granular base. Approximately 180 mm of Granular base was encountered in Borehole 5 located at the existing granular shoulder. The granular is believed to be a crushed limestone product mixed with sand.

### Fill

Underlying the pavement structure, Grey Silty Clay Fill and dark brown Silt / Sand Fill was encountered in Boreholes 2 and 8, respectively, which extended to depths of 0.9 and 2.1 metres below grade.

The Silty Clay Fill was generally mottled and contained traces of fine gravel, while the Silt / Sand Fill contained traces of fine gravel and cinders. With an SPT 'N' value of 6 blows for 30 cm, the Silt / Sand Fill was loose with a moisture content of 5 %.

### Peat

Underlying the Fill in Borehole 2, and the pavement structure in Boreholes 1, 3, 4, 5 and 6, black Peat was encountered, which extended to depths between 0.9 and 2.1 metres below grade.

With SPT 'N' values of between 2 and 9, the Peat was very loose to loose. Natural moisture contents were

between 106 and 294 %

**Sand**

Underlying the pavement structure in Boreholes 7, 9, 10, 11, 12, and 13, and the Fill in Borehole 8, brown to light brown Sand was encountered. This layer extended to depths ranging from 1.6 metres below grade, to at least the maximum depth investigated in the boreholes (except for borehole 9 where it terminated at a depth of 3.2 metres).

With SPT 'N' values of between 2 and 32 blows for 30 cm, the Sand was very loose to dense. Natural moisture contents were between 2 and 38 %

**Silty Clay**

Underlying the Peat in Boreholes 1 through to 6, and the Sand in Boreholes 9 and 13, grey brown to brown Silty Clay was encountered. This layer extended to at least the maximum depth investigated in the boreholes, with the exception of Borehole 2, where it extended to 5.9 metres below grade.

The Silty Clay contained traces of fine gravel, medium gravel pieces, and grey fissures. With SPT 'N' values of between 6 and XXX blows for 30 cm, the Silty Clay was firm to hard. A single value of 50 blows for 15 cm was due to the sampler encountering bedrock. Natural moisture contents were between 8 and 42 %.

**Silty Sand & Gravel**

Underlying the Silty Clay in Borehole 2 brown Silty Sand and Gravel was encountered. This layer extended to at least the maximum depth investigated in the boreholes.

With an SPT 'N' value of 50 blows for 13 cm, the Silty Sand and Gravel was very dense with a natural moisture content of 8 %.

**Bedrock**

Refusal due to augering on assumed bedrock was encountered in Boreholes 4 and 6 on Catharine Street at depths of 2.7 and 3.1 metres, respectively. Assumed bedrock was also encountered at Borehole 2 at a depth of 6.7 metres below grade. Bedrock was not encountered in the rest of the boreholes.

**Groundwater Conditions**

The following groundwater conditions were recorded in the boreholes:

BH	Upon Completion	Notes
1	Dry and open to depth	-
2	Water level at 6.6 m± ; open	Saturated Silty Sand a& Gravel at 5.9 m±
3	Dry and open to depth	-
4	Dry and open to depth	-
5	Dry and open to depth	-
6	Dry and open to depth	-
7	Dry and open to depth	-
8	Caved to 2.7 m± ; Water level at 2.6 m±	Saturated Sand at 3.0 m±.
9	Dry and open to depth	-
10	Dry and open to depth	-
11	Dry and open to depth	-
12	Dry and open to depth	-

BH	Upon Completion	Notes
13	Dry and open to depth	-

## 5.0 DISCUSSIONS AND RECOMMENDATIONS

### 5.1 General

It is understood that the project consists of the installation of municipal services on 'Area 1' which consist of the following roadways in the City of Port Colborne, Ontario:

- Catharine Street – between Clarence Street and Sugarloaf Street
- King Street – between Sugarloaf Street and 11 King Street
- Sugarloaf Street – between King Street and Steele Street

Since the project is in its initial stages AMEC should be retained to review and revise the following recommendations (if necessary) during the detailed design stage of the project.

