Region of Peel
Working for you

Mayfield Road Improvements

Appendix ESR 2

Municipal Class Environmental Assessment

Chinguacousy Road to Winston Churchill Boulevard

June 2016

List of Appendices – Volume 2

H HYDROGEOLOGY AND GEOMORPHIC ASSESSMENT

Hydrogeology Investigation

THURBER ENGINEERING LTD.

HYDROGEOLOGY INVESTIGATION
MAYFIELD ROAD
WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD
BRAMPTON / CALEDON, REGION OF PEEL

Report Submitted

To

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January 27, 2016
File: 19-1605-148

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Appendices

1. INTRODUCTION

This report presents a hydrogeologic study for the portion of Mayfield Road between Winston Churchill Boulevard and Chinguacousy Road, located on the border of the City of Brampton and the Town of Caledon. The work was undertaken by Thurber Engineering Ltd. (Thurber) for Hatch Mott MacDonald as part of a Schedule 'C' Class Environmental Assessment (EA) for the Regional Municipality of Peel. The purpose of the study is to assess the groundwater conditions and potential water well or aquifer impacts related to future construction for long-term improvement of Mayfield Road.

This study was carried out in general accordance with Thurber's proposal letter No. 112-3586, to Hatch Mott MacDonald (The Client). In addition to this investigation, a Geotechnical Investigation and a Contaminated Soil Assessment were conducted; the results of which are presented in separate Thurber reports.

This report uses the International System of Units (SI Units). For clarity of reporting, Mayfield Road will be considered to run in an east-west direction.

It is a condition of this report that Thurber's performance of its professional services is subject to the attached Statement of Limitations and Conditions.

2. PROJECT COMPONENTS

The proposed works include widening of Mayfield Road between Winston Churchill Boulevard and Chinguacousy Road from 2 lanes to 4 lanes by 2021, followed by widening of the portion from 1.5 km west of Mississauga Road to Chinguacousy Road to 6 lanes by 2031. The proposed works that require assessment of the potential for hydrogeologic impact related to excavation and dewatering during construction include the following:

- Culvert upsizing and extensions, removal of culverts, relocation and construction of new culverts; and
- Installation of sewers between Mississauga Road and Chinguacousy Road.

3. CHARACTERISATION OF THE HYDROGEOLOGIC SETTING

3.1 Quaternary and Bedrock Geology

The Quaternary geologic mapping (OGS Map 2223, Brampton Area, 2005) indicates that the geologic conditions within the area consist of low-relief plains of Halton Till: a silt to silty clay till, with occasional zones of glacial lacustrine clay upslope. The till is of variable thickness and overlies Middle-Ordovician bedrock consisting of shale, limestone, dolostone, and siltstone of

the Queenston Formation (Map 2197, 1970). The study area is located within a physiographic region known as the South Slope: the southern slope of the Oak Ridges Moraine. The South Slope is gently sloped and faintly drumlinized, although no drumlins are present within the study area. An esker is located south of Mayfield Road 4.3 km east of its intersection with Chinguacousy Road, between Kennedy Road and Heart Lake Road.

Recently, agriculture and road construction activities in the area have resulted in placement of anthropogenic (fill) deposits in some areas.

3.2 Surface Conditions

The topography within the study area is gently undulating from a ground surface elevation of approximately 256 m to 267 m above sea level, with a gradual downwards slope towards Lake Ontario.

The study area is located within the Credit Valley Watershed, managed by the Credit Valley Conservation Authority. No conservation areas are located within the study area, however three are located nearby. The Silver Creek Conservation Area and Terra Cotta Conservation Area Two are located northwest of the study area, and the esker east of the study area is part of the Heart Lake Conservation Area, covered by the Toronto & Region Conservation Authority.

There are no major watercourses within the study area. CSP culverts are located throughout the study area where minor watercourses cross Mayfield Road.

3.3 Subsurface Conditions

The understanding of the subsurface conditions at the Project site is based on boreholes and piezometers installed as part of the combined hydrogeological and geotechnical investigation carried out for the proposed Project. The results of this subsurface investigation are summarized in the geotechnical report under separate cover. The locations of the boreholes are shown on Figure 1 (Borehole Location Plan) in Appendix A, and the relevant foundation borehole logs are copied in Appendix B.

The boreholes were advanced to depths ranging from 4.4 to 6.7 m. The soil conditions encountered are generally comprised of variable thickness of granular fill associated with the road embankment, which was predominantly underlain by a firm to very stiff silty clay till deposit (Halton Till). Occasional silty sand deposits were encountered within the till at 3.8 to 5.6 m deep in Boreholes 13-33, 13-36, 13-39 and 13-53.

Groundwater Levels

Groundwater depth data was collected from the piezometers, monitoring wells and open boreholes installed during the geotechnical investigation, and are summarized in Table 1 below. The water level depth readings are measured below the ground surface at the location of each borehole.

Table 1 – Measured Groundwater Levels

Borehole No.	Water Level Depth (m)	Date of Reading	Type of Reading
13-22	3.5	March 27, 2014	Monitoring Well
13-29	2.1	October 28, 2014	Piezometer
13-33	3.8	October 8, 2013	Open borehole
13-47	6.3	October 7, 2013	Open borehole
13-53	5.9	October 11, 2013	Open borehole

The water level readings indicate that the groundwater level ranges from approximately 2.1 to 6.3 m deep. The water-table is expected to vary seasonally and with significant precipitation events.

Ice was also noted in the upper 0.3 m below the ground surface in several piezometers that were frozen at the time of reading in March 2014. The ice may be indicative of perched groundwater within the granular fill above the silty clay till. Upon subsequent site visits, most of the piezometers and monitoring wells installed in the road shoulders could not be located and were possibly destroyed due to construction activities and shoulder grading work occurring along Mayfield Road during this time.

3.4 Hydraulic Conductivity

A rising head test was carried out on the 51 mm diameter well installed in Borehole 13-22 within the firm to very stiff silty clay till deposit, which is typical of the soil type within the study area. The test result indicates a hydraulic conductivity of about 2×10^{-7} m/s. A plot of the rising head test result is included in Appendix C. Hydraulic conductivity values for silty clay till deposits are typically in the order of 10^{-7} to 10^{-10} m/s. A hydraulic conductivity value of approximately 2×10^{-7} m/s was also derived for the silty sand deposit according to Hazen's equation based on

a particle size analysis of a sample of the silty sand. Based on this information a conductivity value of 2 x 10^{-7} m/s was selected for subsequent analysis.

4. STUDY METHODOLOGY

4.1 Method of Analysis

The purpose of this hydrogeologic study is to provide estimates of dewatering extraction rates and assess the potential for dewatering for the Project to interfere with other users or groundwater receptors. Assessment of the need for a Permit to Take Water (PTTW) is also provided, based on the dewatering estimates. For the purposes of a potential PTTW submission, the estimated withdrawal rates are conservatively assessed in order to reduce the likelihood that actual pumping rates might exceed the permit allowance thereby stopping work and delaying the Project.

The assessment of potential impacts related to the drawdown of the water-table is based on the calculated dewatering rates. The analysis assumes steady-state conditions that would typically take several days to weeks for the maximum extent of drawdown to fully develop. Transient analysis was carried out to assess the potential for high short term pumping rates.

4.2 Excavation Methodology

Based on plan and profile drawings provided by The Client as of April 30, 2015, and subsequent discussions, we understand that there are approximately 19 culverts to be modified to accommodate the road widening. The modifications include replacement, relocation, removal, upsizing and extensions. Sewers will also be located along the sides of Mayfield Road between Mississauga Road and Chinguacousy Road.

A number of separate excavations will be required to accommodate the culvert modifications. The excavations will typically be located at streambeds and will be excavated down to a competent substrate in order to obtain sufficient geotechnical resistance. The culvert sizes range from 500 to 1350 mm diameter, with invert depths ranging from approximately 1.1 to 3.7 m below the ground surface. Excavations are expected to extend a maximum of 2 m below the groundwater-table.

Trench excavations will be required to install sewers along the sides of Mayfield Road to depths of approximately 3 m below the ground surface. It is expected that trench excavations will be conducted in segments of approximately 100 m long per day, and will extend a maximum of 2 m below the groundwater-table.

The estimated dimensions of the culvert and sewer excavations used for analysis are summarized in Table 2 below.

Table 2 - Estimated Culvert and Sewer Excavation Dimensions

Excavation Location	Type	Excavation Extent (Approximate)
Mayfield Rd.	Culvert	2 m wide x 50 m long x 2 m deep*
Mayfield Rd.	Sewer Segment	2 m wide x 100 m long x 2 m deep*

*Depths are maximum likely excavation depth below water-table.

4.3 Precipitation and Infiltration

An allowance for precipitation falling on the surface of the excavation area should also be included in the dewatering quantity requirements. For the Environment Canada weather station at Toronto Pearson International Airport, which is located approximately 30 km southeast of the Project site, a daily precipitation intensity of 96 mm for a 10 year return period can be used. The Intensity-Duration-Frequency (IDF) curve for Toronto Pearson International Airport is included in Appendix D. This rainfall intensity should be applied over the plan area of the excavation and combined with the groundwater extraction rate to derive the maximum daily discharge rate for short term construction dewatering. Based on anticipated excavation areas of 100 m^2 and 200 m^2 for culverts and sewer segments, flow rates of 9,600 L/day and 19,200 L/day respectively would be appropriate for removal of precipitation from the excavations. This estimate assumes that adjacent surface water and stream flow have been diverted around the excavations.

An allowance for recharge from precipitation infiltration over the zone of influence was included in predicting the dewatering groundwater flow rates. Historical data from the Toronto Pearson International Airport weather station records a maximum monthly mean precipitation rate of approximately 80 mm. A groundwater infiltration rate of 20% of the maximum monthly mean precipitation rate was applied.

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4.4 Hydrogeologic Analysis

Hydrogeologic analysis was carried out to calculate the seepage discharge rate and area of influence for the proposed excavation geometries. The analysis considered seepage though free-draining temporary support systems or sloped excavations.

For the culverts and sewer trench segments, groundwater flow was modeled based on steady-state conditions using a closed form solution for one-dimensional (Dupuit) flow between two line sources in an unconfined aquifer receiving uniform vertical recharge. The analysis assumes a uniform, homogeneous distribution of hydraulic conductivity.

Steady state conditions are expected to take several weeks to occur and accordingly allowance should be made for transient conditions resulting in higher flow that will be encountered during the initial dewatering operations. The higher transient rates provided assume that the excavations will take a minimum of one day to reach full depth and allow for variation in subsurface conditions (by a factor of about 5). Based on the natural variability of subsurface conditions, it is expected that the equivalent hydraulic conductivity could vary significantly.

The results of the dewatering analysis are summarized in Table 3 below. The dewatering rates provided are the anticipated daily flow for each culvert excavation and for an assumed 100 m length of sewer installation.

Table 3 - Estimated Flow Rates For Dewatering

Structure Installation	***Flow Rate: Steady State (L/day)***	***Flow Rate: Transient (peak) (L/day)***	***Flow Rate: Precipitation (1:10 yr event) (L/day)***	***Radius of Influence (m)***
Culvert	1,100	8,000	9,600	20
Sewer Segments (100 m long)	2,200	16,000	19,200	20

Based on the above values, the estimated daily dewatering permit requirements would be:

Culverts (assuming 5 culvert excavations occurring concurrently):

Typical volume per day	53,500 L/day
Peak volume per day	88,000 L/day

Sewer (assuming 100 m long portion of sewer):

Typical volume per day	21,400 L/day
Peak volume per day	35,200 L/day

5. IMPACT ASSESSMENT

5.1 Geotechnical Impacts

Dewatering of shallow open excavations is expected to result in a maximum drawdown of the water-table within the overburden deposits by about two (2) m near the edges of the excavations. The drawdown of the water-table will decrease to zero at the estimated radius of influence. The relatively stiff silty clay till deposit in the Project area has very low compressibility under the anticipated stress change (20 kPa). Considering the mainly rural and agricultural land use and undeveloped condition of the land along the project area the potential for impacts related to groundwater related subsidence is considered to be very low.

5.2 Surface Water Impacts

The excavations for culvert modifications will typically be carried out adjacent to the stream channels which will eventually flow through each culvert. Groundwater recharge conditions are likely to exist where flow is generally from channel bed into the aquifer.

The culvert excavations have some potential to temporarily decrease the downward hydraulic gradient beneath the channel if open for extended periods. However, considering the very low hydraulic conductivity and the slow rate of drainage within the silty clay till, there is not expected to be a discernible decrease in the surface flow rates.

5.3 Existing Groundwater Users

Water Well Survey

Thurber conducted a search of Ministry of Environment (MOE) well records within a 500 m radius of the centreline of the Mayfield Road corridor, which indicated that there are a total of about 84 water wells.

A plot of the regional hydrogeologic conditions showing the MOE well record locations within 500 m of the site, and indicating 84 wells, is included in Figure 2 in Appendix A. A listing of MOE well records within 500 m of the site is included in Appendix E. The precise location of the water wells based on provincial well records is typically uncertain, but the distribution of wells near the Mayfield Road corridor is generally consistent with the location of the existing residential development in the area. The well record data indicates that the average depth of the domestic water wells in the region is approximately 19.4 m, indicating an aquifer depth that is greater than the expected depth of the proposed sewer and culvert excavations. The average static water level depth noted in the well record data is 5 m below the ground surface.

A survey of residents within 500 m of the Project area was conducted in an effort to confirm the presence or absence of these water wells, and to assess how many wells are within the radius of influence of the proposed works. Existing well survey data was available from a recent well survey conducted by Cole Engineering Group (CEG) between November 2012 and July 2013. The CEG survey was conducted for the Victoria Feedermain project, and included a survey of residents along Mayfield Road between Mississauga Road and Chinguacousy Road. The existing data was utilized and supplemented by well data collected by Thurber for the portion of Mayfield Road between Winston Churchill Boulevard and Mississauga Road.

A list of the properties contacted in the well survey is included in Table E1 in Appendix E, which is summarized as follows:

- The well survey consisted of mailing or hand-delivering letters to property owners for 75 properties within 500 m of the Project area to request information about their well systems on a voluntary basis. A questionnaire was provided to each property owner with the letter. Follow-up telephone calls/emails were made to the property owners where their contact information could be obtained.

- Responses were received for 27 properties. The remaining 48 declined to participate in the survey or no contact could be made with the property owners.

- A total of 26 existing water wells were confirmed within the survey area at the properties that participated in the survey. The approximate locations of the wells (based on the property locations) are shown on Figure 3 in Appendix A.

The detailed information collected from the survey of property owners is summarized on Table E2 in Appendix E.

Impact Assessment

Figure 3 shows the private wells that were identified to be closest to the Project site. Based on the anticipated extent of drawdown from the culvert and sewer excavations, there is a potential for dewatering activities to impact the private wells located along the entire length of Mayfield Road within the project limits.

During construction, a well monitoring program should be implemented to assess the potential impact of dewatering activities on the wells identified during the survey. Provisions for an alternate water supply should also be available for the property owners, should any significant loss of well water occur.

5.4 Other Potential Impacts

With continuing dewatering activities there can be potential for inorganic or organic chemical compounds present within the radius of influence to migrate into open excavations where flow rate and sufficient time permit. Considering the temporary duration of dewatering activities and the low conductivity of the till in this area there is a low likelihood that contaminants would be mobilized during dewatering activities. However, the Contaminated Soil Assessment report conducted for the Project identified 3 areas of moderate potential environmental concern. If these areas fall within the radius of influence of dewatered excavations, then a groundwater quality testing program should be implemented to monitor the quality of groundwater near the excavations. Contaminated groundwater collected from the dewatering operations should be disposed of at a facility licensed to handle such materials.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Permit to Take Water

Based on the daily dewatering flow rates provided in Section 4.4 for culverts and sewers, it is anticipated that dewatering activities will exceed the 50,000 L/day limit that would require a PTTW, although this will be governed by the number of culverts or sewer segments that are

excavated concurrently. Therefore, it is recommended that a Category 3 PTTW from the MOE should be obtained for dewatering of the sewer and culvert excavations.

6.2 Discharge of Groundwater

Based on conditions typically encountered for open excavations in till, it is expected that groundwater would require treatment prior to direct discharge into surface water. Treatment to remove suspended sediment and adjustment of temperature would likely be minimum requirements. Further assessment and review of disposal or treatment options would be required if dewatered excavations are to be made in the vicinity of the areas of potential environmental concern as discussed in Section 5.4. Where feasible, it is recommended that groundwater should be discharged at least 30 m away from any surface water bodies.

The assessment contained herein has been provided for review of permit requirements only. Design of temporary dewatering systems and facilities should be carried out by a dewatering specialist retained by the contractor.

6.3 Control of Impacts

The following measures are recommended to mitigate the potential for the dewatering activities to impact the elements described above:

- Monitoring of water quality for groundwater collected within the excavation dewatering system to confirm the water quality is appropriate for the selected discharge option.
- Where possible, it is recommended that groundwater should be discharged at least 30 m away from any streams.
- If discharge to sewers or surface water bodies is proposed, treatment of groundwater to meet acceptable levels is required. Suitable treatment would likely include measures to address suspended sediment and adjust temperature to acceptable levels. The operation and monitoring of discharge facilities should be carried out by a qualified specialist familiar with fisheries and water quality requirements.
- Where discharge is to ground surface or water course, temporary erosion control measures should be installed to control erosion at the discharge points.

- For private wells identified within or adjacent to the inferred radius zone of influence, provision should be made for alternate water supply, and a well monitoring program is recommended to assess the potential impacts.

6.4 Well Monitoring Program

The well monitoring program for the private wells identified along Mayfield Road in this report should consist of measuring the groundwater level and testing the groundwater quality at each well (allowance for monitoring approximately 20 wells is recommended). The quantity and quality measurements should be collected at least 1 week prior to construction, during the period of construction dewatering, and at approximately 1 month following the completion of construction. The during-construction and post-construction measurements and test results should be compared with the pre-construction results to assess the extent of potential impact, if any. Provision for additional quantity and quality tests should be allowed for if problems arise with the wells during construction.

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STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

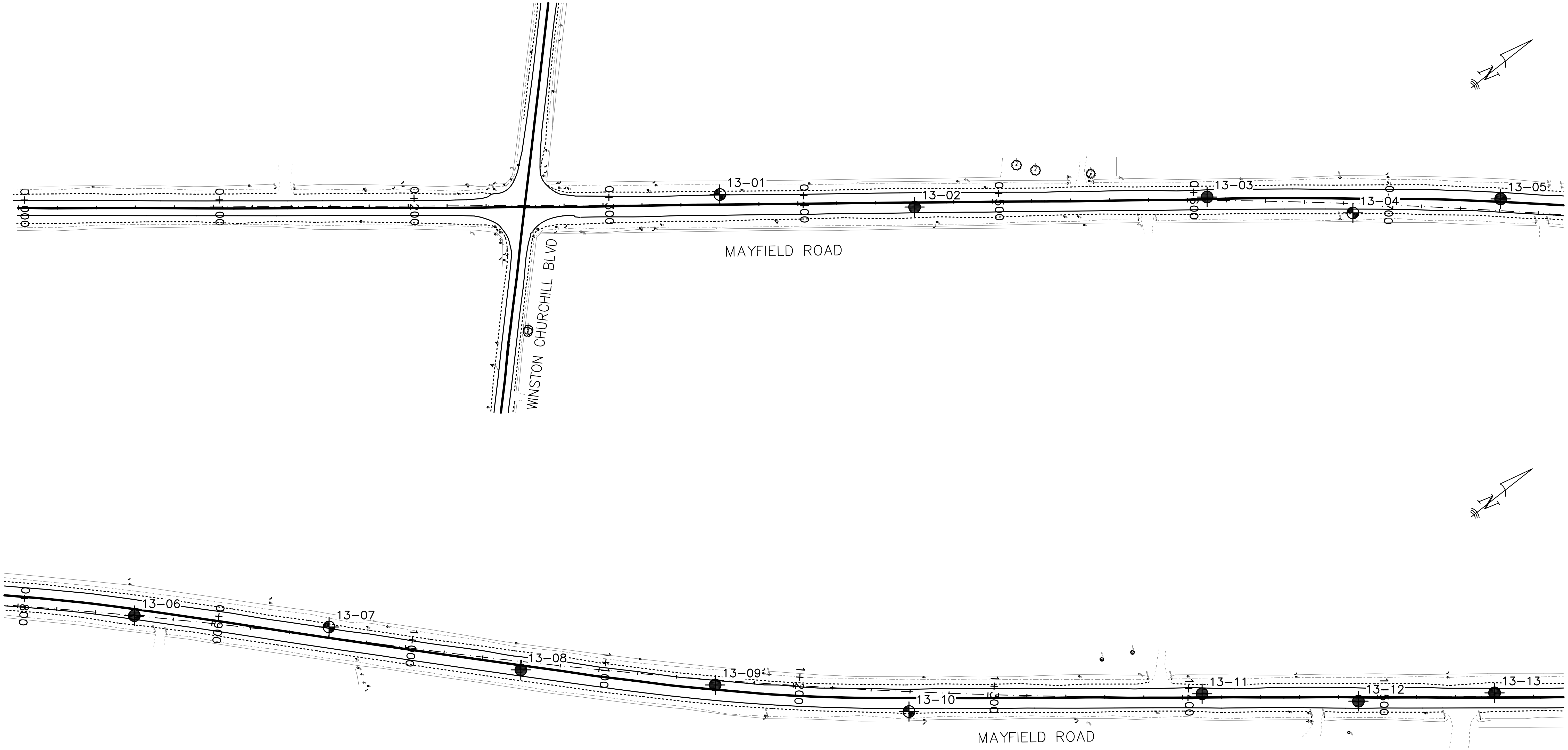
Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

APPENDIX A

FIGURES



LEGEND

- APPROXIMATE FOUNDATION BOREHOLE LOCATION
- APPROXIMATE PAVEMENT BOREHOLE LOCATION

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HATCH MOTT MACDONALD

MAYFIELD ROAD
WINSTON CHURCHILL BOULEVARD
TO CHINGUACOUSY ROAD
CLASS ENVIRONMENTAL ASSESSMENT
BOREHOLE LOCATION PLAN

JOB# 19-1605-148

THURBER ENGINEERING LTD.

