PW-A1-1



REPORT Regional Council

For Information

DATE:

January 14, 2011

REPORT TITLE: ADDITIONAL INFORMATION REGARDING

REGIONAL ROAD 14 (MAYFIELD ROAD) STAGE TWO CONSTRUCTION

FROM INDER HEIGHTS DRIVE TO HEART LAKE ROAD

CAPITAL PROJECTS 01-4830, 02-1935, 04-1222 AND 07-2190

DOCUMENT 2008-043T

CITY OF BRAMPTON, WARD 2 AND 9

TOWN OF CALEDON, WARD 2

FROM:

Dan Labrecque, Commissioner of Public Works

OBJECTIVE

To provide Regional Council additional information regarding the peat removal and standby costs for the Regional Road 14 (Mayfield Road) Stage Two Construction from Inder Heights Drive to Heart Lake Road, Capital Projects 01-4830, 02-1935, 04-1222 and 07-2190, Document 2008-043T, City of Brampton, Ward 2 and 9, Town of Caledon, Ward 2.

REPORT HIGHLIGHTS

- At the December 16, 2010 Regional Council meeting, Council asked for additional information regarding the peat removal and standby costs.
- This report provides details of the geotechnical information that was available: a) prior to tendering and b) based on additional boreholes that were permitted to be installed pursuant to the installation of the barrier wall to protect the wetland. It also provides the actual geotechnical findings, based on excavation.
- The report details the rationale for the equipment that was on standby during the peat removal operation and the associated cost breakdown.

DISCUSSION

1. Background

On December 16, 2010 the report for Regional Road 14 (Mayfield Road) Stage Two Construction from Inder Heights Drive to Heart Lake Road went to Council to request that the contract (Document 2008-043T) for Construction Services between the Region of Peel and Metric Contracting Services Corporation be extended to provide for additional construction services. Sufficient funds were available in the budget for the costs related to the road project.

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This matter had been previously reported to Council in the fall of 2009, through the report of the Commissioner of Public Works, dated August 26, 2009, titled "Regional Road 14 (Mayfield Road) Stage Two Construction from Inder Heights Drive to Heart Lake Road, Capital Projects: 01-4830, 02-1935, 04-1222 and 07-2190, Document Number 2008-043T - City of Brampton, Wards 2 and 9, Town of Caledon, Ward 2". At its meeting held on September 17, 2009, Regional Council approved the process to establish the caisson retaining system and removal of peat as well as the temporary water mains (Resolution 2009-963).

Appendix VII reflects a chronology of this project from the initial Environmental Assessment commencement.

Council asked for additional information in the following areas:

a) Environmental Assessment Review

Staff was requested to review the Environmental Assessment Report to identify what degree of information was included regarding the presence and extent of peat.

b) Drawing of the Borehole Locations and Geotechnical Information in Peat/Bog Area

Staff was asked to provide a drawing of the borehole locations in the peat/bog area and a description of the geotechnical information in this report. Additionally, staff was requested to provide a package for Councillors who participate on the Toronto and Region Conservation Authority (TRCA) that explains the issues regarding the Regional Road 14 (Mayfield Road) Stage Two Construction from Inder Heights Drive to Heart Lake Road. This report provides that information.

c) Analysis of Standby Costs

Staff was requested to provide a thorough analysis of the standby costs that will help Council determine the appropriate course of action of this project.

d) Breakdown of Standby Charges

Staff was requested to provide a breakdown of the \$360,000 standby charges owed to the contractor, and provide additional information regarding potential consequences should the Region of Peel not pay them.

2. Findings

In response to the above, staff provides the following information:

a) Environmental Assessment Review

As part of the Class Environmental Assessment completed in 2002 a preliminary investigation was completed to obtain a general idea of the soil conditions within the

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project limits. It found evidence of underground peat deposits at different locations of the study area and recommended that additional detailed investigations be completed.

The following additional investigations were undertaken during the design stage and included in the tender documents:

- 1) Thurber Engineering Ltd. Report, dated July 24, 2003
- 2) Thurber Engineering Ltd. Report, dated July 22, 2005
- 3) JEGEL Report, dated July 2005
- 4) Thurber Engineering Ltd. Report, dated February 26, 2007

Peat was found in various areas between Kennedy Road and Heart Lake Road as part of these investigations, and a sheet pile and excavation method of removing the peat was devised based on the information gained from these boreholes.

The intent was to obtain detailed geotechnical information of the entire area, including the wet portion of the Provincially Significant Wetland (PSW) located north of Mayfield Road, east of Kennedy Road, as recommended in the Class Environmental Assessment report. However, TRCA's decision not to permit access to the wet area unless a barrier was provided to protect the wetland restricted the geotechnical investigations to the dry portion of it.