### 5.2 Founding Conditions

The native stiff to very hard Silty Clay and compact to dense Sand are considered to be competent subgrade materials, if they remain in their undisturbed states.

Ideally, in areas where loose / firm fills and peat are encountered at pipe invert level, they should be removed and replaced with suitably compacted, approved fill material. Otherwise, there is the possibility of settlement within the fills and peat. This could result in differential settlement between where the pipe rests on sound, native soil and where it rests on fills. This can result in damage to the pipe.

If it is proposed to place any new services on very loose to loose native Sand, AMEC recommends that the support characteristics of the founding material be evaluated in the field and in the laboratory if necessary. If it is proposed to leave existing fills below the new services at any location, as a minimum the excavation base should be surface compacted to 100% of the Standard Proctor Maximum Dry Density (ASTM D698).

An allowable soil bearing value of 100 kPa may be used for the design of the municipal services, as well as associated structures such as manholes.

All pipe bedding should comply with OPSD standards.

### 5.3 Service Installations & Groundwater during Construction

Provided groundwater conditions during construction are similar to those encountered during the investigation, no major groundwater problems are anticipated for the construction that is proposed. Although no specialized dewatering requirements are anticipated, water was encountered in Borehole 2 on Catharine Street and Borehole 8 on King Street.

In Borehole 2, water problems would arise for excavations deeper than approximately 5.9 metres below grade, otherwise water problems would unlikely be an issue.

As mentioned in Section 4.0, it was noted that the Sand in Borehole 8 was saturated with depth. The subsurface information suggests that a water table at between 2.5 and 3 metres may be encountered during the trench excavation. It is noted that the samples' N values drop very considerably at the water level. This could well imply some quicking of the sand at that level. If so, sophisticated dewatering may be required if the trench is to penetrate below that depth.

Testpits along the city streets are not practical. However, some allowance should be made in the contract documents to address potential problems (e.g. additional granular, trench instability), if significantly wetter conditions are encountered at the time of construction.

In general, it is recommended that services installations be carried out in relatively short sections, and that no section of trench remain open for an extended period of time. This will minimize the potential for trench side instability.

Surface water should be directed away from any open excavations.

Other than the groundwater considerations, no excavation problems through the native soils or granular fills are anticipated for the municipal services installations along the proposed alignments. However, below depths of 6.7 metres in Borehole 2, 2.7 metres in Borehole 4, and 3.1 metres in Borehole 6, conventional excavation equipment will probably not make any significant progress. Generally, the inability of the augers to penetrate the bedrock indicates that excavations will likely require the use of hoe-ramming. Significantly reduced excavation rates should be anticipated at these locations.

All excavations must comply with the Occupational Health & Safety Act and Regulations for Construction Projects ('Act'). Based on criteria outlined in the Act, all fills and the Sand should be considered to be Type 3 soils, and possibly degrading to Type 4 if the deposits are saturated. The firm Silty Clay is also considered to be Type 3 soils. The stiff to very stiff Silty Clay are considered to be Type 2 soils. The sides of any trench must be sloped as outlined in the Act.

In general, temporary trench slopes of 1 vertical to 1 horizontal are expected to remain stable through the native soils and fills. However, some cutting back may be required if excessively soft, loose or saturated soils are encountered.

No heavy construction equipment should be allowed to work near the edge of any excavation, nor should construction materials or excavated soils be stockpiled near the edges of the trenches.

If open-cut excavation is proposed for the installation of the municipal services, it may not be practical within the existing roadway. Vertically cut and braced excavations could also be used. The guidelines governing the installation of trench side support are outlined in the Act.

The use of a trench liner box would also be an appropriate construction method from the perspective of worker safety. However, this technique does not provide for a tight soil support and consequently, some caving of the vertically cut excavation sides should be anticipated from beneath the edges of the pavement, which will increase pavement restoration costs. However, if total road reconstruction is proposed, this may not be significant.