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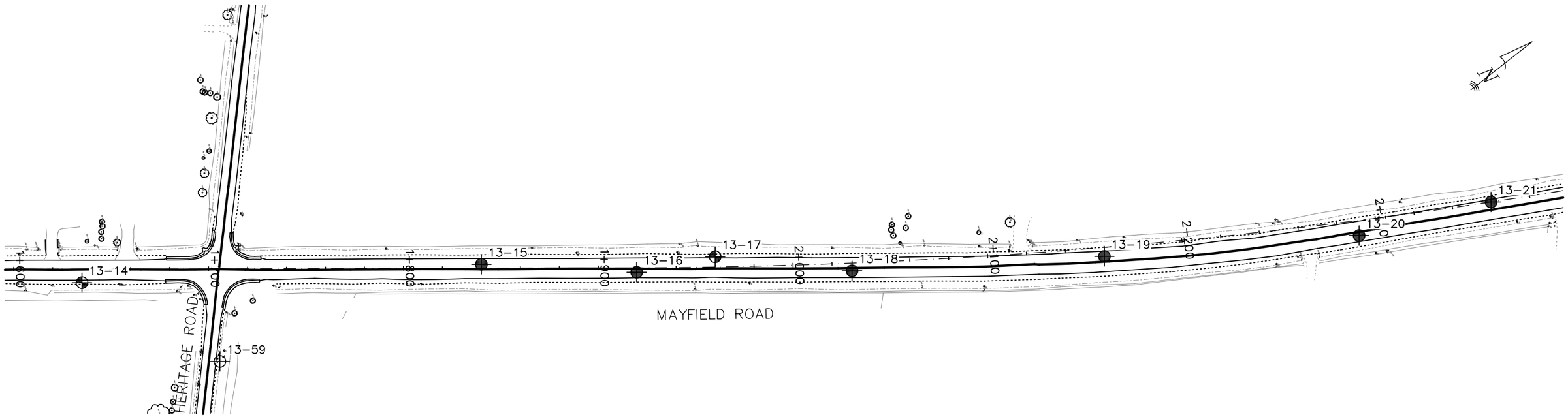

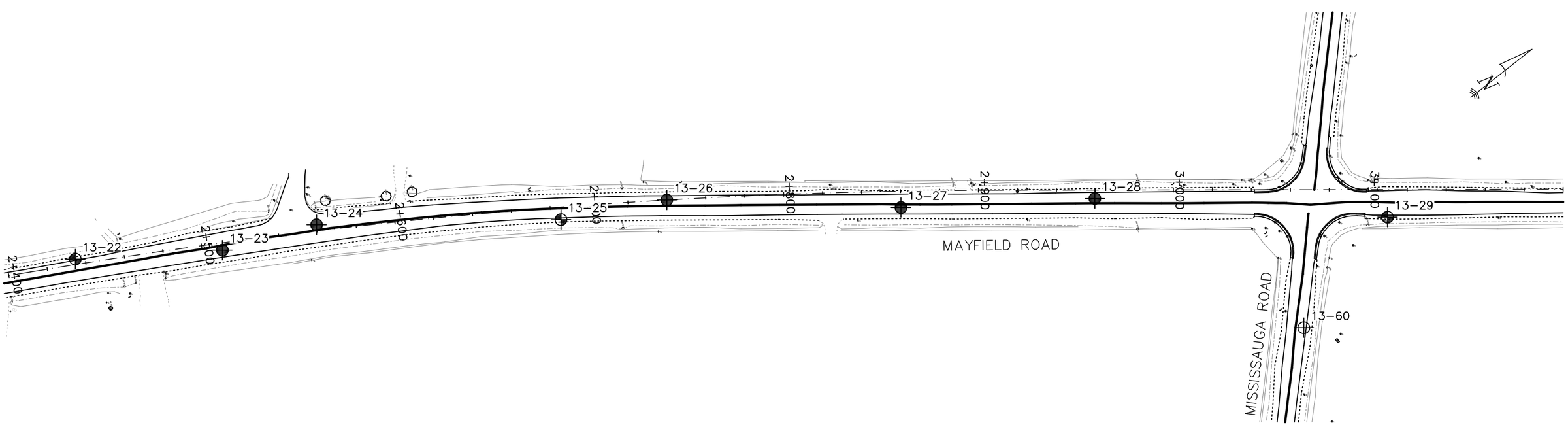

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HATCH MOTT MACDONALD

MAYFIELD ROAD
WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD CLASS ENVIRONMENTAL ASSESSMENT

BOREHOLE LOCATION PLAN

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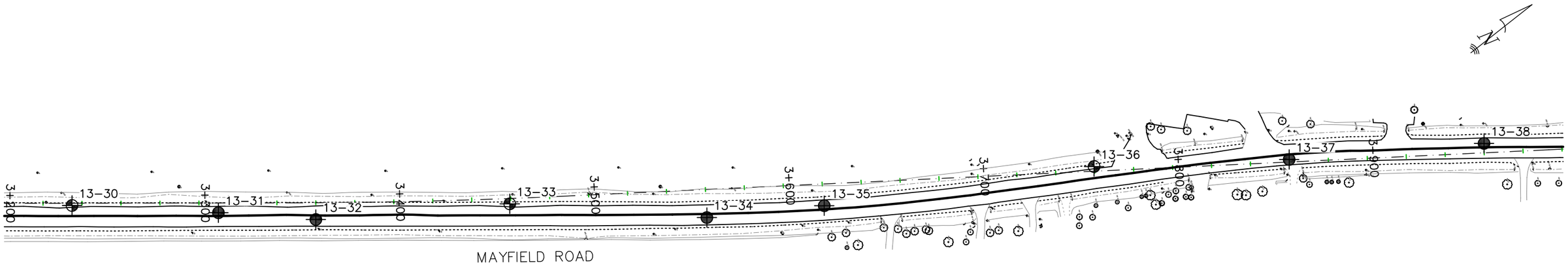

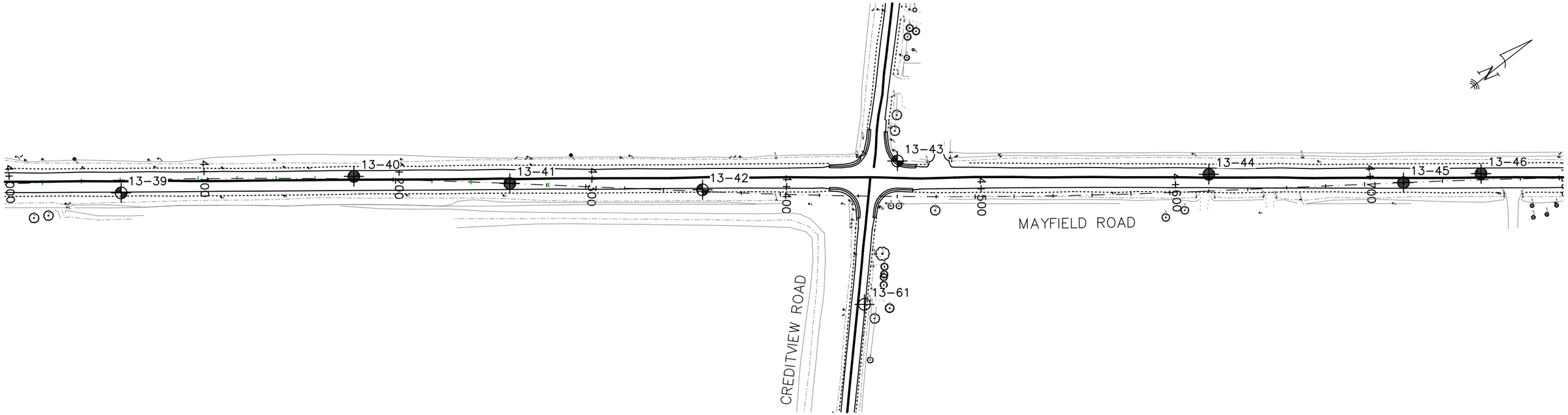

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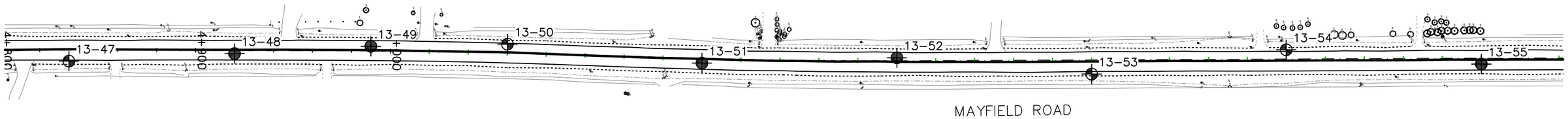

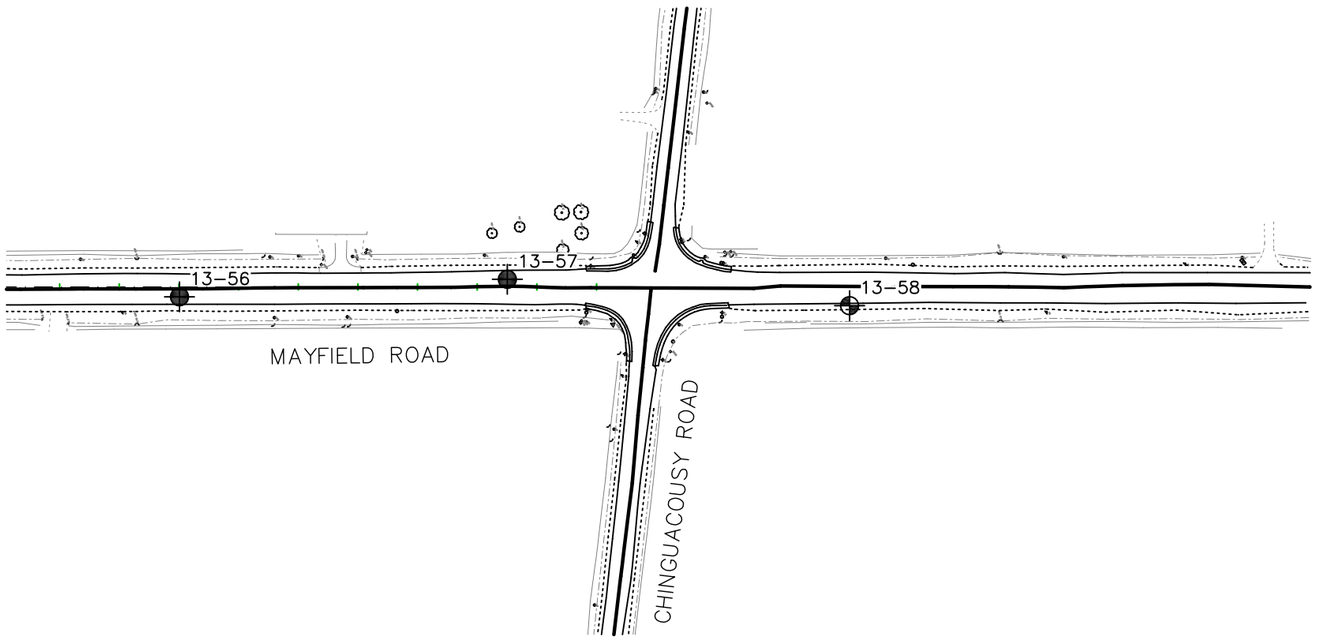

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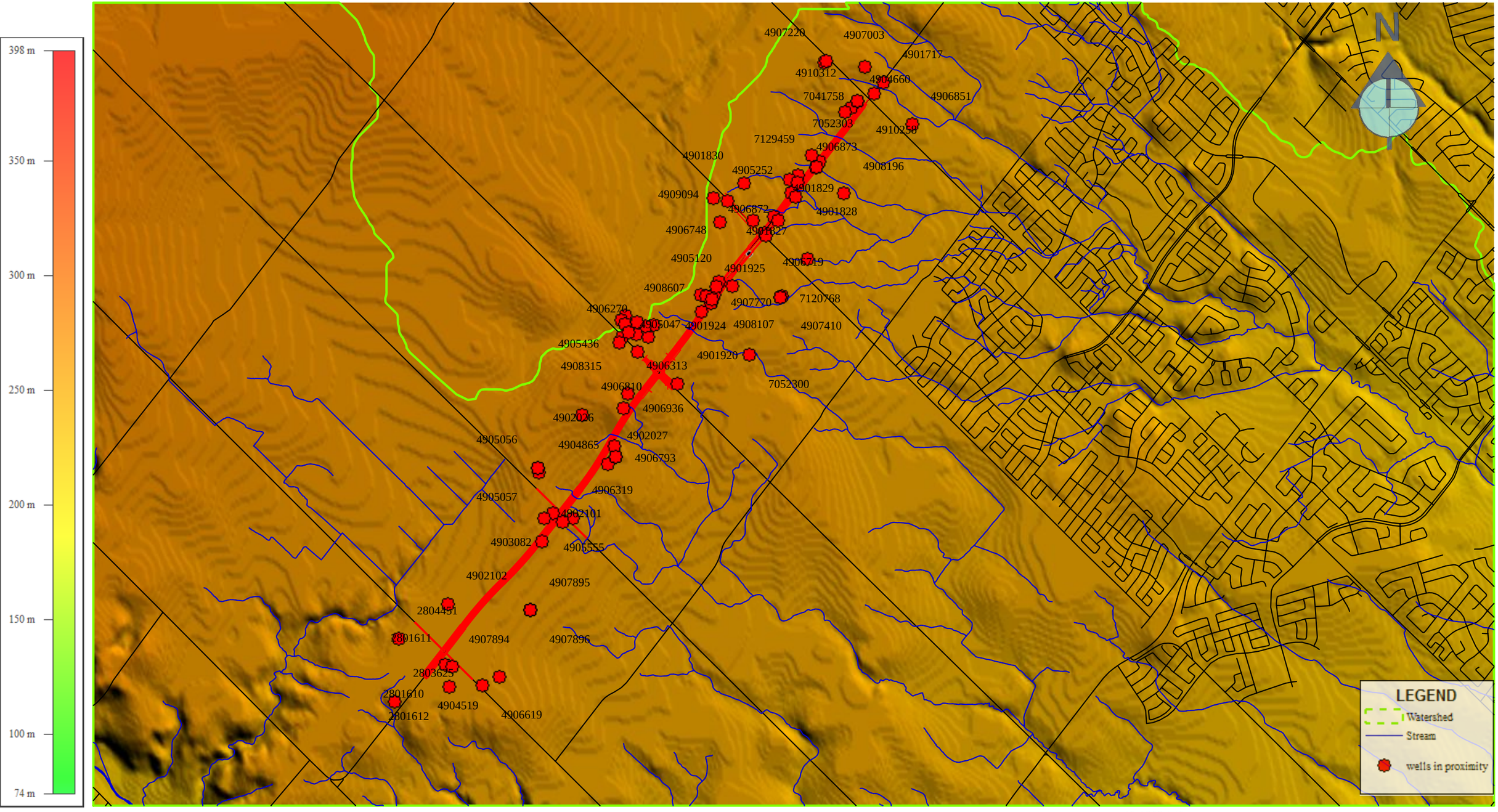
DATE:	SCALE:	DRAWING No.
MAY 2015	1:2000	FIGURE 1

FILENAME: H:\Drafting\19\1605\148\ted5148-BoreholePlan(2015-05-04).dwg
PLOTDATE: May 20, 2015 - 11:24 AM



19-1605-148

FIGURE 2:
MAYFIELD ROAD
Regional Hydrogeologic Conditions
MOE well records within 500 m

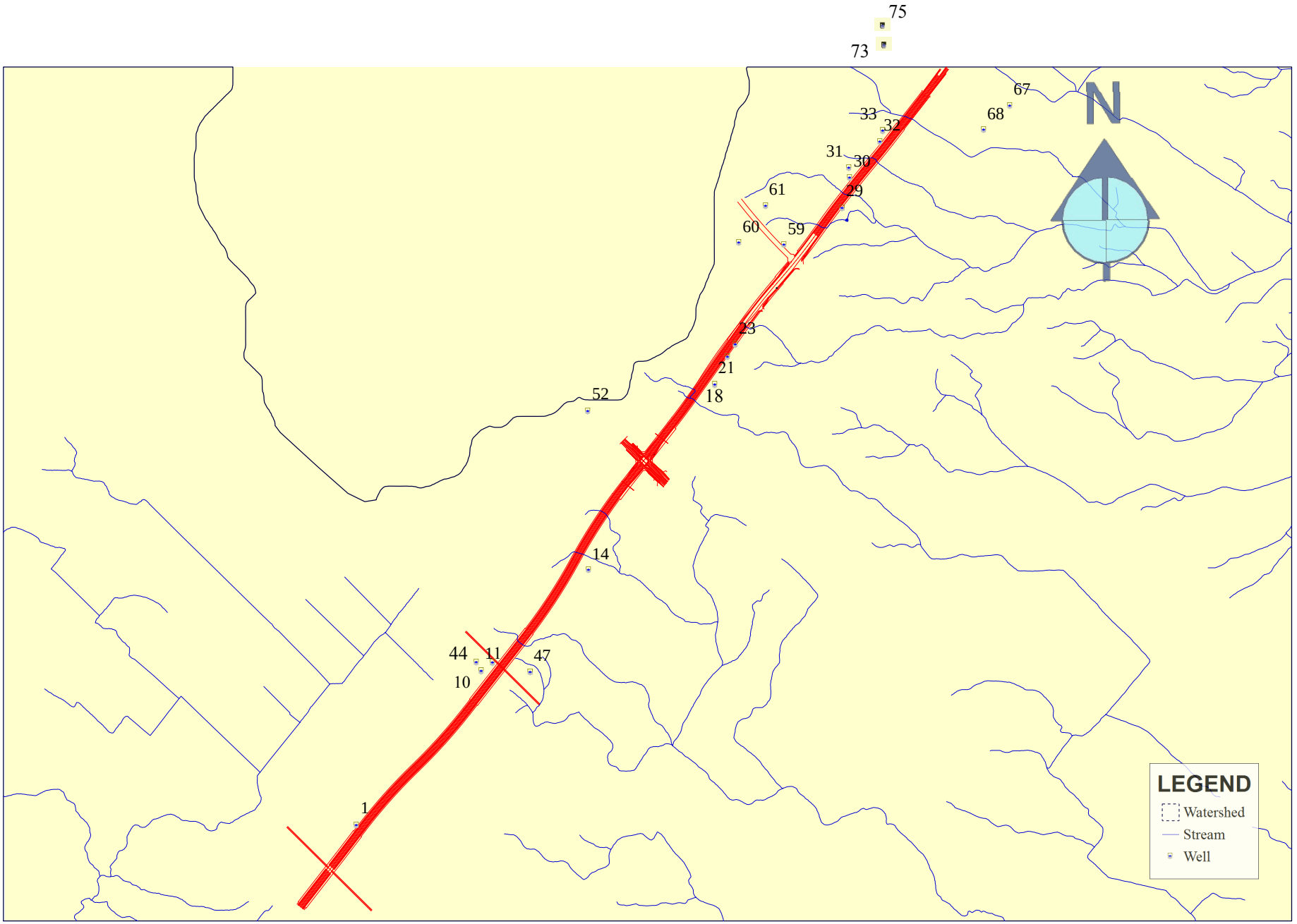


FIGURE 3:
MAYFIELD ROAD
APPROXIMATE LOCATION OF WELLS REPORTED DURING SURVEY

APPENDIX B

RECORD OF BOREHOLE SHEETS

SYMBOLS, ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES

1. TEXTURAL CLASSIFICATION OF SOILS

CLASSIFICATION	PARTICLE SIZE	VISUAL IDENTIFICATION
Boulders	Greater than 200mm	same
Cobbles	75 to 200mm	same
Gravel	4.75 to 75mm	5 to 75mm
Sand	0.075 to 4.75mm	Not visible particles to 5mm
Silt	0.002 to 0.075mm	Non-plastic particles, not visible to the naked eye
Clay	Less than 0.002mm	Plastic particles, not visible to the naked eye