In order to satisfy TRCA's requirements, the Region's consultant recommended using the dry land borehole information to design the barrier. The design was prepared, it was tendered and the barrier was built. Particulars of the geotechnical information are described below under section 2, sub-section b) 2.

b) Drawing of the Borehole Locations and Geotechnical Information in Peat/Bog Area

To illustrate the borehole locations and the geotechnical investigations carried out in this area, the following drawings were prepared and are attached hereto:

1. Sheet 1 - Key Plan (Appendix I)

This drawing provides a general overview of the PSW located on the north side of Mayfield Road east of Kennedy Road as well as the section of wetland that encroaches in the widened Mayfield Road right-of-way.

2. Sheet 2 – Borehole Information at Time of Tender (Appendix II)

This drawing is a smaller scale drawing of the portion of the PSW that encroaches into the widened Mayfield Road right-of-way, described in this report as the peat/bog area. Undertaking geotechnical investigations in this area proved very difficult as TRCA would not allow the construction of boreholes on the wetland unless a barrier was provided to protect this important ecological system. For this reason, boreholes (BH) were constructed only in dry land and as close as possible to the wetland (BH 01-12, BH 02-1, BH 02-12 and BH 02-2). The challenge was that significant

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geotechnical information was required to design the barrier, and as such, the design had to be based on available boreholes, and predicted depths of material.

Taking advantage of the dry summer and with TRCA's approval, Addendum 1 was issued prior to tender closing. The geotechnical consultant (Thurber Engineering Ltd.) report was issued on July 8, 2008 adding the following boreholes within the dry areas of the PSW (BH 08-01, BH 08-02, BH 08-03, BH 08-04, BH 08-05, BH 08-07 and BH 08-08).

Given TRCA's requirement to construct a barrier prior to accessing the wetland, the Region's consultant recommended to use the existing peat depth borehole information to design the required sheet pile retaining wall. The profile portion of Sheet 2 (Appendix II) along with Sections A-A (Appendix II-A) and D-D (Appendix II-B) show the estimated depth of peat in the peat/bog area, based on the available information.

On this basis, the contractor built the sheet pile retaining wall and proceeded to excavate the peat and installed the watermains. During construction peat was encountered at a much greater depth than indicated in the geotechnical investigations. At that time, construction had to stop as the planned peat removal method was not adequate for the actual depths of peat found near the wet portions of the PSW, which were deeper than anticipated.

3. Sheet 3 – Additional Borehole Information February 2009 (Appendix III)

After the sheet piling was installed a new geotechnical investigation was carried out in the wetland area that provided a detailed description of the extent and depth of the peat and underlying unsuitable soils.

In February 2009, following the advice of the Contractor's geotechnical consultant (Isherwood Geostructural Engineers) and the Region of Peel geotechnical consultant (Thurber Engineering Ltd); seven (7) boreholes (BH 1, 2, 3, 4, 5, 6 and 7) were completed by Atlas Dewatering Corporation. Sheet 3 (Appendix III) along with Sections B-B (Appendix III-A) and E-E (Appendix III-B) show the new information relating to the depth of peat and underlying unsuitable soils.

Based on the knowledge gained from this geotechnical investigation, and the expert advice from geotechnical consultants and designers, it was concluded that the peat and unsuitable soils had to be removed and replaced with low strength concrete. The caisson/auger method was deemed to be the most structurally adequate, efficient and cost effective way of doing it.

4. Sheet 4 – Final Limits of Peat and Unsuitable Soils (Appendix IV)

The peat and unsuitable soils, as determined by penetrometer testing, for each caisson were removed until there was a competent base. The competency of the base was determined by penetrometer testing in the field. The augured material was

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analyzed by a geotechnical technologist for each caisson, so that the full extent of the removed material could be mapped. Sheet 4 (Appendix IV) along Sections C-C (Appendix IV-A) and F-F (Appendix IV-B) show the final result. The penetrometer testing actually refined the limits of material to be removed, as the borehole information provides limited data in-situ soil competency. As confirmed, the penetrometer is used to determine the soil load bearing capacity by applying known weight/force to a defined area.

c) Analysis of Standby Costs

Upon carrying out a detailed geotechnical investigation in the wetland, it was concluded by the project's geotechnical consultants and designers that the caisson/auger and king pile/anchor rod method should be used to remove the peat and unsuitable soils and provide a suitable structural base for the new road and underground services. Since there were no similar work items in the contract to undertake this work, the revised removal/containment system was paid on a time and materials basis. The peat removal using the Caisson removal method was time consuming and as such delayed the construction work. The peat removal took approximately 16 months.