The trench box is normally pulled ahead into the next section of excavation, after the pipe and bedding have

been placed. The trench box may have to be lifted out and around existing services, at various points along the alignment.

#### **5.4 Bedding and Trench Backfill**

All pipe bedding should comply with Ontario Provincial Standards Document standards. It is sometimes attempted to use clearstone below the pipe in order to make the placement of the pipe easier. Under no circumstances should clearstone be used as pipe bedding or cover, or as trench backfill, where the surrounding soil comprise fine grained granular soils such as silt or sand. Otherwise, there is the potential for the fine grained soils to be washed into the void spaces in the clearstone, resulting in lost ground.

Trench backfill should be well compacted to reduce post construction settlement and potential settlement of the overlying pavement, curb or sidewalk. Backfill in these load-supporting areas should be compacted to 95% of Standard Proctor Maximum Dry Density (ASTM D698). For the upper 0.5 metres below finished subgrade, the degree of compaction should be increased to 98%.

#### **5.5 Reuse of Excavated Material**

The excavated materials will comprise of Granular Base Fill, Silty Clay Fill, Silt / Sand Fill, Sand, Peat, and Silty Clay.

The granular soils are considered suitable for reuse as trench backfill, if temporary stockpiling and re-handling is practical. Depending on exact conditions, some drying of the soils may be required.

Peat is not considered suitable for as trench backfill.

The Silty Clay Fill and Silty Clay are not considered suitable for reuse as trench backfill. Generally, it is difficult to adequately place and compact cohesive soils in small, confined areas such as trenches. Consideration could be given to using the cohesive soil, only if the trenches were wide enough to permit the use of heavy compaction equipment that is required to break-up and thoroughly re-compact clay soils. Poorly compacted backfill will settle and will be reflected in any overlying rigid surfaces such as pavement, concrete aprons or sidewalks. The soils must also be at a suitable moisture content for re-compaction.

Alternatively, imported Granular 'B' material or better could be used for trench backfill. Granular fills are generally easier to place and compact than clay soils, in confined areas, thus expediting the compaction process. Any unsuitable soils encountered during the excavation should be removed from site and disposed of appropriately, depending on the condition of the soil.

## 6.0 CLOSURE

The Limitations of Report, as provided on the following page, is an integral part of this report.

We trust that this report is complete within our present terms of reference. If you have any questions, please do not hesitate to contact our office.

Yours very truly,

**AMEC** Earth & Environmental  
A division of **AMEC** Americas Limited

*Prepared By:*



Rod de Castro, B.Eng  
Geotechnical EIT

*Reviewed By:*



Peter McGlone, P.Eng.  
Principal Geotechnical Engineer

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## **REPORT LIMITATIONS**

The conclusions and recommendations given in this report are based on information determined at the testhole locations. The information contained herein in no way reflects on the environmental aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the testholes may differ from those encountered at the testhole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. It is recommended practice that the Geotechnical Engineer be retained during the construction to confirm that the subsurface conditions across the site do not deviate materially from those encountered in the testholes.

The design recommendations given in this report are applicable only to the project described in the text, and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, we recommend that we be retained during the final design stage to verify that the design is consistent with our recommendations, and that assumptions made in our analysis are valid.

The comments made in this report relating to potential construction problems and possible methods of construction are intended only for the guidance of the designer. The number of testholes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices. No other warranty is expressed or implied.

The benchmark and elevations mentioned in this report were obtained strictly for use by this office in the geotechnical design of the project. They should not be used by any other party for any other purpose.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. AMEC earth & environmental accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

**APPENDIX A**

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL





REFERENCE: Base Map supplied by <http://www.googlemaps.com>

CLIENT:

CITY OF PORT COLBORNE

AMEC Earth & Environmental

3300 Merriville Hwy, Unit 5  
Thorold, Ontario



DWN BY: DG

PROJECT: GEOTECHNICAL INVESTIGATION

REV. NO.: A

CHKD BY: KS

AREA 1 - CATHARINE STREET, KING STREET & SUGARLOAF STREET

DATE: May 2009

DATUM: NAD83

PORT COLBORNE, ONTARIO

PROJECT NO: TG93012

PROJECTION: UTM Zone 17

TITLE

SITE LOCATION PLAN

SCALE: N.T.S.