2. COARSE GRAIN SOIL DESCRIPTION (50% greater than 0.075mm)

TERMINOLOGY	PROPORTION
Trace or Occasional	Less than 10%
Some	10 to 20%
Adjective (e.g. silty or sandy)	20 to 35%
And (e.g. sand and gravel)	35 to 50%

3. TERMS DESCRIBING CONSISTENCY (COHESIVE SOILS ONLY)

DESCRIPTIVE TERM	UNDRAINED SHEAR STRENGTH (kPa)	APPROXIMATE SPT[(1)] 'N' VALUE
Very Soft	12 or less	Less than 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	Greater than 200	Greater than 30

NOTE: Hierarchy of Soil Strength Prediction

1) Laboratory Triaxial Testing
2) Field Insitu Vane Testing
3) Laboratory Vane Testing
4) SPT value
5) Pocket Penetrometer

4. TERMS DESCRIBING DENSITY (COHESIONLESS SOILS ONLY)

DESCRIPTIVE TERM	SPT "N" VALUE
Very Loose	Less than 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	Greater than 50

5. LEGEND FOR RECORDS OF BOREHOLES

SYMBOLS AND ABBREVIATIONS FOR SAMPLE TYPE	SS Split Spoon Sample	WS Wash Sample	AS Auger (Grab) Sample
	TW Thin Wall Shelby Tube Sample		TP Thin Wall Piston Sample
	PH Sampler Advanced by Hydraulic Pressure		PM Sampler Advanced by Manual Pressure
	WH Sampler Advanced by Self Static Weight	RC Rock Core	SC Soil Core

$$\text{Sensitivity} = \frac{\text{Undisturbed Shear Strength}}{\text{Remoulded Shear Strength}}$$

▼ Water Level

C_{pen} Shear Strength Determination by Pocket Penetrometer

(1) SPT 'N' Value Standard Penetration Test 'N' Value – refers to the number of blows from a 63.5kg hammer free falling a height of 0.76m to advance a standard 50 mm outside diameter split spoon sampler for 0.3 m depth into undisturbed ground.

(2) DCPT Dynamic Cone Penetration Test – Continuous penetration of a 50 mm outside diameter, 60° conical steel point attached to "A" size rods driven by a 63.5 kg hammer free falling a height of 0.76 m. The resistance to cone penetration is the number of hammer blows required for each 0.3 m advance of the conical point into undisturbed ground.

UNIFIED SOILS CLASSIFICATION

MAJOR DIVISIONS		GROUP SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel-sand mixtures, little or no fines.
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines.
		GM	Silty gravels, gravel-sand-silt mixtures.
		GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS	SW	Well-graded sands or gravelly sands, little or no fines.
		SP	Poorly-graded sands or gravelly sands, little or no fines.
		SM	Silty sands, sand-silt mixtures.
		SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS $W_L < 50\%$	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. ($W_L < 30\%$).
		CI	Inorganic clays of medium plasticity, silty clays. ($30\% < W_L < 50\%$).
		OL	Organic silts and organic silty-clays of low plasticity.
	SILTS AND CLAYS $W_L > 50\%$	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.
CLAY SHALE			
SANDSTONE			
SILTSTONE			
CLAYSTONE			
COAL			

RECORD OF BOREHOLE 13-01

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 0+360 WB Shoulder
STARTED : October 8, 2013
COMPLETED : October 8, 2013
N 4 836 446.8 E 589 626.0

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		265.10				
0	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
				264.34				
1		**CLAY**, silty, some sand, trace gravel, trace organics, firm, brown: (TILL)		0.76	1	SS	6	
2					2	SS	7	
				262.97				
		CLAY, silty, sandy, trace gravel, firm to very stiff, brown: (TILL)		2.13	3	SS	18	
3					4	SS	26	
4					5	SS	27	Grain Size Analysis: Gr 3%/ Sa 22%/ Si 37%/ Cl 38%
				260.68				
		END OF BOREHOLE AT 4.42m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		4.42				
5		WATER LEVEL READINGS: DATE / DEPTH(m) / ELEV.(m) Mar27/2014 0.10 (frozen) - Oct28/2014 destroyed						
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION
Bentonite
Filter Sand
Slotted Screen

GROUNDWATER ELEVATIONS
▽ WATER LEVEL UPON COMPLETION
▼ WATER LEVEL IN PIEZOMETER
March 27, 2014

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-04

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 0+685 EB Shoulder
STARTED : October 7, 2013
COMPLETED : October 7, 2013
N 4 836 696.3 E 589 834.2

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		263.70				
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, compact, brown, moist: (FILL)		0.00	1	SS	16	Grain Size Analysis: Gr 31%/ Sa 50%/ Si & Cl 19%
				262.94				
1		**CLAY**, silty, sandy, trace gravel, trace organics, firm, brown: (TILL)(CL)		0.76	2	SS	4	
					3	SS	5	Grain Size Analysis: Gr 0%/ Sa 20%/ Si 48%/ Cl 32%
2				261.41				
		CLAY, silty, sandy, trace gravel, very stiff, brown: (TILL)(CL)		2.29	4	SS	16	
3					5	SS	23	Grain Size Analysis: Gr 2%/ Sa 28%/ Si 52%/ Cl 18%
4					6	SS	24	
				259.28				
		END OF BOREHOLE AT 4.42m. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		4.42				
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-07

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 0+960 WB Shoulder
STARTED : October 8, 2013
COMPLETED : October 8, 2013
N 4 836 904.6 E 590 013.6

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		263.80				
0	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		Grain Size Analysis: Gr 32%/ Sa 55%/ Si & Cl 13%
		CLAY, silty, sandy, firm, brown: (TILL)		263.32 0.48				
1					1	SS	6	Grain Size Analysis: Gr 0%/ Sa 20%/ Si 40%/ Cl 40%
				262.35				
		CLAY, silty, sandy, trace gravel, very stiff to hard, brown: (TILL)		1.45				
2					2	SS	18	
					3	SS	22	
3								
					4	SS	36	
4					5	SS	26	
				259.38				
		END OF BOREHOLE AT 4.42m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		4.42				
5		WATER LEVEL READINGS: DATE DEPTH(m) ELEV.(m) Mar27/2014 0.10 (frozen) - Oct28/2014 dry at 0.90 (blocked)						
6								
7								
8								
9								
10								
11								
12								
13								
14								

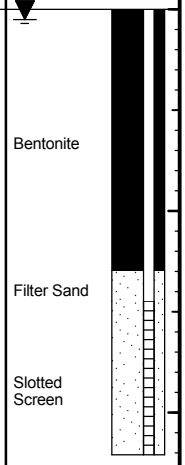
DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION

▼ WATER LEVEL IN PIEZOMETER
March 27, 2014

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-10

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 1+260 EB Shoulder
STARTED : October 7, 2013
COMPLETED : October 7, 2013
N 4 837 111.7 E 590 231.7

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		263.30				
0	Solid Stem Augers	**GRANLAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
				262.54				
1		**CLAY**, silty, sandy, trace organics, firm, brown: (TILL)		0.76	2	SS	5	
2					3	SS	6	Grain Size Analysis: Gr 0%/ Sa 21%/ Si 48%/ Cl 31%
				261.01				
		CLAY, silty, sandy, trace gravel, very stiff, brown: (TILL)		2.29	4	SS	16	
3								
					5	SS	23	
4					6	SS	24	
				258.88				
		END OF BOREHOLE AT 4.42m. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		4.42				
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-14

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 1+635 EB Shoulder
STARTED : October 7, 2013
COMPLETED : October 7, 2013
N 4 837 407.3 E 590 463.2

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		262.30				
0	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
				261.70				
1		**CLAY**, silty, sandy, trace organics, firm, brown: (TILL)		0.60	1	SS	6	
2					2	SS	4	Grain Size Analysis: Gr 0%/ Sa 26%/ Si 41%/ Cl 33%
				260.01				
		CLAY, silty, sandy, trace gravel, very stiff, brown: (TILL)		2.29	3	SS	14	Grain Size Analysis: Gr 0%/ Sa 26%/ Si 40%/ Cl 34%
3					4	SS	21	
4					5	SS	22	
				257.88				
		END OF BOREHOLE AT 4.42m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		4.42				
5		WATER LEVEL READINGS: DATE DEPTH(m) ELEV.(m) Mar27/2014 0.30 (frozen) - Oct28/2014 destroyed						
6								
7								
8								
9								
10								
11								
12								
13								
14								

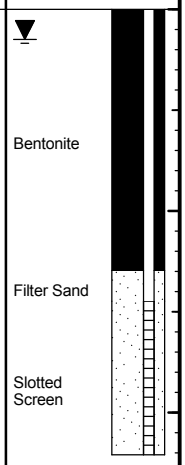
DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION

▼ WATER LEVEL IN PIEZOMETER
March 27, 2014

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-17

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 1+960 WB Shoulder
STARTED : October 8, 2013
COMPLETED : October 8, 2013
N 4 837 671.0 E 590 653.6

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS
		GROUND SURFACE		262.00				
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
		CLAY, silty, sandy, trace organics, firm, brown: (TILL)		261.49 0.51	1	SS	5	
1					2	SS	4	
2		**CLAY**, silty, sandy, trace gravel, very stiff, brown: (TILL)		259.87 2.13	3	SS	8	
3					4	SS	29	
4					5	SS	26	Grain Size Analysis: Gr 4%/ Sa 16%/ Si 39%/ Cl 41%
		END OF BOREHOLE AT 4.42m. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		257.58 4.42				
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-22

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 2+435 WB Shoulder
STARTED : October 8, 2013
COMPLETED : October 8, 2013
N 4 838 068.4 E 590 911.7

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		263.20				
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
				262.57				
1		**CLAY**, silty, sandy, firm, brown: (TILL)		0.63	1	SS	8	
				261.83				
		CLAY, silty, sandy, trace gravel, very stiff to firm, brown: (TILL)(CL)		1.37				
2					2	SS	19	
					3	SS	18	
3					4	SS	16	
4					5	SS	11	
5					6	SS	6	Grain Size Analysis: Gr 2%/ Sa 28%/ Si 43%/ Cl 27%
6					7	SS	15	
				256.49				
7		END OF BOREHOLE AT 6.71m. Well installation consists of 50mm diameter Schedule 40 PVC pipe with a 3.0m slotted screen.		6.71				
8		WATER LEVEL READINGS: DATE DEPTH(m) ELEV.(m) Mar27/2014 3.50 - Oct28/2014 destroyed						
9								
10								
11								
12								
13								
14								

SHEAR STRENGTH: Cu, KPa (nat V - ✚, rem V - ●, Q - ✖, Cpen ▲) 40 80 120 160
DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
WATER CONTENT, PERCENT wp w wl 10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION: Bentonite; Filter Sand; Slotted Screen

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION

▼ WATER LEVEL IN PIEZOMETER
March 27, 2014

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-25

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 2+685 EB Shoulder
STARTED : October 7, 2013
COMPLETED : October 7, 2013
N 4 838 276.8 E 591 049.8

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		263.40				
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
		CLAY, silty, sandy, trace gravel, stiff to very stiff, brown: (TILL)		262.79 0.61				
1					1	SS	11	Grain Size Analysis: Gr 1%/ Sa 27%/ Si 38%/ Cl 34%
2					2	SS	21	
3					3	SS	32	Grain Size Analysis: Gr 0%/ Sa 26%/ Si 35%/ Cl 39%
					4	SS	27	
4					5	SS	27	
		END OF BOREHOLE AT 4.42m. BOREHOLE BACKFILLED WITH CUTTINGS TO SURFACE.		258.98 4.42				
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-29

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 3+110 EB Shoulder
STARTED : October 7, 2013
COMPLETED : October 7, 2013
N 4 838 611.0 E 591 310.9

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		264.40				
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
				263.79				
1		**CLAY**, silty, sandy, trace gravel, trace organics, firm, brown: (TILL)		0.61	1	SS	5	Grain Size Analysis: Gr 2%/ Sa 26%/ Si 51%/ Cl 21%
2					2	SS	3	Grain Size Analysis: Gr 0%/ Sa 26%/ Si 56%/ Cl 18%
				262.19				
		CLAY, silty, sandy, trace gravel, stiff to very stiff, brown: (TILL)		2.21	3	SS	12	
3					4	SS	20	
4					5	SS	23	
				259.98				
		END OF BOREHOLE AT 4.42m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		4.42				
5		WATER LEVEL READINGS: DATE / DEPTH(m) / ELEV.(m) Mar27/2014 0.10 (frozen) - Oct28/2014 2.10 -						
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH: Cu, KPa — nat V - ✚ Q - ✖ — rem V - ● Cpen ▲ — 40 80 120 160

WATER CONTENT, PERCENT — wp w wl — 10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION: Bentonite; Filter Sand; Slotted Screen

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION

▼ WATER LEVEL IN PIEZOMETER
October 28, 2014

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-30

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 3+235 WB Shoulder
STARTED : October 8, 2013
COMPLETED : October 8, 2013
N 4 838 717.4 E 591 377.9

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		264.50				
0	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
		CLAY, silty, sandy, firm, brown: (TILL)		263.99 0.51	1	SS	5	
1				263.05				
		CLAY, silty, sandy, trace gravel, very stiff, brown: (TILL)		1.45	2	SS	15	Grain Size Analysis: Gr 2%/ Sa 26%/ Si 39%/ Cl 33%
2					3	SS	22	
3					4	SS	28	
4		becoming hard		260.08	5	SS	70	
		END OF BOREHOLE AT 4.42m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		4.42				
5		WATER LEVEL READINGS: DATE DEPTH(m) ELEV.(m) Mar27/2014 0.00 (frozen) - Oct28/2014 destroyed						
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH: Cu, KPa (nat V - ✚ Q - ✖; rem V - ● Cpen ▲): 40 80 120 160

WATER CONTENT, PERCENT: wp w wl; 10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION: Cuttings; Bentonite; Filter Sand; Slotted Screen

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION

▼ WATER LEVEL IN PIEZOMETER
March 27, 2014

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-33

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 3+460 WB Shoulder
STARTED : October 8, 2013
COMPLETED : October 8, 2013
N 4 838 894.5 E 591 516.0

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS
		GROUND SURFACE		264.70				
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
				264.14				
1		**CLAY**, silty, sandy, trace organics, firm, brown: (TILL)		0.56	1	SS	6	
				263.18				
2		**CLAY**, silty, sandy, trace gravel, stiff, brown: (TILL)(CL)		1.52	2	SS	14	
					3	SS	15	
3					4	SS	14	Grain Size Analysis: Gr 6%/ Sa 25%/ Si 42%/ Cl 27%
4		becoming hard		260.20	5	SS	68	Grain Size Analysis: Gr 5%/ Sa 32%/ Si 39%/ Cl 24%
		SAND, silty, trace gravel, very dense, brown, moist		4.50	6	SS	98	
5								
6				258.45	7	SS	50/ 0.150	
		END OF BOREHOLE AT 6.25m UPON REFUSAL. WATER LEVEL AT 3.80m IN OPEN HOLE. Well installation consists of 50mm diameter Schedule 40 PVC pipe with a 3.0m slotted screen.		6.25				
7								
8		WATER LEVEL READINGS: DATE DEPTH(m) ELEV.(m) Mar27/2014 destroyed						
9								
10								
11								
12								
13								
14								

SHEAR STRENGTH: Cu, KPa (nat V - ✚, rem V - ●, Q - ✖, Cpen ▲) 40 80 120 160
WATER CONTENT, PERCENT wp w wl 10 20 30 40
DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100
ADDITIONAL LAB. TESTING
PIEZOMETER OR STANDPIPE INSTALLATION: Bentonite; Filter Sand; Slotted Screen

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION October 8, 2013
▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-36

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 3+760 WB Shoulder
STARTED : October 8, 0213
COMPLETED : October 8, 2013
N 4 839 142.0 E 591 686.3

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS / DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	SHEAR STRENGTH: Cu, KPa (nat V - ✚, rem V - ●, Q - ✖, Cpen ▲) 40 80 120 160 / WATER CONTENT, PERCENT (wp, w, wl) 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		264.80							
		ASPHALT: (225mm)		264.57 0.99							
		GRANULAR, gravely sand, crushed, brown, moist: (FILL)		264.27 0.23	1	GS		Grain Size Analysis: Gr 30%/ Sa 46%/ Si & Cl 24%	○		
		CLAY, silty, sandy, trace gravel, partially granular, stiff, brown: (FILL)		0.53	1	SS	9		○		
	Solid Stem Augers	**CLAY**, silty, sandy, trace gravel, stiff to very stiff, brown: (TILL)		263.28 1.52	2	SS	13		○		
					3	SS	17		○		
					4	SS	27		○		
		SAND, silty, trace gravel, dense, brown, moist		260.99 3.81	5	SS	45	Grain Size Analysis: Gr 1%/ Sa 77%/ Si & Cl 22%	○		
		END OF BOREHOLE AT 4.42m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.15m, THEN ASPHALT PATCH TO SURFACE.		260.38 4.42							

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-39

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 4+060 EB Shoulder
STARTED : October 17, 2013
COMPLETED : October 17, 2013
N 4 839 380.9 E 591 868.6

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS
		GROUND SURFACE		264.00				
		TOPSOIL: (50mm)		264.00				
		GRANULAR, gravelly sand, crushed, trace organics, brown, moist: (FILL)		263.44	1	GS		
		CLAY, silty, sandy, trace organics, soft, brown: (TILL)		0.56	1	SS	3	
	Solid Stem Augers	**CLAY**, silty, sandy, trace gravel, firm to hard, brown: (TILL)(CI-CL)		262.48 1.52	2	SS	5	Grain Size Analysis: Gr 2%/ Sa 19%/ Si 42%/ Cl 37%
					3	SS	19	
					4	SS	40	Grain Size Analysis: Gr 1%/ Sa 23%/ Si 37%/ Cl 39%
		SAND, silty, some gravel, occasional cobbles and limestone, very dense, brown, moist		260.19 3.81	5	SS	67	
		END OF BOREHOLE AT 4.4m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		259.58 4.42				

WATER LEVEL READINGS:
DATE DEPTH(m) ELEV.(m)
Mar27/2014 destroyed

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION
Bentonite
Filter Sand
Slotted Screen

GROUNDWATER ELEVATIONS
▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-42

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 4+360 EB Shoulder
STARTED : October 7, 2013
COMPLETED : October 7, 2013
N 4 839 616.5 E 592 051.8