After the most cost effective method of peat removal and road sub-base replacement was determined, the team evaluated options to provide the equipment required support the heavy equipment doing the peat removal. The two options to pay for the equipment when it was not being fully utilized were:

- 1. Using standby time to pay for equipment that was still on site; or
- 2. Mobilize/demobilize support equipment when needed.

Both options were acceptable under the terms of the construction contract. The option of paying for mobilization/demobilization costs as needed had some risk as the equipment may not be available when needed. This would delay the project and incur in standby of the much more costly heavy equipment, thereby increasing costs. This option was compared with having the equipment on site and paying for standby time when not in use. It was concluded that paying standby time was more reliable, kept the project work proceeding and was more cost effective. Therefore, this option was recommended.

The payment of standby time under the Ontario Provincial Standard Specifications (OPSS), which applied to the contract, is to compensate the contractor for their fixed costs for owning and maintaining the equipment when is not fully utilized and could potentially be used in another project. It does not include time when the equipment is broken down or otherwise unavailable for use on the project.

While on Standby Time, the equipment is charged at a reduced rate of 35 per cent of its OPSS rate. In OPSS, Standby Time means any period of time that is not considered Working Time and which together with the Working Time does not exceed 10 hours in any one Working Day and during which time the unit is in fully operable condition. It is for the equipment only and does not include labour.

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Standby time was paid over the duration of this operation (February 2009 to May 2010) only for equipment in compliance with the OPS General Conditions of the contract and based on the specified rates and conditions.

The equipment used for peat extraction/caisson operation was in two categories:

a) Heavy Foundation Equipment supplied by the Sub-contractor Deep Foundations:

- Caisson Driving and Extraction Crane Rigs	\$634.00 per hour
- Caisson Drilling Rigs	\$604.00 per hour
- Tieback Drilling Rigs with air compressor	\$344.25 per hour

b) Support Excavation and Compaction Equipment supplied by the General Contractor Metric Contracting Services Corporation:

- Track Mounted Excavators	\$120.00 per hour
- Front End Loaders	\$ 60.85 per hour
- Dozers	\$ 80.10 per hour
- Compaction Equipment	\$ 65.60 per hour
- Off Road Rock Trucks	\$138.20 per hour
- Skid Steer Loader	\$ 23.35 per hour
- Dump Trucks	\$101.05 per hour

The support equipment was used for:

- Removing and loading peat from the drilling rigs
- Building and maintaining access platforms and access roads for drilling rigs
- · Providing drainage paths and erosion control around wetland area
- Assist in the placement of low strength concrete
- General material supply and movement
- Dewatering activities

As the project progressed, the support equipment usage was reduced based on the operations remaining to be completed and the improved site conditions.

d) Breakdown of Standby Charges

A total cost of \$356,196.12 is owed to the contractor for standby time as summarized in the attached Time and Materials Payment Summary (Appendix V), which is based on the monthly recorded standby hours during the peat removal operation (Appendix VI).

Given that the standby time charges claimed by the contractor are compliant with the OPS General Conditions of the contract, the contractor would have grounds for a claim or action against the Region, should the standby costs not be paid.

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CONCLUSION

This report provides additional information relating to the peat removal and standby costs on the Mayfield Road widening project.

Dan Labrecque

Commissioner of Public Works

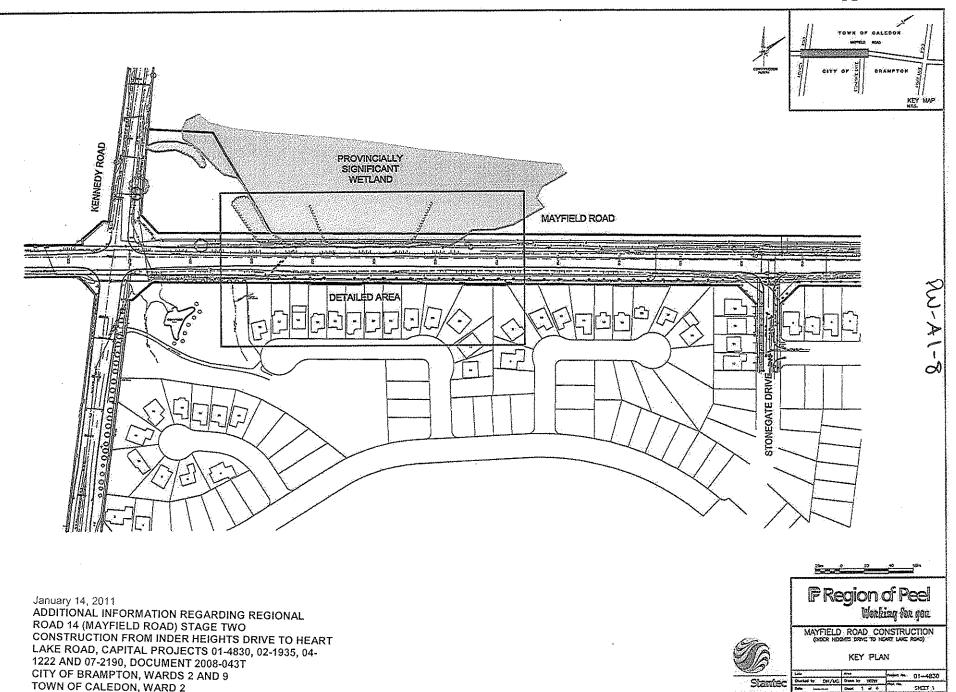
Approved for Submission:

D. Szwarc, Chief Administrative Officer

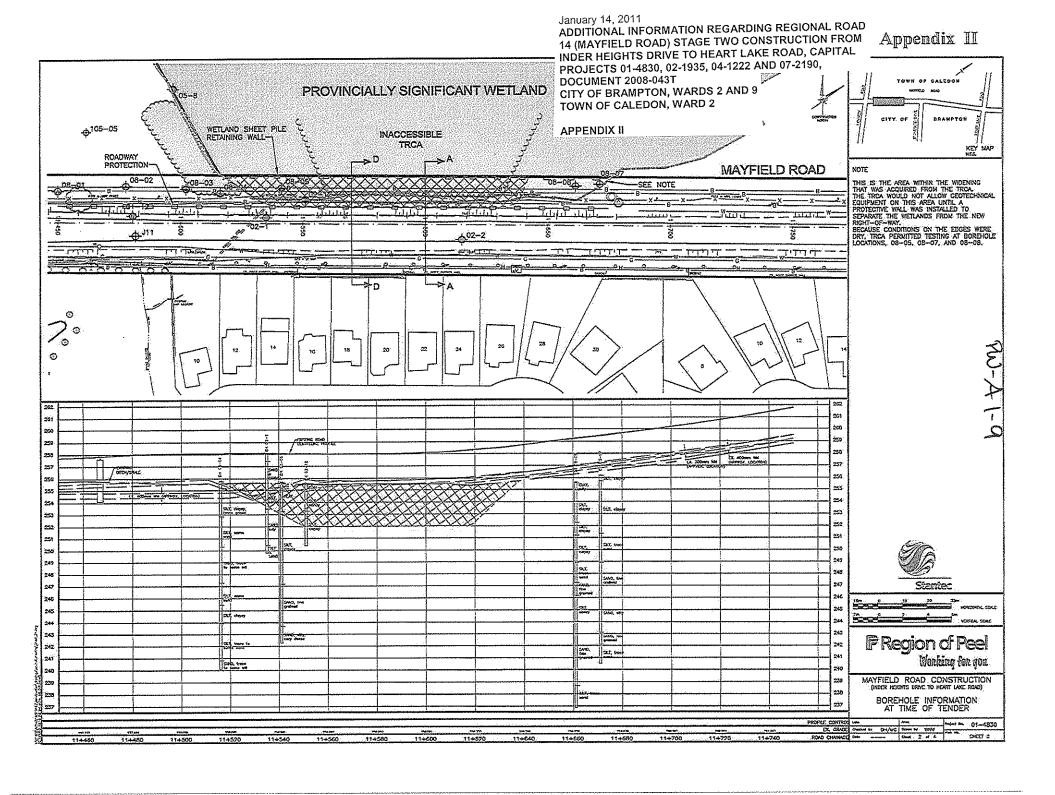
For further information regarding this report, please contact Jose Montouto at extension 7813 or via email at jose.montouto@peelregion.ca