FIGURE NO.

1



REFERENCE: Base Map supplied by <http://www.navigators.youmagara.ca/navigator/>

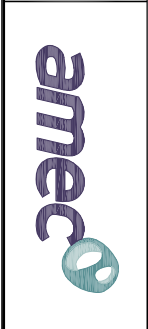
CLIENT  
**CITY OF PORT COLBORNE**

DWN BY: DG  
 CHK'D BY: KS  
 DATUM: NAD83

PROJECT  
**GEOTECHNICAL INVESTIGATION  
 AREA 1 - CATHARINE STREET, KING STREET &  
 SUGARLOAF STREET  
 PORT COLBORNE, ONTARIO**

REV. NO.: A  
 DATE: May 2009  
 PROJECT NO.: TG93012

**AMEC Earth & Environmental**  
 3300 Merrittville Hwy, Unit 5  
 Thorold, Ontario

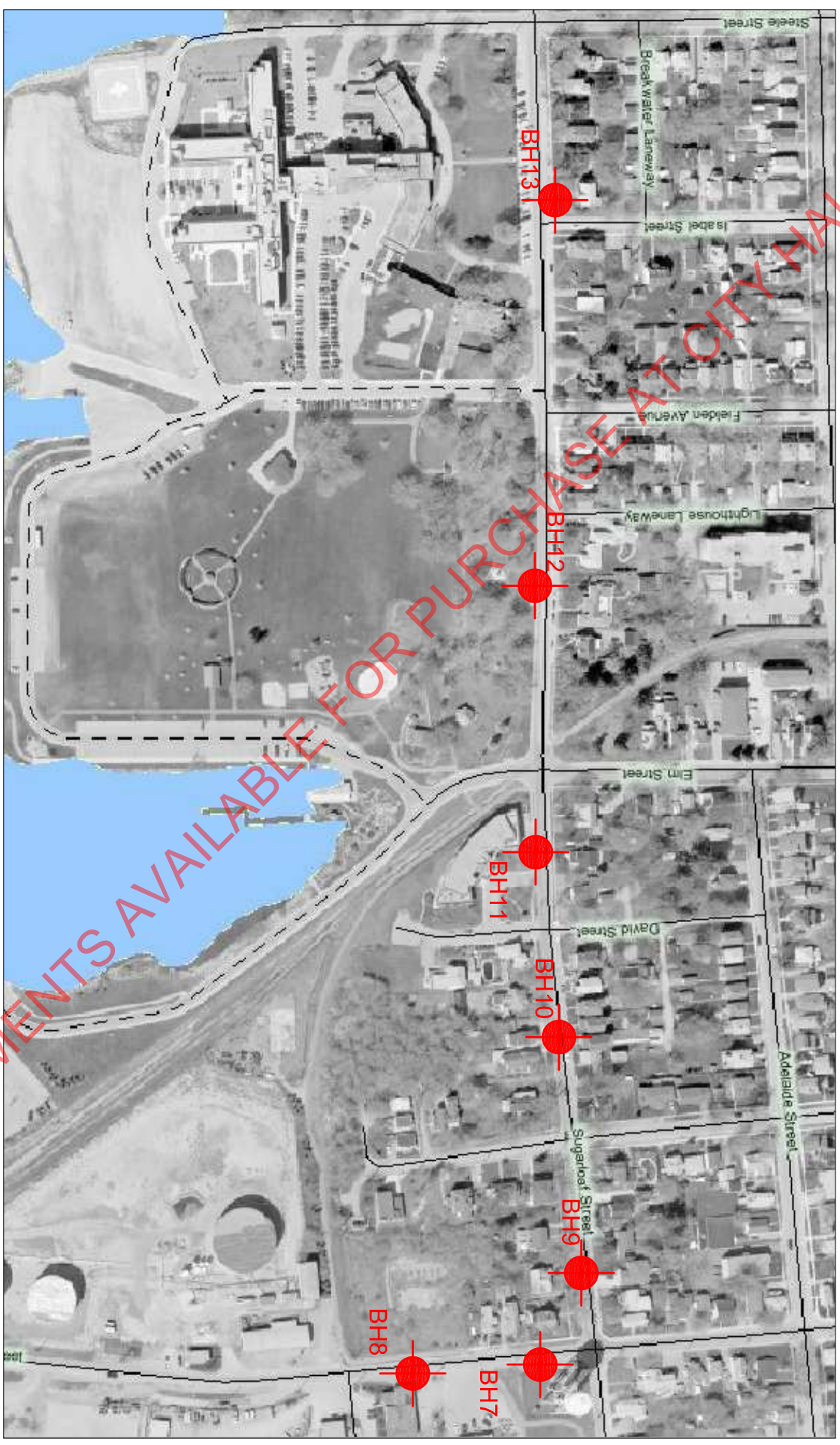


PROJECTION: UTM Zone 17  
 SCALE: 1:4000

TITLE  
**BOREHOLE LOCATION PLAN**

FIGURE No.  
**2a**





REFERENCE: Base Map supplied by <http://www.navigator.yourmagara.ca/navigator/>

CLIENT		CITY OF PORT COLBORNE	
DWN BY:		DG	
CHKD BY:		KS	
DATUM:		NAD83	
PROJECT		GEOTECHNICAL INVESTIGATION AREA 1 - CATHARINE STREET, KING STREET & SUGARLOAF STREET PORT COLBORNE, ONTARIO	
PROJECTION:		UTM Zone 17	
SCALE:		N.T.S.	
TITLE		BOREHOLE LOCATION PLAN	
REV. NO.:		A	
DATE:		May 2009	
PROJECT NO.:		TG93012	
FIGURE NO.:		2b	

**AMEC Earth & Environmental**  
3300 Meriville Hwy, Unit 5  
Thorold, Ontario



## GENERAL REPORT NOTES

### DEFINITIONS OF PENETRATION RESISTANCE

Standard penetration resistance 'N': -- The number of blows required to advance a standard split spoon sampler 30 cm into the subsoil, driven by means of a 63.5 kg hammer falling freely a distance of 70 cm.