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS
		GROUND SURFACE		261.70				
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		261.52	1	GS		
		CLAY, silty, sandy, trace gravel, stiff to very stiff, brown: (TILL)		0.18				
1					1	SS	9	
2					2	SS	18	
3					3	SS	24	Grain Size Analysis: Gr 1%/ Sa 26%/ Si 45%/ Cl 28%
4					4	SS	19	
					5	SS	15	
				257.28				
5		END OF BOREHOLE AT 4.42m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.30m, THEN CUTTINGS TO SURFACE.		4.42				
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-43

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 4+460 WB Shoulder
STARTED : October 8, 2013
COMPLETED : October 8, 2013
N 4 839 704.2 E 592 102.0

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS
		GROUND SURFACE		261.00				
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		Grain Size Analysis: Gr 39%/ Sa 50%/ Si & Cl 11%
		CLAY, silty, sandy, trace organics, firm, brown, moist: (TILL)(CL)		260.49 0.51				
1					1	SS	8	Grain Size Analysis: Gr 0%/ Sa 25%/ Si 62%/ Cl 13%
2					2	SS	5	
		CLAY, silty, sandy, trace gravel, stiff to very stiff, brown: (TILL)(CL)		258.71 2.29	3	SS	11	
3					4	SS	21	Grain Size Analysis: Gr 3%/ Sa 20%/ Si 59%/ Cl 18%
4					5	SS	29	
		END OF BOREHOLE AT 4.42m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.30m, THEN CUTTINGS TO SURFACE.		256.58 4.42				
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-47

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 4+835 EB Shoulder
STARTED : October 7, 2013
COMPLETED : October 7, 2013
N 4 839 990.1 E 592 344.7

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS
		GROUND SURFACE		258.20				
0	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
				257.44				
1		**CLAY**, silty, sandy, trace organics, stiff to firm, brown: (TILL)		0.76	1	SS	9	
					2	SS	7	Grain Size Analysis: Gr 0%/ Sa 18%/ Si 41%/ Cl 41%
2				255.99				
		CLAY, silty, sandy, trace gravel, stiff to hard, brown: (TILL)		2.21	3	SS	14	
3					4	SS	30	
4					5	SS	35	
5					6	SS	10	
6					7	SS	10	Grain Size Analysis: Gr 0%/ Sa 33%/ Si 41%/ Cl 26%
				251.49				
7		END OF BOREHOLE AT 6.71m. WATER LEVEL AT 6.30m IN OPEN HOLE. Well installation consists of 50mm diameter Schedule 40 PVC pipe with a 3.0m slotted screen.		6.71				
8		WATER LEVEL READINGS: DATE DEPTH(m) ELEV.(m) Mar27/2014 destroyed						
9								
10								
11								
12								
13								
14								

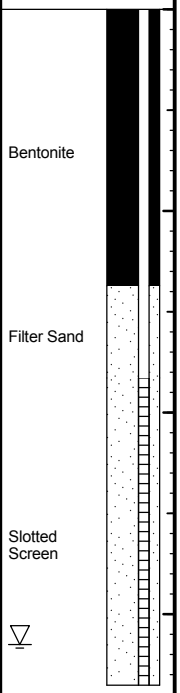
SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION
October 7, 2013

▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-50

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 5+060 WB Shoulder
STARTED : October 8, 2013
COMPLETED : October 8, 2013
N 4 840 172.4 E 592 477.0

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS
		GROUND SURFACE		257.30				
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
		CLAY, silty, sandy, trace gravel, firm to very stiff, brown: (TILL)		256.77 0.53	1	SS	6	
1					2	SS	7	
2					3	SS	21	Grain Size Analysis: Gr 3%/ Sa 27%/ Si 40%/ Cl 30%
3					4	SS	27	
4					5	SS	23	
				252.88				
5		END OF BOREHOLE AT 4.42m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.30m, THEN CUTTINGS TO SURFACE.		4.42				
6								
7								
8								
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH: Cu, KPa
nat V - ✚ Q - ✖
rem V - ● Cpen ▲
40 80 120 160

WATER CONTENT, PERCENT
wp w wl
10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-53

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 5+360 EB Shoulder
STARTED : October 11, 2013
COMPLETED : October 11, 2013
N 4 840 398.7 E 592 674.5

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS
		GROUND SURFACE		256.50				
0	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS		
				255.99				
		CLAY, silty, sandy, trace gravel, stiff to very stiff, brown: (TILL)		0.51				
1					1	SS	14	
2					2	SS	16	
3					3	SS	19	
					4	SS	24	Grain Size Analysis: Gr 4%/ Sa 23%/ Si 40%/ Cl 33%
4					5	SS	15	
5					6	SS	8	
				250.86				
		SAND, silty, trace gravel, compact, brown, moist		5.64				
6					7	SS	10	
				249.79				
7		END OF BOREHOLE AT 6.71m. WATER LEVEL AT 5.90m IN OPEN HOLE. Well installation consists of 50mm diameter Schedule 40 PVC pipe with a 3.0m slotted screen.		6.71				
8		WATER LEVEL READINGS: DATE DEPTH(m) ELEV.(m) Mar27/2014 destroyed						
9								
10								
11								
12								
13								
14								

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH: Cu, KPa (nat V - ✚ Q - ✖; rem V - ● Cpen ▲): 40 80 120 160

WATER CONTENT, PERCENT: wp w wl; 10 20 30 40

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION: Bentonite; Filter Sand; Slotted Screen

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION October 11, 2013

▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-54

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 5+460 WB Shoulder
STARTED : October 8, 2013
COMPLETED : October 8, 2013
N 4 840 484.8 E 592 726.4

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	COMMENTS	SHEAR STRENGTH: Cu, KPa (nat V - ✚, rem V - ●, Q - ✖, Cpen ▲) / WATER CONTENT, PERCENT (wp, w, wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		256.60				DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	40 80 120 160 / wp w wl 10 20 30 40		
	Solid Stem Augers	**GRANULAR**, gravelly sand, crushed, brown, moist: (FILL)		0.00	1	GS			○		
				256.09							
		CLAY, silty, sandy, trace gravel, firm to stiff, brown: (TILL)		0.51							
1					1	SS	7	Grain Size Analysis: Gr 0%/ Sa 32%/ Si 40%/ Cl 28%	○		
2					2	SS	10		○		
3					3	SS	13		○		
					4	SS	15		○		
4					5	SS	12		○		
				252.18							
		END OF BOREHOLE AT 4.42m. BOREHOLE BACKFILLED WITH BENTONITE HOLEPLUG TO 0.30m, THEN CUTTINGS TO SURFACE.		4.42							
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

RECORD OF BOREHOLE 13-58

PROJECT : Mayfield Road - Class Environmental Assessment
LOCATION : Station 5+885 EB Shoulder
STARTED : October 7, 2013
COMPLETED : October 7, 2013
N 4 840 812.4 E 592 997.3

Project No. 19-1605-148
SHEET 1 OF 1
DATUM Geodetic

DEPTH SCALE (metres)	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	COMMENTS / DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)	SHEAR STRENGTH: Cu, KPa (nat V - ✚ Q - ✖ rem V - ● Cpen ▲ 40 80 120 160) / WATER CONTENT, PERCENT (wp w wl 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		256.30							
0	Solid Stem Augers	**GRANULAR**, sand and gravel, crushed, brown, moist: (FILL)		0.00	1	GS		Grain Size Analysis: Gr 53%/ Sa 39%/ Si & Cl 8%	○		
				255.72							
1		**CLAY**, silty, sandy, trace organics, firm, brown: (TILL)		0.58	1	SS	6		○		Bentonite
				254.78							
2		**CLAY**, silty, sandy, trace gravel, stiff to hard, brown: (TILL)		1.52	2	SS	10	Grain Size Analysis: Gr 0%/ Sa 17%/ Si 41%/ Cl 42%	○		
3					3	SS	18		○		Filter Sand
					4	SS	29		○		
4					5	SS	32		○		Slotted Screen
				251.88							
5		END OF BOREHOLE AT 4.42m. Piezometer installation consists of 19mm diameter Schedule 40 PVC pipe with a 1.52m slotted screen.		4.42							
6		WATER LEVEL READINGS: DATE DEPTH(m) ELEV.(m) Mar27/2014 destroyed									
7											
8											
9											
10											
11											
12											
13											
14											

GROUNDWATER ELEVATIONS

▽ WATER LEVEL UPON COMPLETION ▼ WATER LEVEL IN PIEZOMETER

LOGGED : JG
CHECKED : MEF

THURBER

THURBER2S 5148.GPJ 3/10/15

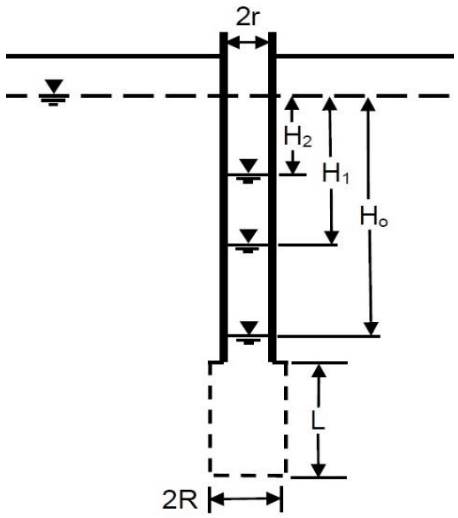
APPENDIX C

RISING HEAD TEST RESULTS

Rising Head Test

Borehole: 13-22
Method: Hvorslev (1951) based on NAVFAC Soil Mechanics Design Manual 7.01

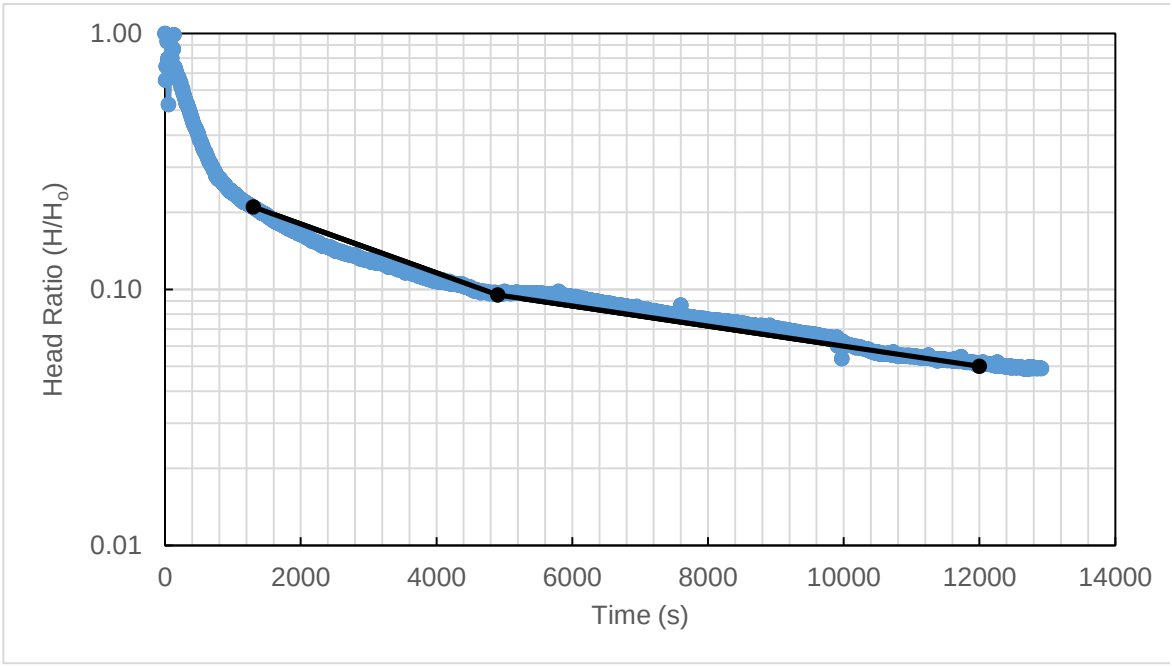
Input Data		
Well Diameter (m)	D	0.051
Well Radius (m)	r	0.026
Borehole Diameter (m)	D_b	0.127
Radius of Intake Point (m)	R	0.064
Length of screen (m)	L	3.05
Initial Unbalanced Head (m)	H_o	1.80
Shape Factor	F	4.95



$$F = \frac{2\pi L}{\ln\left(\frac{L}{R}\right)}$$

$$K = \frac{r^2}{2L} ln\left(\frac{L}{R}\right)\left[\frac{ln(H_1/H_2)}{t_2 - t_1}\right]$$

K_x = 8.6E-08 m/s to 2.1E-07 m/s



APPENDIX D

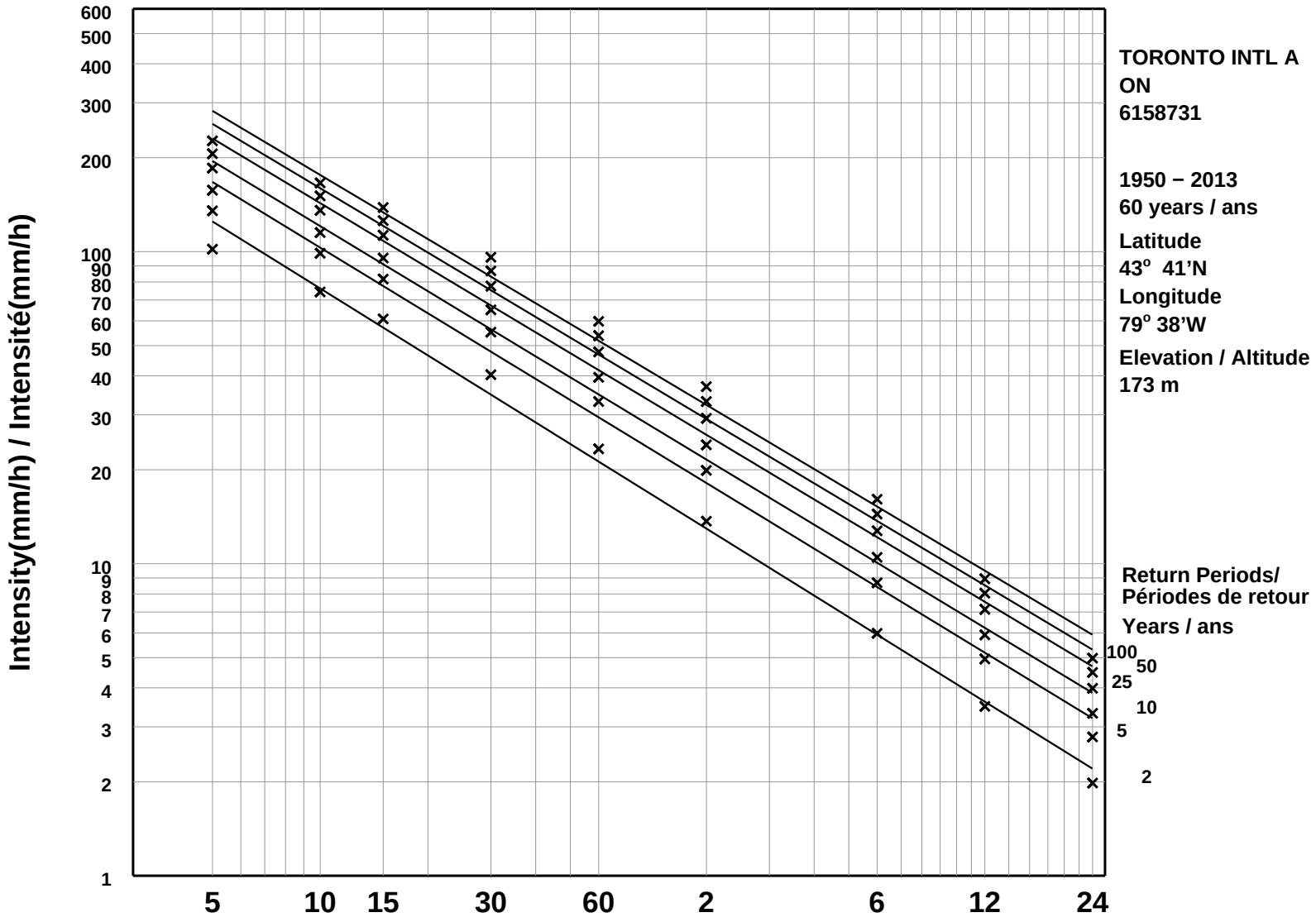
SHORT DURATION RAINFALL

INTENSITY-DURATION-FREQUENCY CURVES

Short Duration Rainfall Intensity−Duration−Frequency Data

2014/12/21

Données sur l’intensité, la durée et la fréquence des chutes de pluie de courte durée



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APPENDIX E

MOE WELL RECORDS AND

WATER WELL SURVEY RESULTS

MOE Water Well Record Search

Mayfield Road, Winston Churchill Boulevard to Chinguacousy Road, 500 m Radius

BOREHOLE ID	DATE COMPLETED	DEPTH (m)	DEPTH TO BEDROCK (m)	STATIC LEVEL (m)	WELL ID
10316944	10/15/1957	19.8	10.7	4.6	4902101
10316674	12/22/1959	11		4.9	4901830
10316675	8/24/1960	9.8		4.3	4901831
10316767	12/13/1960	11	8.5		4901924
10316768	12/15/1960	48.2	11	5.5	4901925
10316764	1/15/1962	12.5	10.1	7	4901921
10316765	3/2/1962	27.4	10.4	10.7	4901922
10148164	3/6/1962	33.5	6.7	10.7	2801610
10316766	4/21/1962	13.4	8.5	7.3	4901923
10148165	7/7/1962	28	8.8	9.1	2801611
10316676	8/22/1962	15.2		1.8	4901832
10316869	8/27/1962	17.1	11.3	6.7	4902026
10316763	9/15/1962	16.2	6.4	12.5	4901920
10316670	5/4/1963	13.4		6.1	4901826
10316671	6/21/1963	11.6		6.4	4901827
10316677	12/2/1963	17.7		5.2	4901833
10316562	1/22/1964	48.8	46.3		4901717
10316672	4/4/1964	12.8		6.1	4901828
10316945	4/14/1964	28	14.6	9.1	4902102
10148166	4/25/1964	13.7	7.9	1.5	2801612
10316673	5/9/1964	18.9	10.4	4.9	4901829
10316870	8/31/1967	9.8		5.2	4902027
10317923	6/10/1968	14		1.5	4903082
10150161	8/4/1971	6.7	3.7	1.8	2803625
10150969	9/12/1973	18.9	13.7	6.1	2804451
10319301	8/25/1974	11	8.8	3.7	4904519
10319435	5/19/1975	24.4	19.2	1.2	4904660
10319634	4/19/1976	12.8		6.1	4904865
10319815	8/4/1976	10.4		1.2	4905056
10319816	8/5/1976	10.4		1.2	4905057
10319806	9/17/1976	55.2	4.9		4905047
10319877	5/23/1977	8.5	6.1	3.7	4905120
10320007	8/15/1977	14.6	12.2	4.6	4905252
10320169	8/7/1978	10.7		2.4	4905436
10320283	10/30/1979	14.9	11.3	4.6	4905555
10320296	11/22/1979	10.4	5.8	4.6	4905569
10320843	6/16/1984	18.9	11	1.5	4906277
10320841	8/14/1984	15.2	8.5	1.5	4906275
10320836	11/9/1984	11.6	7	4.3	4906270
10320835	11/19/1984	12.5	9.8	5.2	4906269
10320879	5/7/1985	36.6	28.7	3.4	4906313
10320885	6/21/1985	36.6	16.5	4.6	4906319
10321281	5/14/1986	9.8	7.3	3.4	4906719
10321183	8/22/1986	34.7	5.5	7	4906619
10321282	9/18/1986	14.9	9.1	11	4906720
10321354	1/27/1987	29	19.5	3	4906793
10321434	6/16/1987	12.5		3.7	4906873
10321433	7/27/1987	12.8		4.3	4906872
10321309	10/20/1987	13.4	12.2	3.7	4906748
10321371	1/11/1988	29.3	21.9	1.8	4906810
10321412	3/4/1988	18.3			4906851