Authored By: Jose Montouto

c. Legislative Services



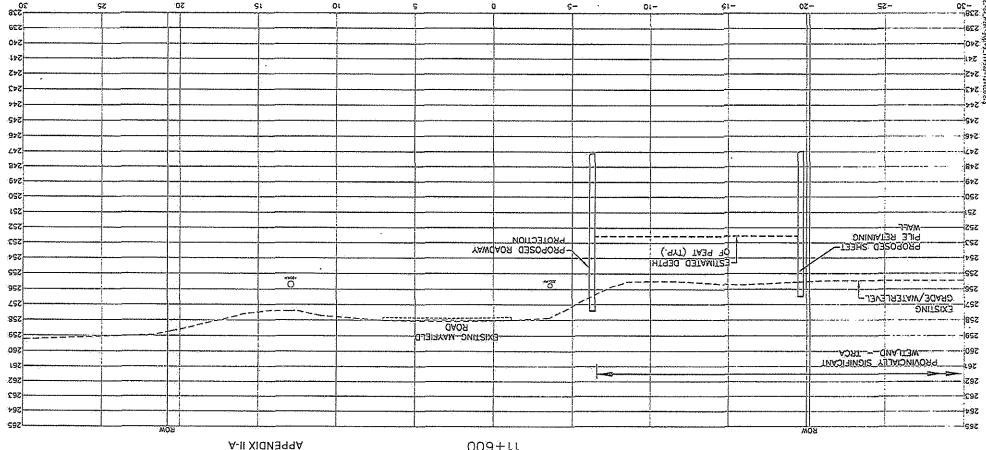
APPENDIX I



CITY OF BRAMPTON, WARDS 2 AUD 9 1222 AND 07-2190, DOCUMENT 2008-043T LAKE ROAD, CAPITAL PROJECTS 01-4830, 02-1935, 04-CONSTRUCTION FROM INDER HEIGHTS DRIVE TO HEART ROAD 14 (MAYFIELD ROAD) STAGE TWO ADDITIONAL INFORMATION REGARDING REGIONAL January 14, 2011

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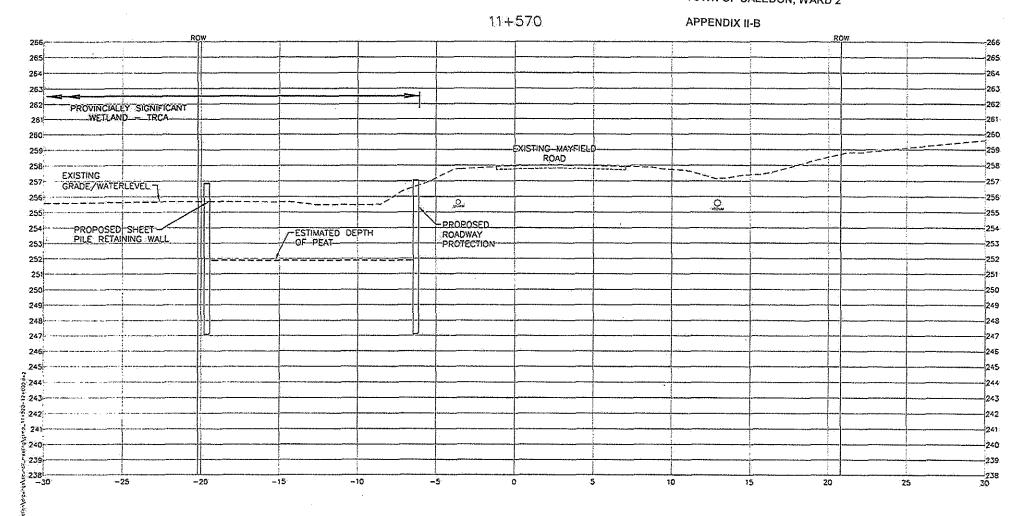
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SECTION D-D
TENDER CONDITIONS

MAYFIELD ROAD CONSTRUCTION Inder Heights Drive to Heart Lake Road

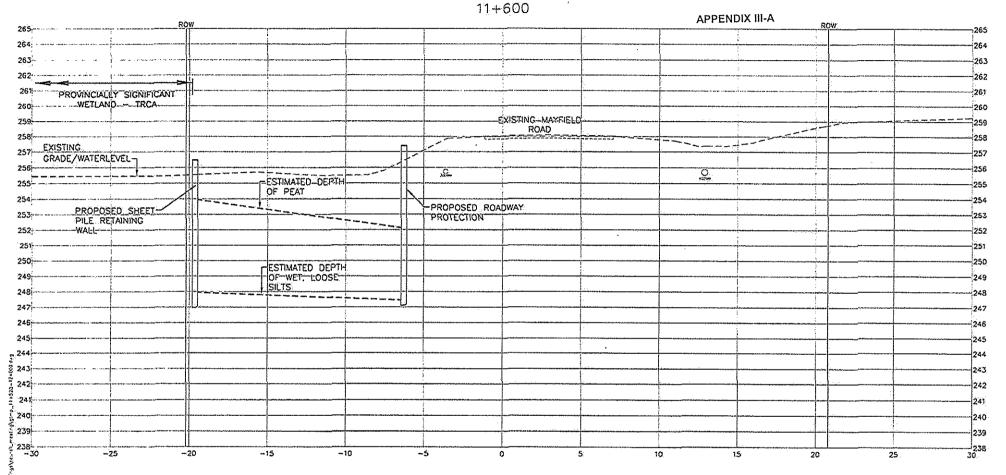
MAYFIELD ROAD GRADING TEMPLATES Sta. 11+520 to Sta. 12+000