Dynamic penetration resistance: -- The number of blows required to advance a 50 mm, 60 degree cone, fitted to the end of drill rods, 30 cm into the subsoil, the driving energy being 475 Joules per blow.

### SAMPLE TYPE ABBREVIATIONS USED IN BOREHOLE LOGS

S.S.	Split spoon	T.W.	Thinwall open	R.C.	Rock core
A.S.	Auger sample	T.P.	Thinwall piston	W.S.	Washed sample
	P.H.	Sample pushed hydraulically	P.M.	Sample pushed manually	

### SOIL TEST SYMBOLS USED IN BOREHOLE LOGS

<input type="checkbox"/>	Standard penetration resistance	▼	Laboratory vane	○	Unconfined compression
■	Dynamic penetration resistance	▲	Field vane	●	Undrained triaxial
		×	Penetrometer	S	Sensitivity

### CONVENTIONAL SOIL DESCRIPTIONS

COHESIVE (CLAYS ETC.)			GRANULAR (SANDS ETC.)	
<u>Consistency</u>	<u>'N' blows/30cm</u>	<u>c kPa</u>	<u>Denseness</u>	<u>'N' blows/30 cm</u>
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	>50
Hard	>30	> 200		

### ABBREVIATIONS FOR MOISTURE CONDITIONS

sdtpl - slightly drier than the plastic limit.  
 dtpl - drier than the plastic limit.  
 apl - about the plastic limit.

swtpl - slightly wetter than the plastic limit.  
 wtpl - wetter than the plastic limit.  
 mwtpl - much wetter than the plastic limit.