MOE Water Well Record Search

Mayfield Road, Winston Churchill Boulevard to Chinguacousy Road, 500 m Radius

BOREHOLE ID	DATE COMPLETED	DEPTH (m)	DEPTH TO BEDROCK (m)	STATIC LEVEL (m)	WELL ID
10321497	9/15/1988	21.9	18.3	12.2	4906936
10321548	9/20/1988	10.4		3	4906987
10321564	10/19/1988	19.8		3.4	4907003
10321969	8/28/1989	17.4		6.1	4907410
10321780	11/3/1989	36.6		4.9	4907220
10322219	7/9/1992	23.2	17.4	1.8	4907660
10322220	7/9/1992	23.2	16.5	2.1	4907661
10322454	1/26/1993				4907895
10322455	2/2/1993				4907896
10322453	2/5/1993				4907894
10322329	8/12/1993	43	8.2	11.6	4907770
10322666	7/27/1995	29.3	15.2	5.5	4908107
10322755	6/4/1996	14.6		6.4	4908196
10322851	2/23/1998	23.5	10.4	1.8	4908315
10323147	2/14/2000	23.2	17.1		4908612
10323146	2/15/2000	18.3	12.2		4908611
10323144	2/17/2000	19.8	14.6		4908609
10323142	2/18/2000	24.4	17.1	5.2	4908607
10323141	3/7/2000	19.8	14.3	5.8	4908606
10540529	11/21/2002				4909094
11177207	4/23/2004	7.5	6.4		4909579
11555492	6/27/2006	37.2	32.9		4910258
11694193	7/5/2006				4910312
11764249	2/1/2007	4.9			7041758
11764925	3/1/2007			4.3	7042431
23051723	5/23/2007				7051723
23052300	10/22/2007	11.3			7052300
23051682	10/22/2007				7051682
23052303	10/24/2007	6.1			7052303
1002033605	12/5/2008				7120768
1002033602	12/5/2008				7120767
1002821618	7/15/2009				7129459
1002821627	7/15/2009				7129459
1002718402	7/16/2009	10.7			7129459
Averages:		19.4	12.8	5.0	

TABLE E1
Mayfield Road
Hydrogeology Investigation
Water Well Survey - Record of Residents Contacted

Property Reference #	PIN	Property Address / Location	Property Owner	Notes/Participation	Survey By	Responded to Survey
1	14255-0128	84 Mayfield Road, Caledon	George Terrence Leslie and Lora Lee Leslie	2 wells on property	Thurber	Yes
2	14255-0127	East side of Winston Churchill Boulevard, north of Mayfield Road, Caledon	George Terrence Leslie and Lora Lee Leslie	no well on property	Thurber	Yes
3	14255-00126	East side of Winston Churchill Boulevard, north of Mayfield Road, Caledon	George Terrence Leslie and Lora Lee Leslie	no well on property	Thurber	Yes
4	14255-00125	East side of Winston Churchill Boulevard, north of Mayfield Road, Caledon	George Terrence Leslie and Lora Lee Leslie	no well on property	Thurber	Yes
5	14361-0001	111 Mayfield Road, Brampton	MCN (Mayfield) Inc.	unable to contact	Thurber	No
6	14361-0004	South side of Mayfield Road, east of Winston Churchill Boulevard, Brampton	Tiber Brampton Holdings Inc.	unable to contact	Thurber	No
7	14361-0005	South side of Mayfield Road, east of Winston Churchill Boulevard, Brampton	Dinesh Haribhai Mistry, Pushpa Mistry, Bachubhai Jhinabhai Patel and Gitaben Patel	unable to contact	Thurber	No
8	14255-0024	400 Mayfield Road, Caledon	Lorwood Holdings Incorporated	unable to contact	Thurber	No
9	14361-0006	419 Mayfield Road, Brampton	MCN (Mayfield) Inc.	unable to contact	Thurber	No
10	14255-0025	468 Mayfield Road, Caledon	Marvarie Denhart and Michael Raghunath		Thurber	Yes
11	14255-0026	486 Mayfield Road, Caledon	Betty Jane Moore		Thurber	Yes
12	14255-0052	624 Mayfield Road, Caledon	Donald Keith Garbutt and Lisa Garbutt	unable to contact	Thurber	No
13	14361-0021	709 Mayfield Road, Brampton	Lloyd Harland Crawford	did not answer	Thurber	No
14	14361-0022	767 Mayfield Road, Brampton	Peter Brydon Smith and Sheila Julia Smith	2 wells on property	Thurber	Yes
15	14361-0023	781 Mayfield Road, Brampton	Ajit Sahota, Surinder Sahota and Balbir Sahota	unable to contact	Thurber	No
16	14255-0280	North side of Mayfield Road, west of Mississauga Road, Caledon	1096281 Ontario Limited	unable to contact	Thurber	No
17	14255-0054	816 Mayfield Road, Caledon	1096281 Ontario Limited	unable to contact	Thurber	No
18	14365-0003	1209 Mayfield Road, Brampton	John William Gerald Van Tent and Brenda Christine Bernice Van Tent		Cole	Yes
19	14365-0004	1235 Mayfield Road, Brampton	Kiran Kumar and Angela Isaacs		Cole	No
20	14255-0094	1248 Mayfield Road, Caledon	Alloa Public School, Peel District School Board	no well on property- decommissioned 15 years ago	Cole	Yes
21	14365-0005	1255 Mayfield Road, Brampton	Colleen Shuk Lan Hui	3 wells on property	Cole	Yes
22	14255-0281	1278 Mayfield Road, Caledon	The Regional Municipality of Peel	left message, no reply	Thurber	No
23	14365-0006	1285 Mayfield Road, Brampton	Jasvir Brar and Narinder Brar		Cole	Yes
24	14365-0063	1333 Mayfield Road, Brampton	Paradise Homes North West Inc.		Cole	No
25	14252-0045	1500 Mayfield Road, Caledon	The Trustees of the Home Congregation of the United Church of Canada	no well on property	Thurber	Yes
26	14365-0020	1577 Mayfield Road, Brampton	Creditview Mayfield Corporation	unable to contact	Thurber	No
27	14365-0045	1635 Mayfield Road, Brampton	1367933 Ontario Inc.	unable to contact	Thurber	No
28	14365-0046	South side of Mayfield Road, east of Creditview Road, Brampton	Walness Developments Inc.	unable to contact	Thurber	No
29	14365-0023	1637 Mayfield Road, Brampton	Fausto Finelli		Cole	Yes
30	14252-0026	1680 Mayfield Road, Caledon	Reza Lonjak		Cole	Yes

TABLE E1
Mayfield Road
Hydrogeology Investigation
Water Well Survey - Record of Residents Contacted

Property Reference #	PIN	Property Address / Location	Property Owner	Notes/Participation	Survey By	Responded to Survey
31	14252-0027	1704 Mayfield Road, Caledon	Emilia Dias and Mario Dias		Cole	Yes
32	14252-0028	1760 Mayfield Road, Caledon	Van Gool Family Holdings Inc.		Cole	Yes
33	14252-0029	1770 Mayfield Road, Caledon	Romesh Vanaik, Rajan Vanaik and Rahul Vanaik		Cole	Yes
34	14252-0031	1890 Mayfield Road, Caledon	Kenneth Robert Sprickerhoff and Annie Sprickerhoff		Cole	No
35	14252-0941	2068 Mayfield Road, Caledon	Mayfield Station Developments Inc.	did not answer phone calls	Thurber	No
36	14252-0033	North side of Mayfield Road, west of Chinguacousy Road, Caledon	Hydro One Networks Inc.	unable to contact	Thurber	No
37	14252-0032	North side of Mayfield Road, west of Chinguacousy Road, Caledon	Giacinto Iaboni, Elisa Iaboni Bianca Iaboni, Gina Iaboni, Cerelli Armando and Nick Gouliaras	did not answer phone calls	Thurber	No
38	14252-0030	North side of Mayfield Road, west of Chinguacousy Road, Caledon	1223513 Ontario Inc.	unable to contact	Thurber	No
39	14251-0002	South side Mayfield Road, east of Chinguacousy Road, Brampton	Mattamy (Mount Pleasant) Limited	unable to contact	Thurber	No
40	25059-0058	11324 Winston Churchill Boulevard, Halton Hills	Treeola Farms Limited	left message, no response	Thurber	No
41	25059-0059	11354 Winston Churchill Boulevard, Halton Hills	Aloisia Asbeck and Roland Vollert	unable to contact	Thurber	No
42	25058-0122	11694 Winston Churchill Boulevard, Halton Hills	No. 3 Hunglin Development Corporation	tenant did not respond to phone contact	Thurber	No
43	14361-0007	11968 Heritage Road, Brampton	Vinfab Investments Inc.	unable to contact	Thurber	No
44	14255-0027	12038 Heritage Road, Caledon	Robert James Leslie		Thurber	Yes
45	14255-0051	12171 Heritage Road, Caledon	Mary Agnes Lavina Garbutt and Donald Keith Garbutt	unable to contact	Thurber	No
46	14361-0008	West side of Heritage Road, south of Mayfield Road, Brampton	Jack Bottner	no longer owner	Thurber	No
47	14361-0019	Southeast corner of Mayfield Road and Heritage Road, Brampton 11917 Heritage Road, Brampton	Heinz Baumann		Thurber	Yes
48	14361-0020	East side of Heritage Road, south of Mayfield Road, Brampton	Springbrook North Developments Inc.	unable to contact	Thurber	No
49	14361-0024	11722 Mississauga Road, Brampton	584572 Ontario Limited	mail box full	Thurber	No
50	14365-0050	11719 Mississauga Road, Brampton	Paradise Homes NW Inc.	unable to contact	Thurber	No
51	14255-0274	12111 Mississauga Road, Caledon	Pioneer Hi-Bred Production Ltd.	unable to contact	Thurber	No
52	14255-0055	12134 Mississauga Road, Caledon	1143922 Ontario Limited; Kavar Jewellers Inc.		Thurber	Yes
53	14255-0130	12139 Mississauga Road, Caledon	John Martins and Grinoalda Martins	unable to contact	Thurber	No
54	14255-0056	12150 Mississauga Road, Caledon	Rosemary O'Donnell	unable to contact	Thurber	No
55	14255-0092	12153 Mississauga Road, Caledon	Aleksander Trochanowski and Joanna Trochanowski	unable to contact	Thurber	No
56	14255-0091	12165 Mississauga Road, Caledon	James Richard Scott and Joan Mary Scott	unable to contact	Thurber	No
57	14365-0043	11630 Creditview Road, Brampton	Paradise Homes North West Inc.	unable to contact	Thurber	No
58	14365-0019	11953 Creditview Road, Brampton	Creditview Mayfield Corporation	unable to contact	Thurber	No
59	14252-0025	12017 Creditview Road, Caledon	856063 Ontario Inc.		Cole	Yes
60	14255-0282	12100 Creditview Road, Caledon	1867847 Ontario Limited		Cole	Yes

TABLE E1
Mayfield Road
Hydrogeology Investigation
Water Well Survey - Record of Residents Contacted

Property Reference #	PIN	Property Address / Location	Property Owner	Notes/Participation	Survey By	Responded to Survey
61	14252-0025	12101 Creditview Road, Caledon	856063 Ontario Inc.		Cole	Yes
62	14255-0272	12158 Creditview Road, Caldeon	Francis Pelly, Joan Pelly and An McCartney	no service	Thurber	No
63	14252-0940	12205 Creditview Road, Caledon	Stephen James Dolson, Mary Jean Dolson, Thomas Edward Dolson, Fradol Farms Limited and Fradol Family Farm GP.	unable to contact	Thurber	No
64	14365-0077	East side of Creditview Road, south of Mayfield Road, Brampton	2308645 Ontario Inc.	unable to contact	Thurber	No
65	14365-0078	East side of Creditview Road, south of Mayfield Road, Brampton	1839234 Ontario Limited	unable to contact	Thurber	No
66	14365-0044	East side of Creditview Road, south of Mayfield Road, Brampton	Gold Park Rowntree Developers Inc.	unable to contact	Thurber	No
67	14251-0001	11687 Chinguacousy Road, Brampton	PL Ventures Limited		Cole	Yes
68	14365-0027	11690 Chinguacousy Road, Brampton	Catherine Ann Monkman, Neil Clayton Monkman, Lori Anne Monkman and Estate of Keith Maxwell Monkman		Cole	Yes
69	14365-0029	South side of Mayfield Road, west of Chinguacousy Road, Brampton	Catherine Ann Monkman	unable to contact	Thurber	No
70	14365-0028	South side of Mayfield Road, west of Chinguacousy Road, Brampton	Lori Anne Monkman	unable to contact	Thurber	No
71	14252-0034	12016 Chinguacousy Road, Caledon	2201411 Ontario Inc.		Cole	No
72	14252-0035	12116 Chinguacousy Road, Caledon	Sharon Bonello	unable to contact	Thurber	No
73	14252-0038	12140 Chinguacousy Road, Caledon	Domenico Polsinelli and Concetta Polsinelli		Cole	Yes
74	14252-0036	12156 Chinguacousy Road, Caledon	Moises Cordeiro and Maria A. Cordeiro		Cole	No
75	14252-0071	12157 Chinguacousy Road, Caledon	Domingos Da Cruz ad Fatima Maria Da Cruz		Cole	Yes

TABLE E2
Mayfield Road Hydrogeology Investigation
Water Well Survey Results

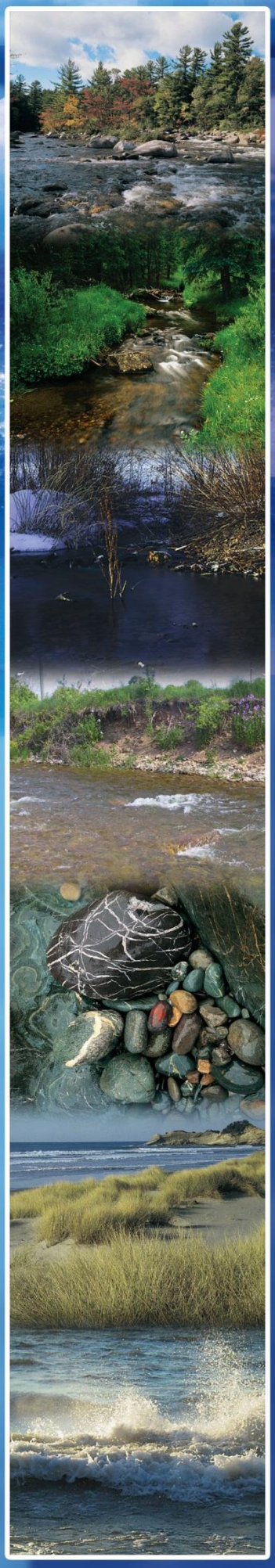
Property Reference #	PIN	Property Address / Location	Years of ownership	Surface Water on Property	Number of Water Users	Well Information									Septic Information			
						Well type	Well Age (yrs)	Depth (m)	Water Depth (m)	Main Well Use	Quality Tested	Quality Issues	Well Ever Gone Dry	Used for Human Consumption	System Age (yrs)	Distance from Well (m)	Main Use	Any Issues
1	14255-0128	84 Mayfield Road, Caledon	68	No	2	Dug, then Drilled	>70	~37	unknown	Domestic	Yes	Hardness	No	Yes	>70	90-120	Domestic	No
						Drilled	~44	~37	unknown	Livestock-not used	Yes	Hardness	Yes	Yes				
2	14255-0127	East side of Winston Churchill Boulevard, north of Mayfield Road, Caledon	68	No	2	No wells									No septic system			
3	14255-00126	East side of Winston Churchill Boulevard, north of Mayfield Road, Caledon	68	No	2	No wells									No septic system			
4	14255-00125	East side of Winston Churchill Boulevard, north of Mayfield Road, Caledon	68	No	2	No wells									No septic system			
10	14255-0025	468 Mayfield Road, Caledon	3	No	4	n/p	n/p	n/p	n/p	Domestic	Yes	No	Yes	Yes	n/p	n/p	Domestic	No
11	14255-0026	486 Mayfield Road, Caledon	25	No	1	Bored	40	16.75	3	Domestic	Yes	No	Yes	Yes	40	120	Domestic	No
14	14361-0022	767 Mayfield Road, Brampton	29	No	2	Dug	29	12.2	9.75	Domestic	Yes	No	No	Yes	29	24	Domestic	No
						Drilled	29	37	~37	Domestic - not used	No	n/p	No	No				
18	14365-0003	1209 Mayfield Road, Brampton	n/p	n/p	2	Drilled	17	30.48	5.06-7.22	Domestic	Yes	High Sodium	n/p	Yes	n/p	n/p	n/p	n/p
20	14255-0094	1248 Mayfield Road, Caledon	n/p	n/p	n/p	No wells									n/p	n/p	n/p	n/p
21	14365-0005	1255 Mayfield Road, Brampton	n/p	n/p	n/p	Drilled	21	45.72	10.23-11.32	Domestic	n/p	n/p	Yes	n/p	Septic System Present - but no Information available			
						Dug	n/p	12.19	2.19-2.51	Domestic	n/p	n/p	n/p	n/p				
						Drilled	n/p	18.29	3.81-5.32	Domestic	n/p	Sulphur odor	n/p	n/p				
23	14365-0006	1285 Mayfield Road, Brampton	n/p	n/p	2	Bored	n/p	n/p	0.43-2.08	Domestic	Yes	High Sodium & total coliform	n/p	No	Septic System May be Present - no Information available			
25	14252-0045	1500 Mayfield Road, Caledon	88	No	0	No Wells									No septic system			
29	14365-0023	1637 Mayfield Road, Brampton	n/p	n/p	4	Drilled	n/p	n/p	n/p	Domestic	Yes	Sulphur smell	n/p	No	Septic System Present - but no Information available			
30	14252-0026	1680 Mayfield Road, Caledon	n/p	n/p	10	Dug	26	11.75	5.47	Domestic	No	n/p	n/p	Yes	Septic System Present - but no Information available			
31	14252-0027	1704 Mayfield Road, Caledon	n/p	n/p	6	Bored	n/p	24.38	4.94-5.83	Domestic	Yes	High Sodium	n/p	Yes cooking	n/p	n/p	n/p	n/p
32	14252-0028	1760 Mayfield Road, Caledon	n/p	n/p	4	Dug	n/p	9.26	3.1	Domestic/ irrigation	Yes	High Sodium	n/p	No	Septic System Present - but no Information available			
33	14252-0029	1770 Mayfield Road, Caledon	n/p	n/p	9	Drilled	n/p	n/p	5.39-5.84	Domestic	Yes	Not sealed High Sodium	n/p	No	Septic System Present - but no Information available			
44	14255-0027	12038 Heritage Road, Caledon	28	n/p	4	Dug	28	13.4	n/p	Domestic	Yes	Bacteria / hardness	Yes	Yes	28	30	Domestic	Yes - tree roots
47	14361-0019	Southeast corner of Mayfield Road and Heritage Road, Brampton 11917 Heritage Road, Brampton	n/p	n/p	n/p	n/p	30	37	n/p	Livestock	No	n/p	No	No	n/p	n/p	n/p	n/p
52	14255-0055	12134 Mississauga Road, Caledon	n/p	Springs at N property line	2	Dug	37	~8	~3.5	n/p	No	High Iron	Yes	Yes	37	>30	Domestic	No
59	14252-0025	12017 Creditview Road, Caledon	n/p	n/p	3	Bored	52	11.9	1.12-2.96	Domestic	Yes	High Sodium & total coliform	n/p	Yes cooking	n/p	n/p	n/p	n/p
60	14255-0282	12100 Creditview Road, Caledon	<1	n/p	6	Bored	n/p	n/p	0.73-1.88	Domestic	Yes	High Sodium	n/p	No	n/p	n/p	n/p	n/p

TABLE E2
Mayfield Road Hydrogeology Investigation
Water Well Survey Results

Property Reference #	PIN	Property Address / Location	Years of ownership	Surface Water on Property	Number of Water Users	Well Information									Septic Information			
						Well type	Well Age (yrs)	Depth (m)	Water Depth (m)	Main Well Use	Quality Tested	Quality Issues	Well Ever Gone Dry	Used for Human Consumption	System Age (yrs)	Distance from Well (m)	Main Use	Any Issues
61	14252-0025	12101 Creditview Road, Caledon	n/p	n/p	3	Bored	52	11.9	0.63-2.96	Domestic	Yes	High Sodium	No	n/p	n/p	n/p	n/p	n/p
67	14251-0001	11687 Chinguacousy Road, Brampton	n/p	n/p	2	Bored	20-25	>20	3.37	Domestic/ livestock	Yes	High Sodium & total coliform	n/p	Yes	n/p	n/p	n/p	n/p
68	14365-0027	11690 Chinguacousy Road, Brampton	n/p	n/p	2	Dug	10	10.21	3.5-5.79	Domestic	Yes	Total coliform, e-coli & High sodium	n/p	No	Septic System Present - but no Information available			
73	14252-0038	12140 Chinguacousy Road, Caledon	n/p	n/p	1	Drilled	26	36.5	n/p	Domestic	Yes	High Sodium	n/p	n/p	n/p	n/p	n/p	n/p
75	14252-0071	12157 Chinguacousy Road, Caledon	6	n/p	4	Dug	n/p	13.8	3.5-8.81	Domestic	Yes	High Sodium	n/p	n/p	n/p	n/p	n/p	n/p

n/p = not provided

Fluvial Geomorphology and Meander Belt Assessment



water's edge
ENVIRONMENTAL SOLUTIONS TEAM LTD.