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Appendix III

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ADDITIONAL INFORMATION REGARDING REGIONAL ROAD
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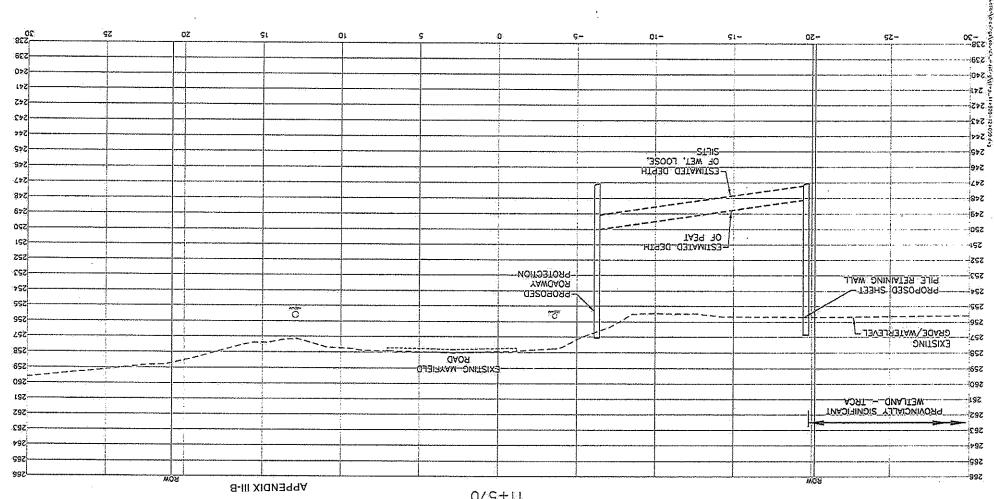
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SECTION B-B FEB. 2009 ADDITIONAL BOREHOLES MAYFIELD ROAD CONSTRUCTION Inder Heights Drive to Heart Lake Road

MAYFIELD ROAD GRADING TEMPLATES Sta. 11+520 to Sta. 12+000

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TOWN OF CALEDON, WARD 2 CITY OF BRAMPTON, WARDS 2 AND 9 1222 AND 07-2190, DOCUMENT 2008-043T LAKE ROAD, CAPITAL PROJECTS 01-4830, 02-1935, 04-CONSTRUCTION FROM INDER HEIGHTS DRIVE TO HEART ROAD 14 (MAYFIELD ROAD) STAGE TWO ADDITIONAL INFORMATION REGARDING REGIONAL January 14, 2011 0/9+11



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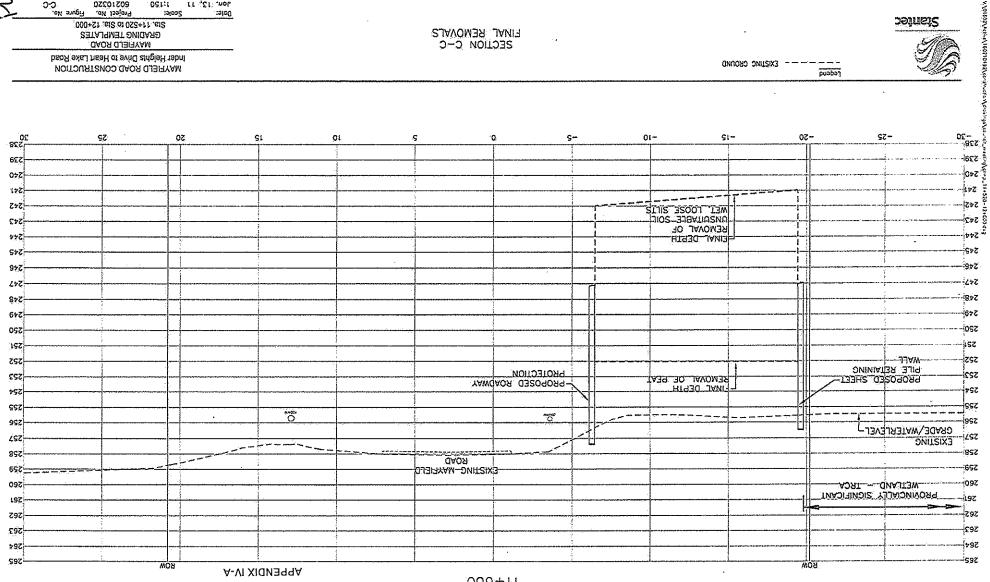
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LINAL REMOVALS