### NOTE

The soil conditions, profiles, comments, conclusions and recommendations found in this report are based upon the samples recovered during the field work. Soils are heterogeneous materials and, consequently, variations (possibly extreme) may be encountered at site locations away from boreholes. During construction, competent, qualified inspection personnel should verify that no significant variations exist from the conditions described in this report.

### RECORD OF BOREHOLE No 1

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 16, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST □ DYNAMIC PENETRATION TEST ■					WATER CONTENT (%)			OBSERVATIONS & REMARKS		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)									
						○ UNCONFINED      ▲ FIELD VANE ● QUICK TRIAXIAL    ◆ LAB VANE											
						10	20	30	40	50	100	200	300	20	40	60	
0.0 0.2	<b>PAVEMENT STRUCTURE</b> - 150 mm of <b>Asphalt</b> over 1.2 m of <b>Granular</b> , moist, dense.																
			1	SS	41												
1.4	Black <b>PEAT</b> . moist, very loose.																
			2	SS	3												
2.1	Grey to Brown <b>SILTY CLAY</b> , traces of fine rounded gravel, medium gravel pieces apl to dtpl, firm to very stiff.																
			3	SS	6												
			4	SS	20												
	Becoming mwtp, very soft to soft at 4.0 m±.		5	SS	2												
5.0	<b>BOREHOLE TERMINATED.</b>																Upon completion: Borehole dry and open.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 2

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 16, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)										
						○ UNCONFINED	● QUICK TRIAXIAL	▲ FIELD VANE	◆ LAB VANE	10	20	30	40	50	20	40	60	
0.0	<b>PAVEMENT STRUCTURE -</b> 180 mm of <b>Asphalt</b> over 280 mm <b>Granular Base</b> .																	
0.2																		
0.5	<b>FILL -</b> Grey Silty Clay, mottled, traces of fine gravel, apl.																	
0.9	Black <b>PEAT</b> , moist, loose to very loose.		1	SS	9													
			2	SS	2													
1.9	Grey to brown <b>SILTY CLAY</b> , grey fissures, apl to dtpl, stiff to very stiff.		3	SS	10													
			4	SS	19													
	Becoming apl to wtpl, firm at 4.0 m±.		5	SS	7													
5.9	Brown <b>SILTY SAND</b> and <b>GRAVEL</b> , dense, wet to saturated.		6	SS	50/13cm													
6.7	<b>BOREHOLE TERMINATED</b> due to refusal upon augering on assumed bedrock.																	Upon completion: Borehole open and water level at 6.6 m±.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 3

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 16, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)									
						○ UNCONFINED      ▲ FIELD VANE ● QUICK TRIAXIAL    ◆ LAB VANE											
						10	20	30	40	50	100	200	300	20	40	60	
0.0 0.2	<b>PAVEMENT STRUCTURE</b> - 200 mm of <b>Asphalt</b> over 1.2 m <b>Granular Base</b> , moist, compact.																
1			1	SS	26												
1.4	Black <b>PEAT</b> , moist, very loose to loose.																
2			2	SS	4												
2.1	Grey to brown <b>SILTY CLAY</b> , trace fine rounded gravel, apl to dtpl, very stiff.																
3			3	SS	16												
4			4	SS	22												
4	Becoming wtpl, stiff at 4.0 m±.																
5			5	SS	8												
5.0	<b>BOREHOLE TERMINATED.</b>																108.3
																	Upon completion: Borehole dry and open.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 4

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 16, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input checked="" type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)												
						○ UNCONFINED	● QUICK TRIAXIAL	▲ FIELD VANE	◆ LAB VANE	□	10	20	30	40	50	20	40	60		
0.0 0.1	<b>PAVEMENT STRUCTURE</b> - 130 mm of <b>Asphalt</b> over 300 mm of <b>GranularBase</b> . Black <b>PEAT</b> , moist.																			
0.4																				
0.9	Grey-brown to brown <b>SILTY CLAY</b> , trace fissures, silt seems, traces of fine gravel, medium gravel pieces, apl to dtpl, very stiff.		1	SS	7	1														
			2	SS	19	2														
			3	SS	28	2														
2.7	<b>BOREHOLE TERMINATED</b> upon refusal to augering on assumed Bedrock.																		Upon completion: Borehole dry and open.	