Mayfield Drive – West Humber Tributaries
Brampton, ON

Fluvial Geomorphological Assessment
and
Meander Beltwidth Assessment

October 22, 2015

October 22, 2015
WE 13002

Melissa Alexander
Environmental Planner
Hatch Mott MacDonald
5035 South Service Road, Sixth Floor
Burlington, Ontario
L7L 6M9

Dear Ms. Alexander:

RE: Mayfield Road EA (Winston Churchill Blvd to Chinguacousy Rd)
Meander Beltwidth Assessment

As part of the technical studies to support of the 'Schedule C' Class Environmental Assessment study for Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard, we have completed a meander beltwidth and fluvial assessment of various watercourse crossings along Mayfield Road.

Our assessment includes an examination of the general geomorphic characteristics of the watercourses and the determination of the local meander beltwidths. We have also performed a desktop study utilizing aerial photographs and existing background literature on the watercourses in the study area.

Data sources for the analyses include:

- Aerial Photography for 1976, 1983, 1993, 1999, 2002 and 2012 (TRCA);
- Google Imagery for location maps;
- Final Environmental Implementation Report – Mount Pleasant Sub-Area 51-1 (September 2011);
- Mount Pleasant Comprehensive Fisheries Compensation Plan (November 2011);
- Subwatershed Characterization and Integration – Phase 1 (AMEC, 2011);
- Subwatershed Characterization and Integration – Phase 2 (AMEC, 2011);
- Subwatershed Characterization and Integration – Phase 3 (AMEC, 2011);
- Credit Valley Subwatershed Study Huttonville Creek, Springbrook Creek, Churchville Tributary (CVC, 2004);
- Discussions with Hatch Mott MacDonald staff;
- Geomorphic Survey (Water's Edge, 2013); and,
- Geomorphic Field Assessments.

1.0 EXISTING CONDITIONS

Site inspections of various creek crossings at Mayfield Road in the study area were completed by Water's Edge staff between January and September of 2013. The site inspections were undertaken after a brief review of the mapping and available literature. A more detailed review of available literature was undertaken after the field work when more information was made available. During our field investigations, fourteen watercourses in the study area were surveyed. Though most of these watercourses were dry swales, they possessed enough channel definition to be identified as watercourse features. Not all locations of culverts were surveyed since not all locations showed defined watercourses.

Desktop Analysis
Prior to confirming channel characteristics through field reconnaissance the site was analyzed through the use of air photos to note all the watercourse crossings within the study area (Mayfield Road between Winston Churchill Blvd and immediately east of Chinguacousy Rd). A total of fourteen watercourse crossings were identified. Each crossing is either a first or a second order headwater stream of one of the following watercourses - the Credit River, East and West Huttonville Creeks, and West Fletcher's Creek. As part of our desktop assessment, information gleaned from previous studies (fisheries compensation plan, environmental implementation reports and subwatershed studies) was examined and all relevant sections are summarized in this report.

Reach (Site) Delineation
Channel morphology and substrate characteristics can change along a watercourse. Hence, it becomes imperative to account for these changes by delineating lengths of a watercourse that exhibit similar planform, sediment substrate, land use, local geology, valley confinement, hydrology and slope. Typically, a reach is about two meanders long. However, in this study, each watercourse crossing was considered to be a single reach. The fourteen reaches were labeled alphabetically starting from Reach A to Reach M going from Winston Churchill Blvd to Chinguacousy Rd. Reaches A, B, and C are located in the Credit River Tributaries subwatershed, Reaches D, E, F, G, H, and I are located in the Huttonville Creek subwatershed, while the remaining reaches (J, K, L, M and N) are located in the Fletcher's Creek subwatershed. Figures 1, 2, 3 and 4 below show the location of the studied reaches and the culvert crossings (in boxes). The locations of the culverts are based on mapping provided by HMM. Some culvert locations were not surveyed as the geomorphic features were not visible.

Field Reconnaissance
In addition to confirming our desktop assessment, our field reconnaissance also included the determination of various geomorphic parameters. Each reach is comprised of generally similar topography and physical characteristics. A long profile of each crossing and representative cross sections through each reach were surveyed. Generally, the survey results are used to characterize the reaches as per their bankfull characteristics. However, in this study, the reaches are 1st order streams that do not show developed bankfull characteristics. Therefore, the average channel widths and depths were determined for the best possible "bankfull" indicators. It must be noted that these are not true bankfull parameters since most of these reaches are not continuously inundated. The rules for determination of bankfull parameters do not apply in such cases of headwater streams. All reaches are located in agricultural landuse areas and have been altered to accommodate agricultural practices. Therefore, most crossings are ditch-like and non-sinuous.

A brief description of the watercourses at the locations of culverts have been culled from the reports listed on page 1 and are presented in Table 1. The parameters listed in Table 2 were observed through the analysis of survey data. The longitudinal profiles and the cross sections of the study reaches are presented in Appendix A. Site Photographs are listed in Appendix B.

General Watershed Characteristics
The three subwatersheds are located within the Credit River Watershed. The Credit River Watershed originates in Orangeville and Caledon and encompasses Erin, part of Halton Hills, and Brampton; then expels into Lake Ontario.

Credit River Tributary
The unnamed tributary of the Credit River originates from Mayfield Road between Winston Churchill Boulevard and Heritage Road. The tributary then expels into the Credit River south of Hwy 107 between Hwy 19 and Heritage Road. The majority of this tributary watershed's land use is agriculture. Reaches A, B, and C are located within the tributary, which corresponds to HMM culvert numbers 1 and 2.

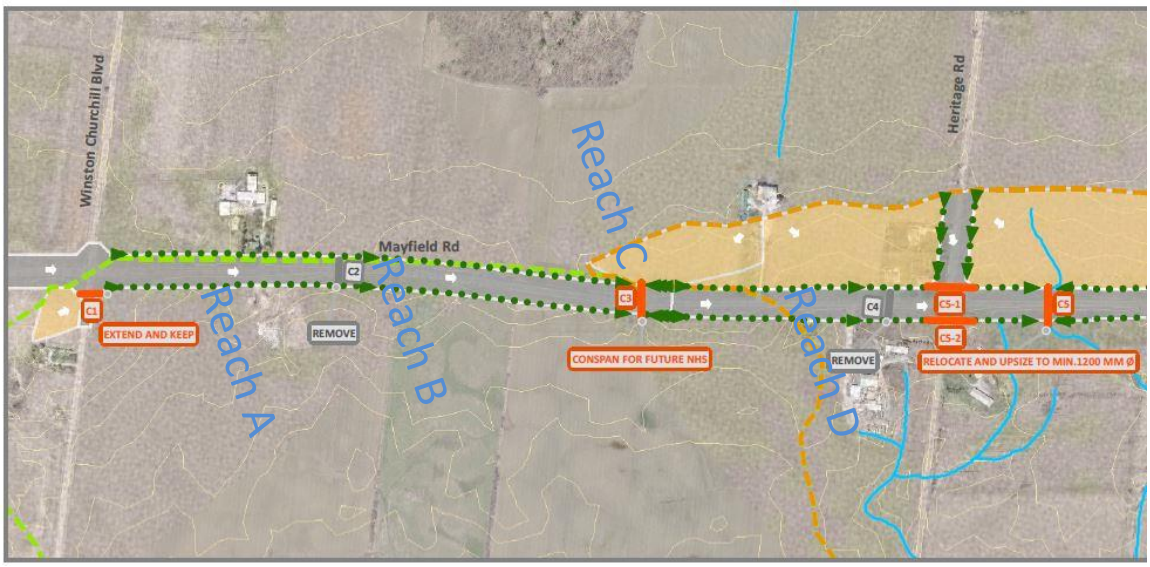


Figure 1: Locations of Reaches A, B, C and D (modified from HMM)

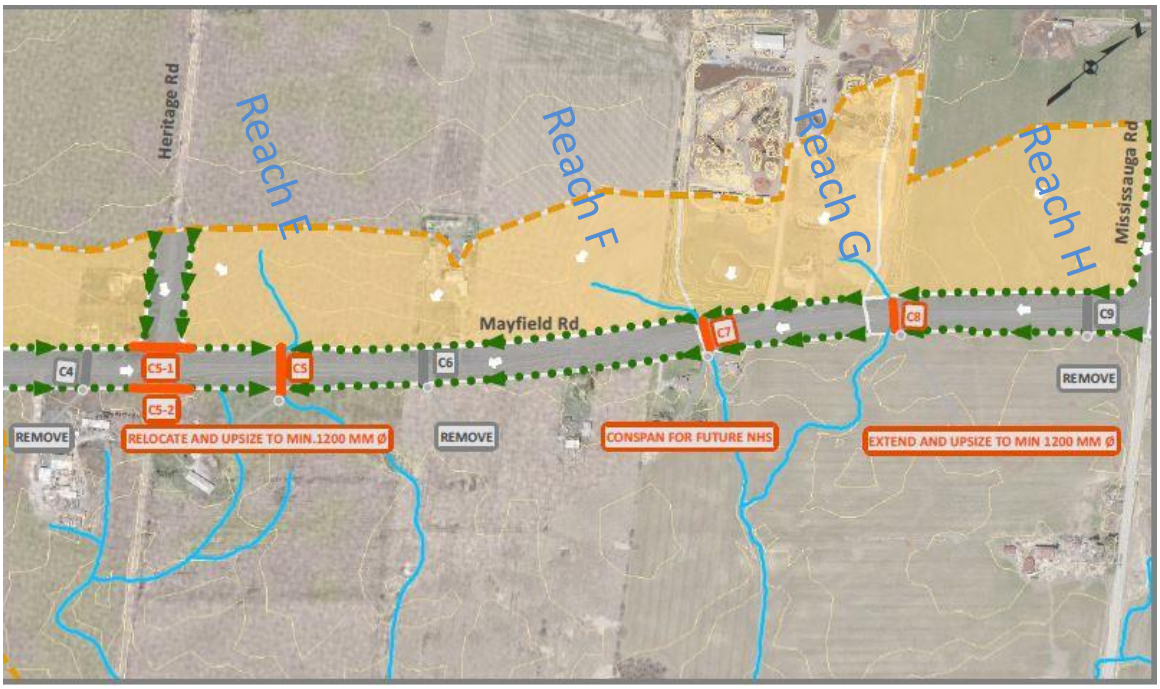


Figure 2: Locations of Reaches E, F, G and H (modified from HMM)

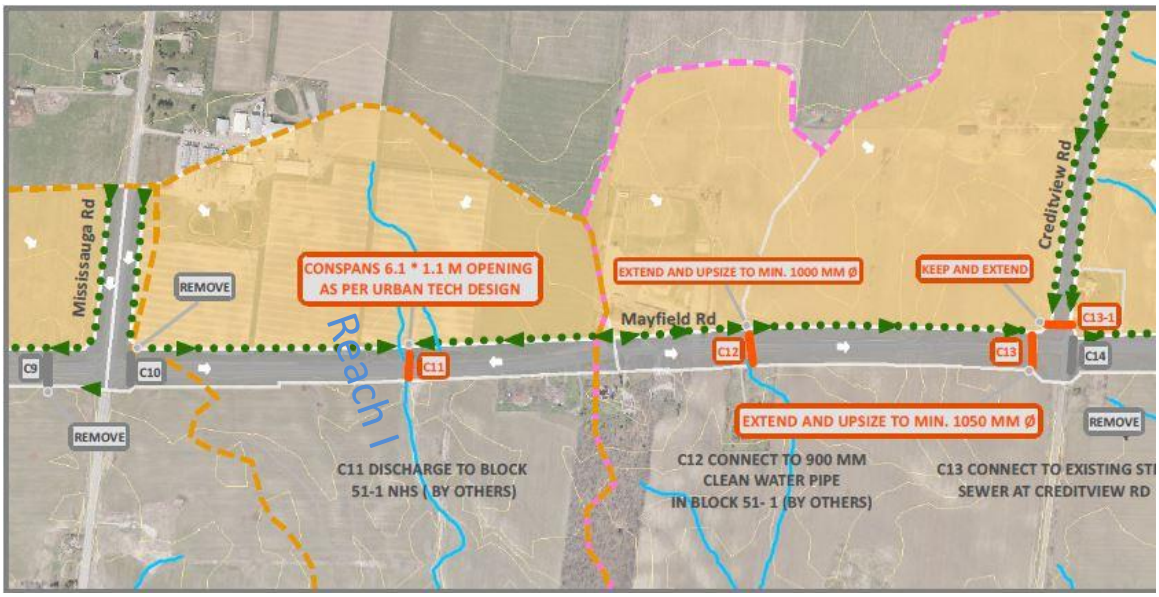


Figure 3: Location of Reach I (modified from HMM)

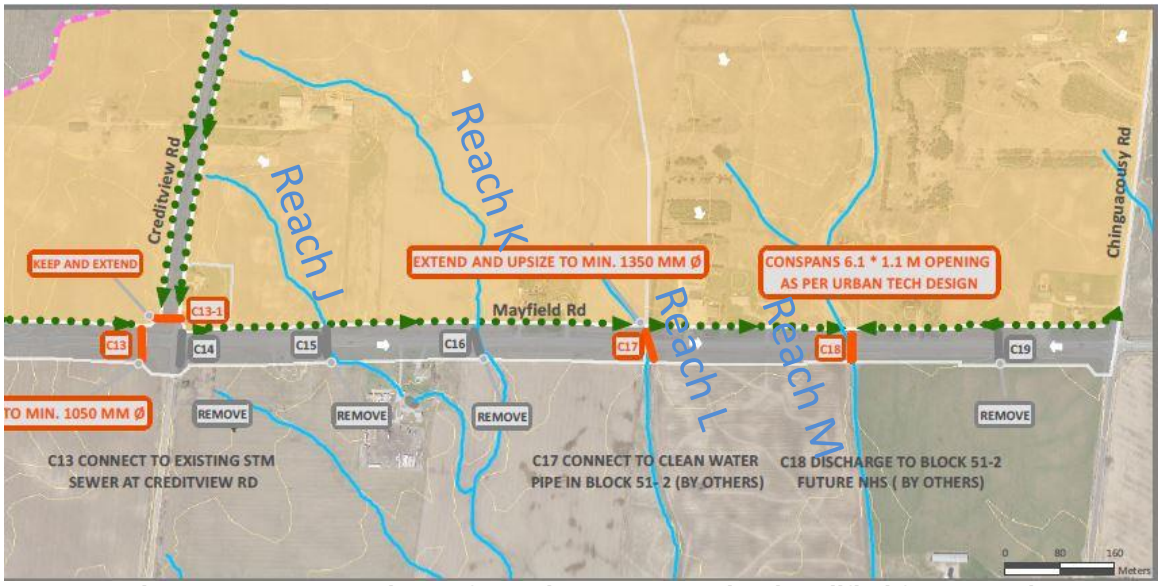


Figure 4: Locations of Reaches J, K, L and M (modified from HMM)

Figure 5: Location of Reach N (located east of Chinguacousy Rd) (source: Google Maps)

Huttonville Creek

The Huttonville Creek subwatershed originates north of Mayfield Road between Creditview Road and Heritage Road. Huttonville Creek then flows south east and discharges into the Credit River in Huttonville. The upper portion of the watershed is primarily agricultural land with small percentages of marsh and forested sections. The creek valley corridor for this creek begins south of Highway 7. However, the contributing headwater streams originate in the agricultural lands immediately upstream of Mayfield Road. Huttonville Creek contains reaches D, E, F, G, H, and I which corresponds to HMM culvert numbers 3 to 11.

Fletcher Creek

The Fletcher's Creek subwatershed is very narrow and is situated from Mayfield Road between Mississauga Road and Hurontario Street. The subwatershed then goes south east through Brampton and expels into the Credit River in Meadowvale South. The upper portion of the watershed is primarily agricultural land use and south of Wanless Drive is community/infrastructural land use. Fletcher's Creek comprises of reaches J, K, L, M, and N which corresponds to HMM culvert numbers 10 to 16.

Table 1: Watercourse summary

Location (between roads)	HMM Culvert #	Water-course	Surveyed Reach #	Flow Description	Reach # in background reports	Channel Definition	RSD Habitat (CFCP)
Winston Churchill and Heritage	-	Credit River Tributaries	Reach A	N/A	N/A	no info available	N/A
	C2		Reach B				
	C1		-				
	C3		Reach C				
	-	West Huttonville Creek	Reach D	U/S of an Intermittent Stream	U/S of HV9a	no info available	
	C4		-	U/S of an Intermittent Stream	U/S of HV9a	no info available	
Heritage and Mississauga	C5	West Huttonville Creek	Reach E	no info available	Unnamed	no info available	N/A
	C7		Reach F	U/S of an Ephemeral Stream	U/S of HV13	Swale	
	C8		Reach G	U/S of an Ephemeral Stream		Swale	
	C9		Reach H	U/S of an Ephemeral Stream	U/S of HV14	Swale	
Missisauga Rd and Creditview Rd	C10	West Huttonville Creek	-	U/S of an Ephemeral Stream	U/S of HV14	Swale	No
	C11	East Huttonville Creek	Reach I	Intermittent	HV29	Defined Channel	Yes
	C12		-	Ephemeral	F06b	Swale	No
	C13	Fletcher's Creek	-	U/S of an Ephemeral Stream	U/S of F09b	no info available	No
	C14		-	U/S of an Ephemeral Stream	U/S of F09b	no info available	No
Creditview and Chingua-cousy	-	Fletcher's Creek	Reach J	Ephemeral	F10b	Swale	No
	C16		Reach K	Ephemeral	F11c	Swale	No
	C17		Reach L	Intermittent	F07d	Swale	No
	C18		Reach M	Ephemeral	F14	Swale	Yes
Immediately East of Chingua-cousy Rd	-	Fletcher's Creek	Reach N	Ephemeral	F16c	Swale	No

Table 2: Summary of Geomorphic Parameters

Surveyed Reach #	Width (m)	Average Depth (m)	Maximum Depth (m)	Width to Depth Ratio	Entrenchment Ratio	Slope (m/m)
A	1.2	0.03	0.07	40.3	4.1	0.013
B	1.3	0.05	0.15	45.4	6.3	0.027
C	1.9	0.04	0.10	47.5	2.0	0.006
D	0.9	0.04	0.09	21.8	6.2	0.014
E	2.8	0.02	0.04	138.0	2.2	0.016
F	0.8	0.04	0.08	21.1	4.6	0.021
G	1.9	0.03	0.06	63.0	2.7	0.008
H	2.1	0.03	0.05	68.3	3.0	0.003
I	2.3	0.07	0.13	35.3	1.9	0.014
J	0.8	0.02	0.03	38.0	5.5	0.003
K	1.1	0.02	0.04	52.5	2.8	0.055
L	1.7	0.02	0.04	126.8	3.0	0.009
M	1.5	0.09	0.22	16.7	11.4	0.010
N	1.9	0.04	0.07	52.2	2.1 - 19.2	0.008

2.0 MEANDER BELTWIDTH AND 100 YEAR EROSION ASSESSMENTS

Assessment of the meander beltwidth is usually undertaken in accordance with commonly accepted standard meander beltwidth delineation procedures which are established for watercourses with well defined, meandering bankfull channels. In this study, all but one watercourse are swales with either intermittent or ephemeral flows. In such cases, we have used background documentation that use surrogate reaches, regime equations that are based on bankfull characteristics (“channel-full” in our study), aerial photo measurements.