SECTION C-C

Inder Heights Drive to Heart Lake Road MAYFIELD ROAD CONSTRUCTION

Sta. 11+520 to Sta., 12+000 **GRADING TEMPLATES** MAYFIELD ROAD

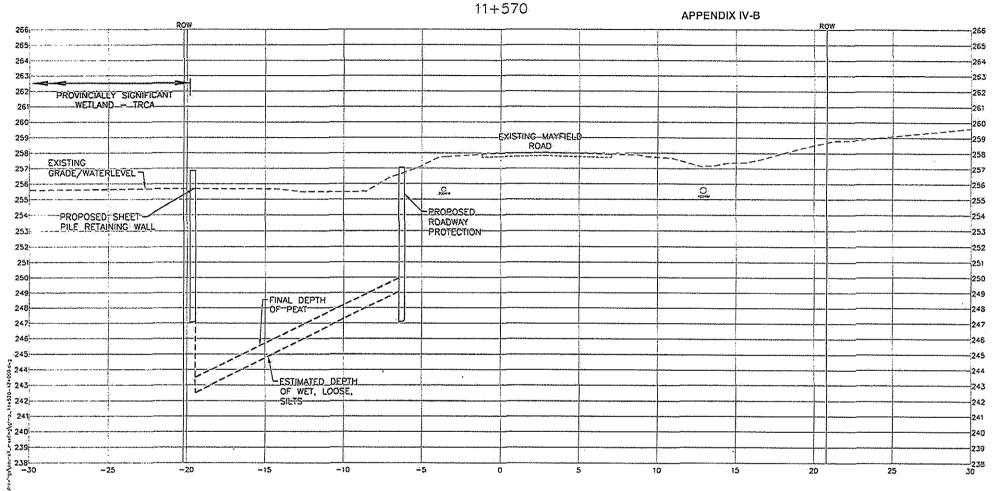
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SECTION F-F FINAL REMOVALS MAYFIELD ROAD CONSTRUCTION Inder Heights Drive to Heart Lake Road

MAYFIELD ROAD GRADING TEMPLATES Sts. 11+520 to Sts. 12+800

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TOWN OF CALEDON, WARD 2



Appendix V

CM STREET APPENDIX V TIME AND MATERIAL SUMMARY FOR PAYMENT CONTRACTOR: Meble SUBCONTRACTOR: CONTRACT NO: 2008-043T ACCOUNT NO: DATE: DESCRIPTION OF WORKS: Standby Time SECTION A: LABOUR TOTAL ENTITLEMENTS HRS EACH CLASSIFICATION NO. RATE AMOUNT HRS PAYROLL BUSDENS Auten hatide payroll burden, everhead & goods LABOUR MARKUPS Falsa kaluda par saliburtan energadi basali \$0.00 \$0.00 741 SUBTOTAL RATES INCLUDE PAYROLL BURDEN, (2) (3) OVERHEAD & PROFIT TOTAL HOURS ROOM AND BOARD CAMP COSTS 0.0 SUB TOTAL BLOCKS 1,2,3,4 TOTAL 4 & 5 \$0.00 SECTION B: OWNED EQUIPMENT HOURS ROURS | HOURS | HOURS | RATE | AMOUNT | STANDBY | RATE | AMOUNT | STANDBY | RATE | STANDBY | STAN ENTITLEMENTS RATE \$75.50 \$56.35 (a) Up to \$10000.00 = 105% of 127 Rofes. (1) \$10000.00 to 50 \$20000.00 = \$10000.00 + 50% Buch, Facevator, Crawler Mounted \$5.000 e Hide, Exercator, Crawler Mounted 19,500 is High, Excavator, Crawler Mounted 13,600 is af Al-al-211. [0] Only \$7,0000 00 = \$19000 00 + 8014 in Evens Hydr. Excepator, Crawler Mounted 32,000 kg Hide Desaylor, Cander Mounted 31,0001g Hide, Except Leader Mounted 52,0001g Hide, Except Leader Mounted 52,0001g Durn Fried 17 Hold 27,0001g Off Rod Tock, Autochted, Paylord 20,0001g Self Processed, Autochted, Paylord 20,0001g Self Processed, Via, Pard F. Compositor 19100ig Self Processed, Via, Pard F. Compositor 19100ig Self Processed, Via, Pard F. Compositor 19100ig Self Processed, Via, Pard F. Compositor 1910ig Self Processed, Via, Pard F. Compositor 1910ig Self Processed, Via, Pard F. Compositor 1910ig Faster Builders 60 Kin Fristor Builders 60 Kin Fristor Builders 60 Kin th barchty 35% of 137 Acco. Front End Leader 150 Kw Front End Leader 150 Kw Tractor with Leader/Backhee 4WD 65 Kw ENd Steer, Rubber Tired 300 Kg SUBTOTAL @ 100% (4) @90% @80% \$355,196.12 TOTAL 1,2,3,4, SECTION C: RENTED EQUIPMENT DAYS OR HOURS HOURS STATEBY ENTATEMENTS AMOUNT \$0.00 TYPE RATE RATE AMOUNT (a) 110% of 127 Rates.
(b) Operator Included 110% of Approved Rate.
(c) Standby 35% of the 127 Rates or Invoked Price. (2) TOTAL 1 & 2 \$0.00 SECTION D: MATERIAL UNIT TOTAL TYPE PRICE AMOUNT ENTITLEMENTS \$0.00 (a) 120 % Of Cost of Malada Lp to \$1000 (b). (b) 115 % of Cost of Malada Open \$1000 (b). TOTAL 1 8 2 \$0.00 TOTAL OF SECTIONS A,B,C & D \$356,198.12