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL



### RECORD OF BOREHOLE No 5

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 16, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input checked="" type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS				
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)											
						○ UNCONFINED	● QUICK TRIAXIAL	▲ FIELD VANE	◆ LAB VANE	□	10	20	30	40	50	20	40	60	
0.0	<b>180 mm GRANULAR BASE.</b>																		
0.2	Black <b>PEAT</b> , traces of fine rounded gravel and clay, moist, loose.																		
			1	SS	4	1													
1.4	Brown <b>SILTY CLAY</b> , traces of fine rounded gravel, silt seams, dtpl, very stiff.																		
			2	SS	16	2													
			3	SS	18	3													
			4	SS	16	3													
3.5	<b>BOREHOLE TERMINATED.</b>																		Upon completion: Borehole dry and open.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 6

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 16, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input checked="" type="checkbox"/>					WATER CONTENT			OBSERVATIONS & REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)					(%)		
						<input type="checkbox"/> UNCONFINED <input checked="" type="checkbox"/> FIELD VANE <input checked="" type="checkbox"/> QUICK TRIAXIAL <input checked="" type="checkbox"/> LAB VANE	10	20	30	40	50	20	40	60	
0.0 0.1	<b>PAVEMENT STRUCTURE-</b> 80 mm of <b>Asphalt</b> over 300 mm of <b>Granular Base.</b>  Black <b>PEAT</b> , traces of Sand, moist to wet, loose.														
0.4			1	SS	6	1	10	20	30	40	50	20	40	60	
1.4	Brown <b>SILTY CLAY</b> , traces of fine gravel, grey fissures, apl to dtpl, stiff to very stiff.		2	SS	14	2	10	20	30	40	50	20	40	60	
		3	SS	23	3	10	20	30	40	50	60	20	40	60	
3.1						3									

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 7

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 16, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)									
						○ UNCONFINED	● QUICK TRIAXIAL	▲ FIELD VANE	◆ LAB VANE								
						10	20	30	40	50	100	200	300	20	40	60	
0.0 0.1 0.2	<b>PAVEMENT STRUCTURE - 130 mm of Asphalt over 50 mm of Granular Base.</b>  Light brown to brown <b>SAND</b> moist, dense to compact.		1	SS	32												
			2	SS	19												
			3	SS	19												
			4	SS	17												
3.5	<b>BOREHOLE TERMINATED.</b>																Upon completion: Borehole dry and open.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 8

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 16, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)										
						10	20	30	40	50	100	200	300	20	40	60		
0.0 0.2	<b>PAVEMENT STRUCTURE - 200 mm Asphalt over 770 mm Granular Base.</b>																	
1.0	<b>FILL - Dark brown Silt and Sand, traces of cinders, traces of fine gravel, moist, loose.</b>		1	SS	44													
			2	SS	6													
2.1	<b>Brown to light brown SAND, moist to saturated, compact to very loose.</b>		3	SS	27													
			4	SS	2													
3.5	<b>BOREHOLE TERMINATED.</b>																	Upon completion: Borehole caved to 2.7 m±, water level at 2.6 m±.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 9

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 16, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)							
						○ UNCONFINED	● QUICK TRIAXIAL	▲ FIELD VANE	◆ LAB VANE						
						10	20	30	40	50	20	40	60		
0.0	<b>PAVEMENT STRUCTURE -</b> 200 mm <b>Asphalt</b> over 80 mm <b>Granular Base.</b>  Brown to light brown <b>SAND</b> , moist to wet, compact to loose.	[Symbol]													
0.2															
0.3				1	SS	15									
				2	SS	10									
			3	SS	9										
3.2	Grey brown <b>SILTY CLAY</b> , grey fissures, apl, stiff.	[Symbol]	4	SS	11										
3.5	<b>BOREHOLE TERMINATED.</b>													Upon completion: Borehole dry and open.	