Monthly Stand-by Classification

Mayfield Road - Contract 2008-043T

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	Tractor Buldozer 80kW	2	9 91	137	102.5	65	78			<u>_</u>							
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APPENDIX VII
January 14, 2011

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ADDITIONAL INFORMATION REGARDING REGIONAL ROAD 14 (MAYFIELD ROAD) STAGE TWO CONSTRUCTION FROM INDER HEIGHTS DRIVE TO HEART LAKE ROAD CAPITAL PROJECTS 01-4830, 02-1935, 04-1222 AND 07-2190 DOCUMENT 2008-043T CITY OF BRAMPTON, WARDS 2 AND 9 TOWN OF CALEDON, WARD 2

REGIONAL ROAD 14 (MAYFIELD ROAD) RECONSTRUCTION FROM HURONTARIO STREET TO HEART LAKE ROAD - PROJECT CHRONOLOGY

- 1. Mayfield Road, Hurontario Street to Heart Lake Road, Class Environmental Assessment. Environmental Study Report. Completed in November 2002.
- 2. Construction Contracts:
 - a) Document Number 2003-470T Replacement of Snelgrove Bridge and Associated Improvements Mayfield Road at the Etobickoke Creek.

Contractor: Aecon Construction and Materials Ltd.

Construction Start: October 2003

Completion: October 2005

b) Document Number 2006-056T - Mayfield Road Reconstruction from East of McLaughlin Road to Valley View Drive.

Contractor: Memme Construction

Construction Start: October 2006

Completion: July 2008

c) Document Number 2007-389T - Mayfield Road Stage One Construction from Stonegate Drive to Heart Lake Road

Contractor: FCM Construction Ltd.

Construction Start: November 2007

Completion: October 2008

d) Document Number 2008-043T - Mayfield Road Stage Two Construction from Stonegate Drive to Heart Lake Road

Contractor: Metric Contracting Services Corporation

Construction Start: September 2008.

Preliminary Acceptance: November 17, 2010 (Under warranty until November 17, 2010)

2012)

e) Document Number 2009-088T - Mayfield Road Stage Three Construction from Summer Valley Drive to Heart Lake Road

Contractor: Graham Bros. Construction Limited.

Construction Start: June 2009.

Estimated Completion: Summer 2011

APPENDIX VII
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ADDITIONAL INFORMATION REGARDING REGIONAL ROAD 14 (MAYFIELD ROAD) STAGE TWO CONSTRUCTION FROM INDER HEIGHTS DRIVE TO HEART LAKE ROAD CAPITAL PROJECTS 01-4830, 02-1935, 04-1222 AND 07-2190 DOCUMENT 2008-043T CITY OF BRAMPTON, WARDS 2 AND 9 TOWN OF CALEDON, WARD 2

3. Subject Contract outlined in the report of the Commissioner of Public Works, dated January 14, 2011, titled "Additional Information Regarding Regional Road 14 (Mayfield Road) Stage Two Construction from Inder Heights Drive to Heart Lake Road, Capital Projects 01-4830, 02-1935, 04-1222 and 07-2190, Document 2008-043T, City of Brampton, Wards 2 and 9, and Town of Caledon, Ward 2" is Contract d) Document Number 2008-043T: Mayfield Road Stage Two Construction from Stonegate Drive to Heart Lake Road.

a) Tendered: July 23, 2008

b) Construction Start: September 2008

c) Council Report: August 26, 2009

d) Preliminary Acceptance: November 17, 2010

e) Council Report: December 16, 2010

f) Supplementary Report: February 10, 2011