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 10

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 17, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input checked="" type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS					
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)												
						○ UNCONFINED	● QUICK TRIAXIAL	▲ FIELD VANE	◆ LAB VANE	□	10	20	30	40	50	20	40	60		
0.0 0.2 0.3	<b>PAVEMENT STRUCTURE -</b> 150 mm <b>Asphalt</b> over 100 mm <b>Granular Base.</b>  Brown to light brown <b>SAND</b> , coarse gravel pieces at 3.0 m±, moist to wet, loose.	[Strat Plot]	1	SS	8					□										
				2	SS	5					□									
				3	SS	6					□									
				4	SS	9					□									
3.5		<b>BOREHOLE TERMINATED.</b>																		Upon completion: Borehole dry and open.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 11

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 17, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)							
						○ UNCONFINED	● QUICK TRIAXIAL	▲ FIELD VANE	◆ LAB VANE						
						10	20	30	40	50	20	40	60		
0.0 0.2 0.2	<b>PAVEMENT STRUCTURE -</b> 180 mm <b>Asphalt</b> over 50 mm <b>Granular Base.</b> Brown to light brown <b>SAND</b> , moist to wet, compact.	[Strat Plot]	1	SS	15										
1		2	SS	11											
2		3	SS	16											
3		4	SS	15											
3.5		<b>BOREHOLE TERMINATED.</b>													
														Upon completion: Borehole dry and open.	

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL

### RECORD OF BOREHOLE No 12

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 17, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input checked="" type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS						
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)													
						○ UNCONFINED	● QUICK TRIAXIAL	▲ FIELD VANE	◆ LAB VANE	□	10	20	30	40	50	20	40	60			
0.0 0.1 0.2	<b>PAVEMENT STRUCTURE -</b> 100 mm <b>Asphalt</b> over 130 mm <b>Granular Base.</b>  Brown to light brown <b>SAND</b> , coarse gravel pieces at 2.3 m±. moist to wet, compact to loose.		1	SS	9	1															
			2	SS	20	2															
			3	SS	21	3															
			4	SS	9	4															
3.5			<b>BOREHOLE TERMINATED.</b>																		Upon completion: Borehole dry and open.

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL



### RECORD OF BOREHOLE No 13

1 OF 1

PROJECT Area 1 LOCATION (Refer to borehole location plan) ORIGINATED BY NM  
 CLIENT City of Port Colborne COMPILED BY NM  
 JOB NO. TG93012 DATE April 17, 2009 CHECKED BY KS

SOIL PROFILE		SAMPLES			GROUND WATER CONDITIONS	DEPTH (m)	STANDARD PENETRATION TEST <input type="checkbox"/> DYNAMIC PENETRATION TEST <input checked="" type="checkbox"/>					WATER CONTENT (%)			OBSERVATIONS & REMARKS
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE			"N" VALUES	SHEAR STRENGTH (kPa)							
						○ UNCONFINED      ▲ FIELD VANE ● QUICK TRIAXIAL    ✦ LAB VANE									
						10	20	30	40	50	20	40	60		
0.0 0.1 0.3	<b>PAVEMENT STRUCTURE - 130 mm Asphalt over ?? Granular Base.</b> Brown SAND, moist to wet, compact.		1	SS	14										
1.6	Grey brown <b>SILTY CLAY</b> , grey fissures, till-like at 2.9 m±, dtpl, stiff to hard.		2	SS	14										
			3	SS	28										
			4	SS	50/15cm										
3.4	<b>BOREHOLE TERMINATED.</b>													Upon completion: Borehole dry and open.	

THESE DOCUMENTS AVAILABLE FOR PURCHASE AT CITY HALL