Background Documentation on Meander Beltwidths
Based on the available background literature as listed in Page 1 of this report, the requirements/results for Meander Beltwidths (MBW) of the various watercourses are noted in Table 3. Details gleaned from the various reports are noted below:

CVC Subwatershed 7, 8a, 8b Study
This sub-watershed study includes meander beltwidths for West and East Huttonville Creeks. Of the seven Huttonville reaches studied in the report, two are relevant to this study, Reach 1 and Reach 3. The reach definition in the CVC study includes tributaries that join the main drainage network of the creek. As per Table 4.8.2 and Figure 4.8.1 in the CVC report, Reach 1 extends from Mayfield Road to south of Wanless Drive and Reach 3 extends from Mayfield Road to its confluence with the west branch of Huttonville Creek. The meander beltwidth for these reaches is listed as 10 m. Figure 6 shows stream reaches breakdown in the upper half of the Huttonville Creek watershed and was prepared by modifying Figure 5.8.1. Based on the figure, the beltwidth only applies to watercourses at culverts 3, 4, 5, 6 and 9 since the other locations are not depicted in the map. It must be noted that the report suggests that the same beltwidth be applied to the first and higher order streams deemed to be in the reach. In our opinion, the 10 m beltwidth is excessive in the case of swales.

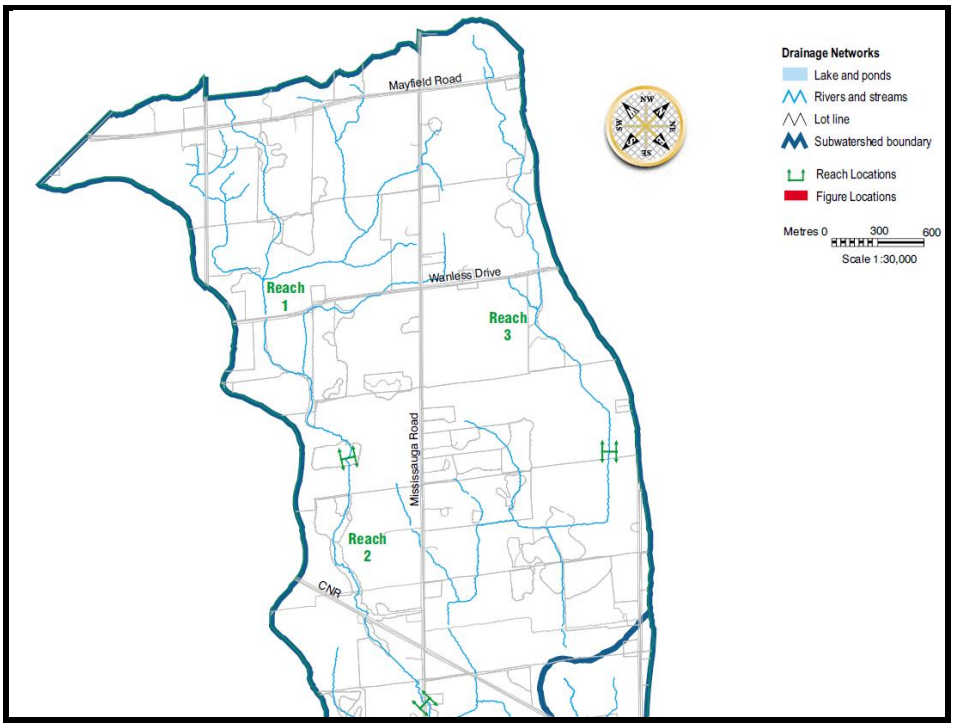


Figure 6: Location of Reaches 1(Reach A), 2 (Reach B) and 3 (Reach C) (figure modified from Figure 4.8.1 in the CVC report)

Final Environmental Implementation Report for the Mount Pleasant Sub-Area 51-5 (EIR)

The EIR (2011) report includes the meander beltwidth assessment for HV29, the only well-defined watercourse with a proposed culvert location in our study. The beltwidth is prescribed at 10 m for the reach immediately downstream of Mayfield Road.

AMEC Phase 2 Subwatershed Impact Assessment Report

This report was published prior to the EIR. As per the AMEC report, the meander beltwidth values presented are to be considered as approximations that need to be refined in the EIR stage. The only crossing affected by this is culvert # 11 for which the EIR has a less conservative approximation of meander beltwidth of 10 m. Although Tables 3.22 and 3.23 of the AMEC report provide a large list of meander beltwidths, only two beltwidths presented are directly relevant to the areas of proposed crossings. In addition to the meander beltwidth, an additional setback of either the 100 year migration rate or a 10% factor of safety applied to each bank is also provided. Table 3 presents a summary of meander beltwidths as gleaned from various reports.

Meander Beltwidths from Regime Equations

Inferences on meander beltwidths can also be made based on regime equations as per Williams (1986). These equations are based on bankfull dimensions such as cross sectional are, width and mean depth. In addition to the regime equations, measurements were also made from aerial photography. The measurements made resemble the regime equations based on cross sectional area. The meander beltwidths measured and calculated are listed in Table 4. At certain locations, the where measurements could not be made because of lack of clear channel delineation in aerial photography, we recommend that the empirical equations based on cross sectional area be used.

Final Meander Beltwidths

Based on the documented meander beltwidths, those calculated using regime equation and those measured using aerial photographs, we have determined the final meander beltwidths. Table 5 presents a summary of the beltwidths from each of these methods and the final beltwidths for proposed crossings. In locations where field work was not undertaken, either the measured or the

documented values were chosen. Certain locations (C1, C10, C12-C14) showed no discernible channel during field investigation, on aerial photographs and do not have any background documentation. For such locations, no beltwidths have been specified. Locations where meander beltwidths were measurable, the final beltwidth was calculated to be the sum of the bankfull width and preliminary beltwidth and a 10% factor of safety added as no 100 year migration rates were calculated. Where bankfull data was unavailable (C4) a 20% factor of safety was used. A 20% factor of safety was also used for Reach L (C17) which is to be upsized and is expected to receive waters from C15 and C16 that are to be removed. As mentioned in the previous sub-section, the regime equations based on cross sectional area provided the most reliable estimate of meander beltwidth as they corroborated with the measured beltwidths. However, at Reach K (C16), the regime equation based on width provided a more reliable estimate. To provide a conservative estimate, the largest of the available beltwidths (measured, calculated or previously documented) for a reach was chosen as the final beltwidth except for Reach M where the beltwidth provided in the AMEC (24m) significantly exceeds the measured beltwidth. Geomorphologically, Reach M is comparable to other Fletcher's Creek headwater swales. However, this reach is better defined than the rest. Therefore, the regime equation approach that provides a suitable estimate (of 7 m) is recommended.

It must be noted that traditional protocols could not be used in this meander beltwidth assessment as almost all crossings did not fit the definition of a meandering stream, but rather were poorly defined headwater streams classified as swales all of which are either intermittent or ephemeral streams.

Table 3: Summary Meander Beltwidths from Background Documents

HMM Culvert #	Surveyed Reach #	CVC Sub-watershed Study	*AMEC Sub-watershed Study - Phase 2*	*EIR Area 51-1*
-	Reach A	study in progress	N/A	N/A
C2	Reach B			
C1	-			
C3	Reach C			
-	Reach D	10*	no info available	
C4	-	10		
C5	Reach E	10	No info available. For downstream reaches: (15-20)** †	N/A
C7	Reach F	10		
C8	Reach G	10		
C9	Reach H	10*		
C10	-	10*	no info available	no info available
C11	Reach I	10	15 (18)**	10 (20)**
C12	-	report not available	no info available	no info available
C13	-			
C14	-			
-	Reach J	report not available	no info available	N/A
C16	Reach K			
C17	Reach L			
C18	Reach M		(24)**	
-	Reach N	report not available	no info available	N/A

* Description in the CVC report indicates a meander beltwidth of 10 m for the section of Huttonville that includes this watercourse but the watercourse is not shown on the map

** Numbers in brackets represent meander beltwidths with additional setbacks as recommended by the source document

† Meander beltwidths for reach downstream of this reach

Table 4: Meander Beltwidth (m) based on Regime Equations and Aerial Photography

HMM Culvert #	Surveyed Reach #	*Regime Equations based on XS Area*	*Regime Equations based on Width*	*Regime Equations based on Mean Depth*	*Measured Preliminary Beltwidth*
-	Reach A	2	5	1	-
C2	Reach B	3	6	2	-
C1	-	-	-	-	No feature discernible
C3	Reach C	4	9	1	2.2
-	Reach D	2	4	1	-
C4	-	-	-	-	1.6
C5	Reach E	3	13	0	2
C7	Reach F	2	4	1	use empirical
C8	Reach G	3	9	1	2.3
C9	Reach H	3	10	1	use empirical
C10	-	-	-	-	No feature discernible
C11	Reach I	5	11	3	2.4
C12	-	-	-	-	No feature discernible
C13	-	-	-	-	No feature discernible
C14	-	-	-	-	No feature discernible
-	Reach J	1	3	0	-
C16	Reach K	1	5	0	use empirical
C17	Reach L	2	8	0	2
C18	Reach M	5	7	4	3
-	Reach N	3	9	1	6.5

Table 5: Summary of Beltwidths (m) at the Proposed Culvert Locations

HMM Culvert #	*Surveyed Reach #*	*MBW based on Documents (m)*	*MBW based on XS Area Regime Equations (m)*	*Measured Prelim MBW (m)*	*Bankfull Width(m)*	*Final MBW (m)*
C1	-	N/A	-	-	-	-
C2	Reach B	N/A	3	-	1.3	-
C3	Reach C	N/A	4	2.2	1.9	5
C4	-	10*	-	1.6	-	10
C5	Reach E	10*	3	2	2.8	5
C6	-	N/A	-	-	-	-
C7	Reach F	10*	2	use empirical	0.8	2
C8	Reach G	10*	3	2.3	1.9	5
C9	Reach H	10*	3	use empirical	2.1	3
C10	-	10*	-	-	-	-
C11	Reach I	10* **	5	2.4	2.3	10
C12	-	N/A	-	-	-	-
C13	-	N/A	-	-	-	-
C14	Reach J	N/A	3‡		0.8	
C15	-	-	-	-	-	-
C16	Reach K	N/A	5‡	use empirical	1.1	5
C17	Reach L	N/A	2	2	1.7	4.4
C18	Reach M	24†	7‡	3	1.5	7 (24)◊
-	Reach N	N/A	3	6.5	1.9	9

* From CVC report; ** From EIR report; † From AMEC report; ‡ regime equation based on width; ◊ number in parenthesis refers to the MBW based on background literature
Highlighted rows in Table 5 indicate culverts that are to be removed

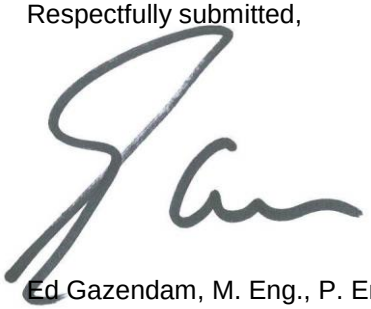
The culverts to be removed are all situated on watercourses that have either been identified as "Ephemeral" or on watercourses upstream of reaches identified as "Ephemeral or Intermittent". For such streams, the impact of removal of culverts is expected to be minimal, especially if roadside drainage in the form of swales/ditches is provided alongside the road. Culverts 14, 15 and 16 which are to be removed are all located on headwater tributaries to Fletcher's Creek and are ephemeral in nature. Culvert 17, also located on Fletcher's Creek, is expected to receive waters from the aforementioned ephemeral watercourses. Since there isn't enough data available to speculate on the impact that the removal of the culverts will have on the identified meander beltwidths of the neighbouring culverts, the 20% factor of safety used in the determination of the final meander beltwidth can be considered to be a reliable indicator of the affected meander beltwidth.

3.0 STUDY CONCLUSIONS

Based on our field work and desktop analyses, we conclude the following:

1. There are sixteen proposed culvert locations. The watercourses along ten locations were geomorphically surveyed;
2. All watercourses (except for Reach I) are either intermittent or ephemeral channels characterized as swales. Reach I is a well-defined channel with intermittent flow;
3. Background documentation, regime equations and aerial photo analyses were used in the determination of the meander beltwidths at each location;
4. Certain locations do not have any discernible water features. No meander beltwidths have been specified for such location; and,
5. The final Meander Beltwidths are as outlined in Table 5.

Respectfully submitted,



Ed Gazendam, M. Eng., P. Eng.,
President, Sr. Geomorphologist
Water's Edge Environmental Solutions Team

Christina Bright, M. A. Sc.,
Fluvial Geomorphologist

Attachments:
Appendix A – Profile and Cross Sections
Appendix B – Photographs

References:
Williams, G.P., 1986. River meanders and channel size. Journal of Hydrology, 88 pp.147-164

APPENDIX A:

Profile and Cross Sections

Various Watercourses Brampton, Ontario

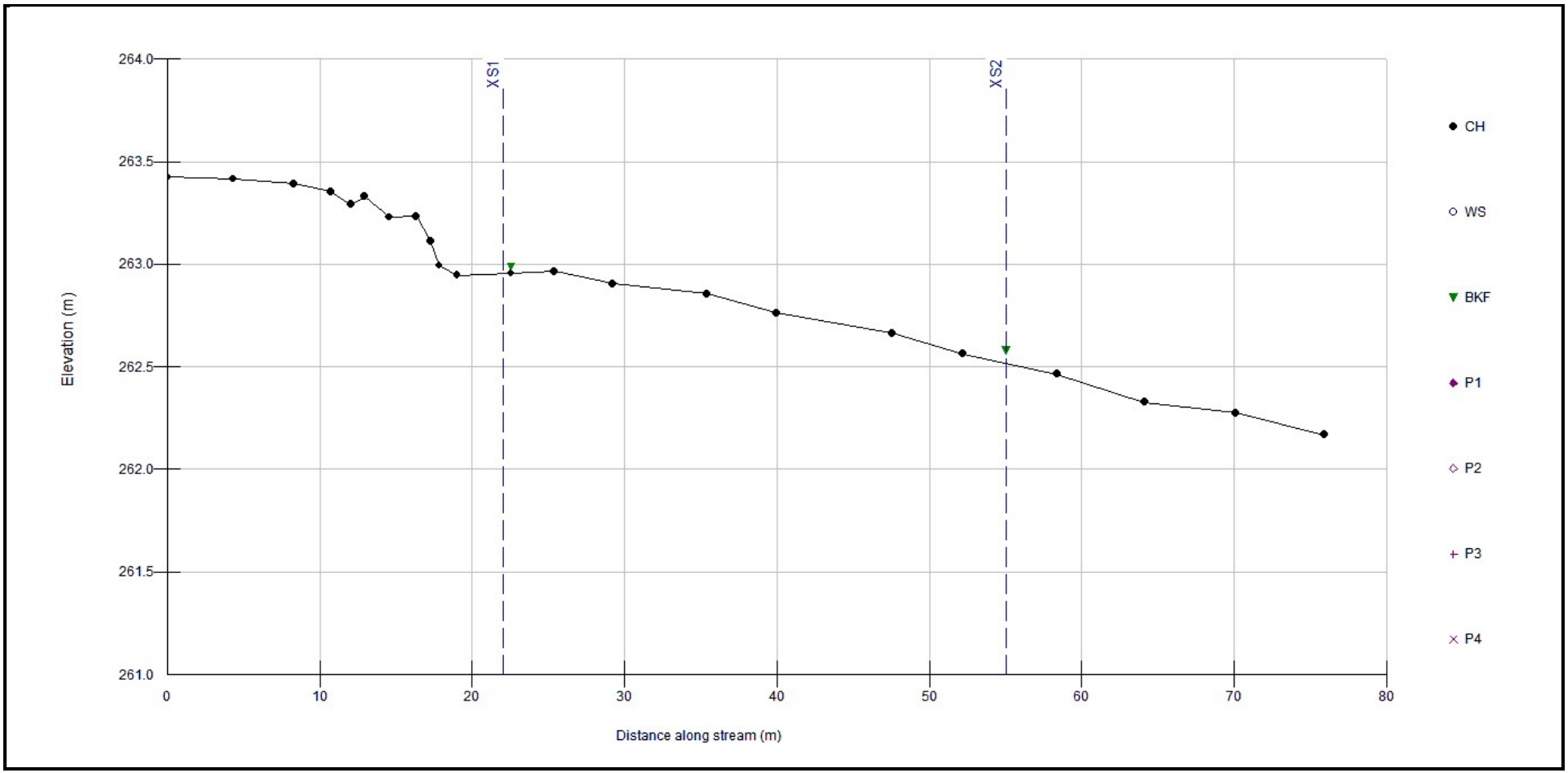


Figure 1: Reach A - Existing Profile

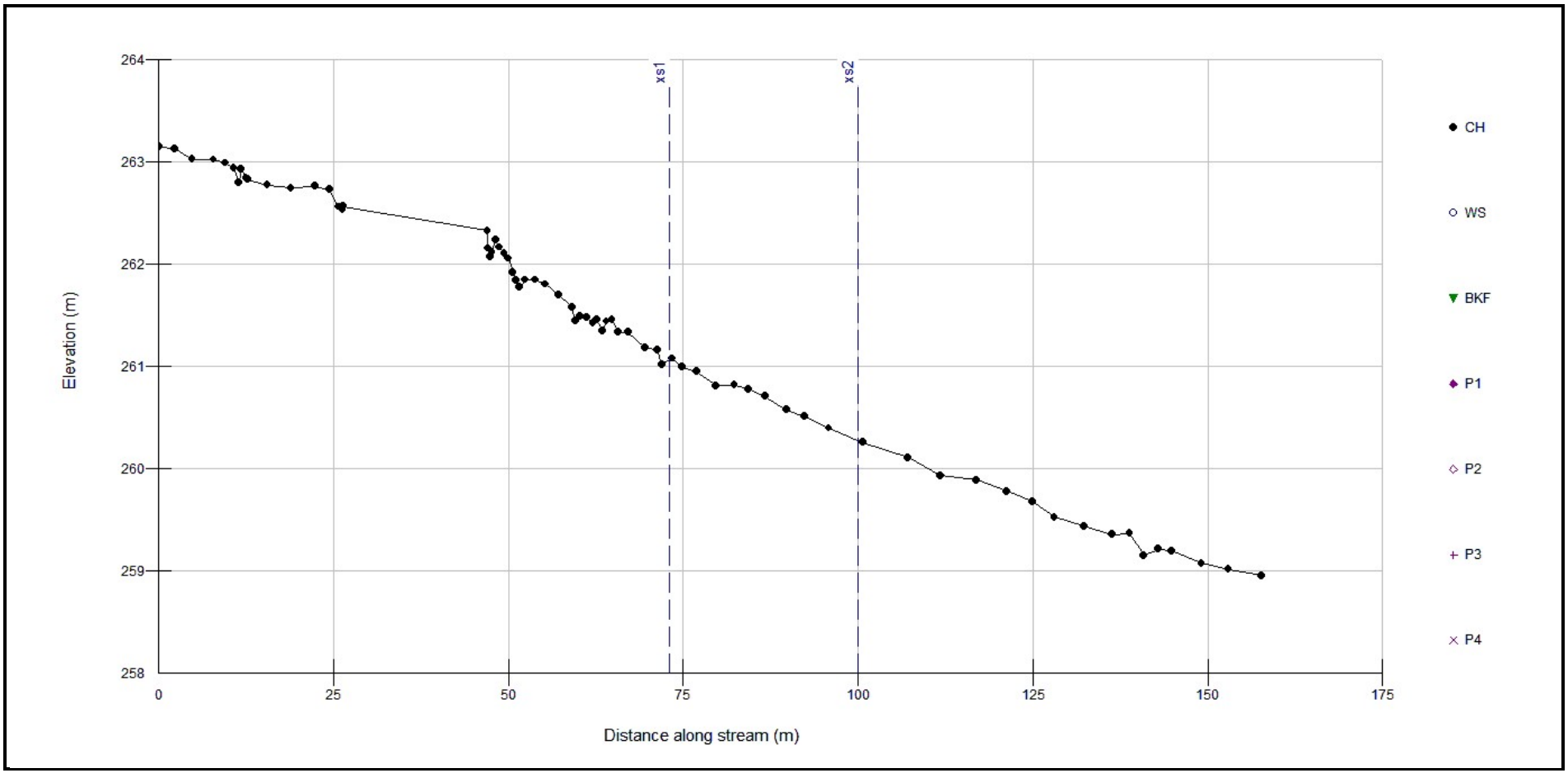


Figure 2: Reach B - Existing Profile

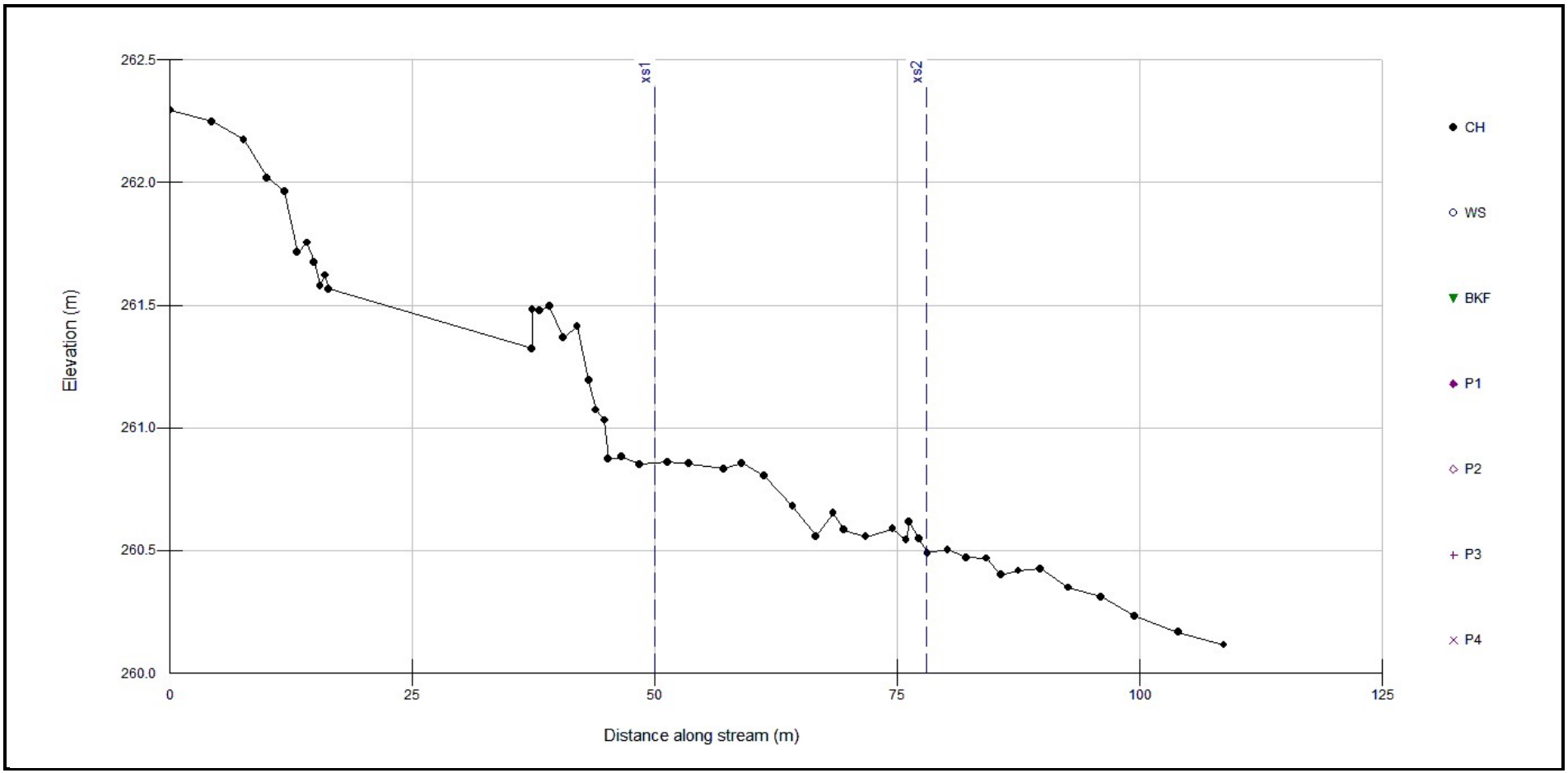


Figure 3: Reach C - Existing Profile

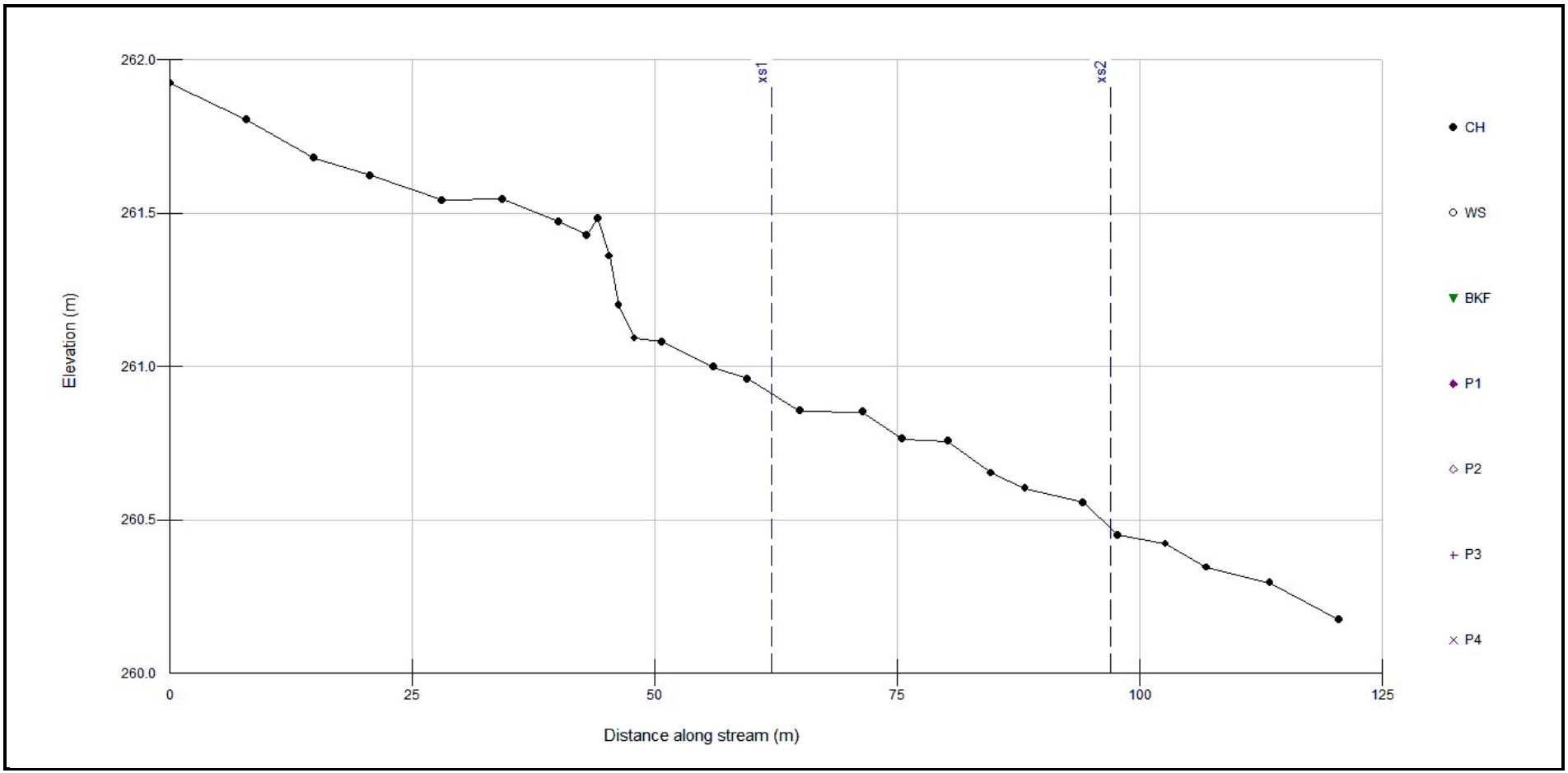


Figure 4: Reach D - Existing Profile

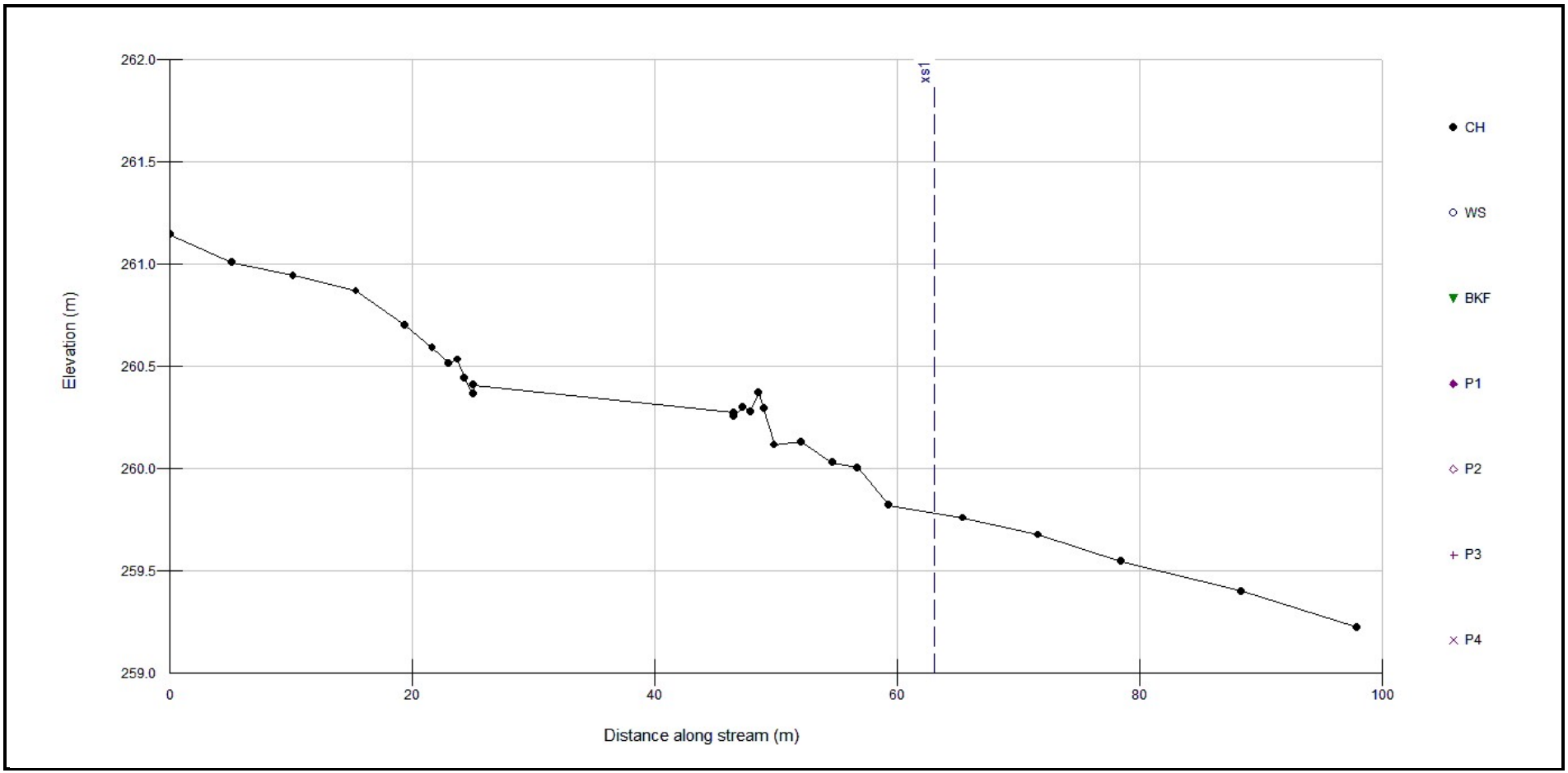


Figure 5: Reach E - Existing Profile

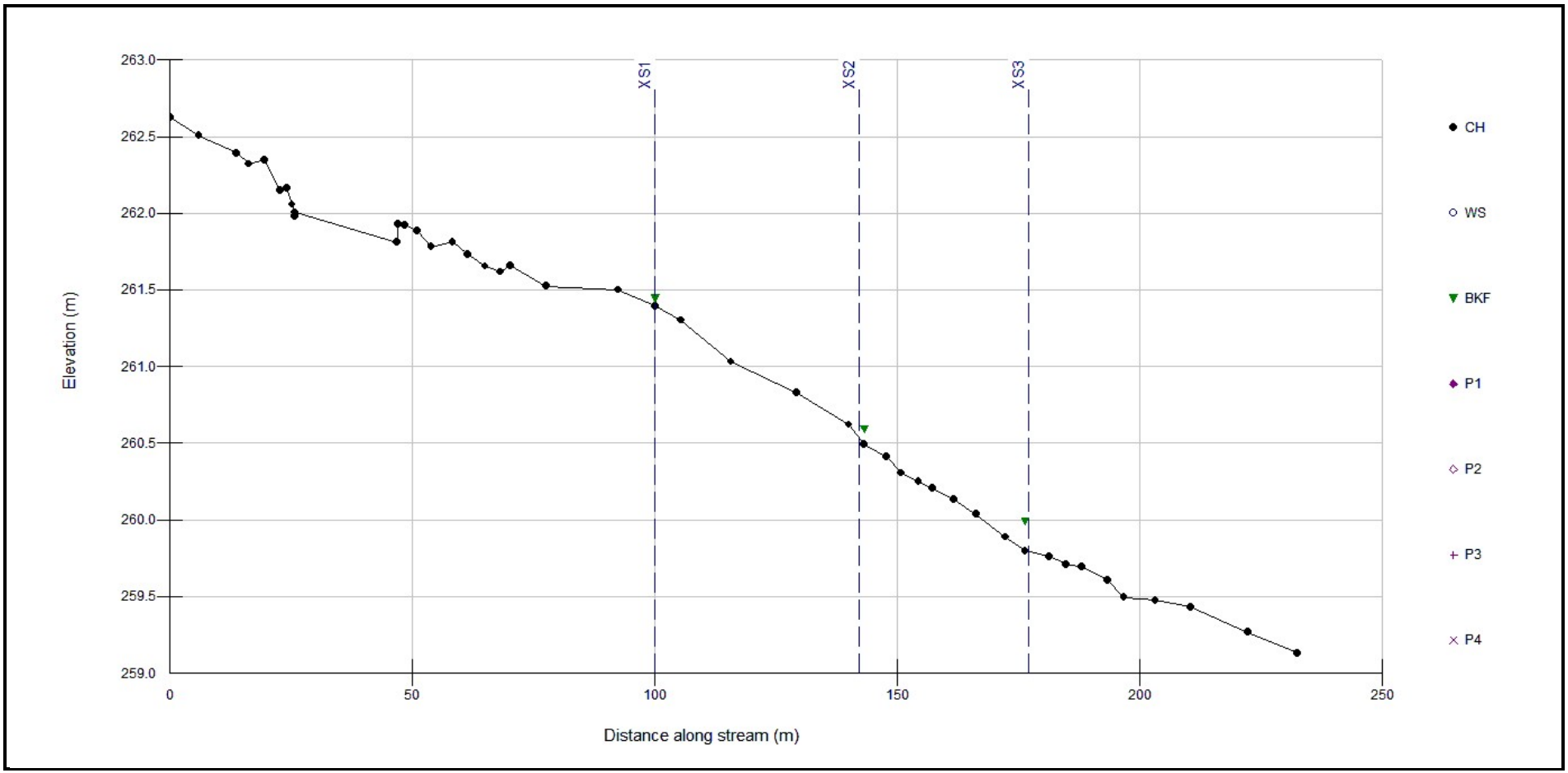


Figure 6: Reach F - Existing Profile

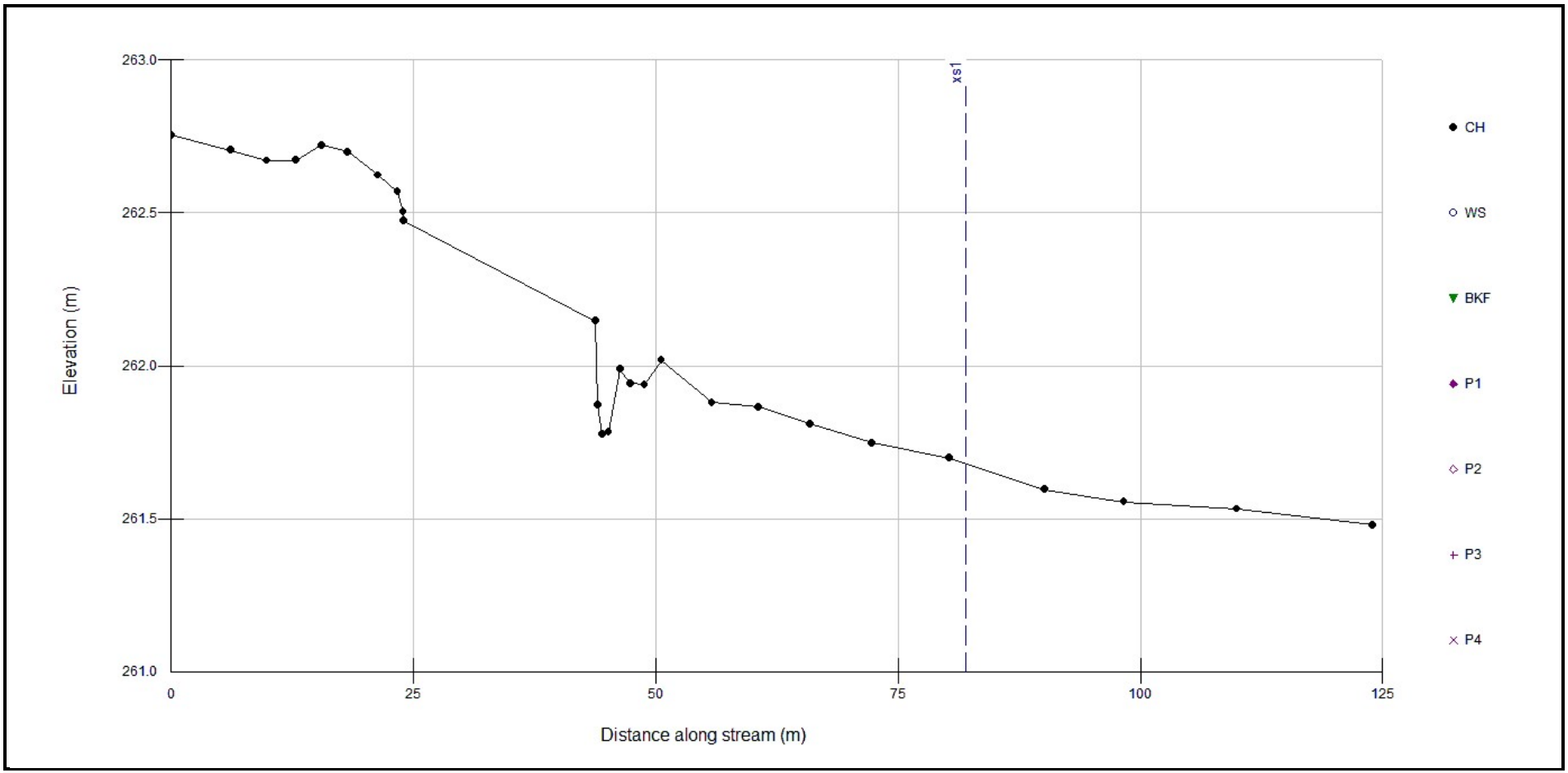


Figure 7: Reach G - Existing Profile

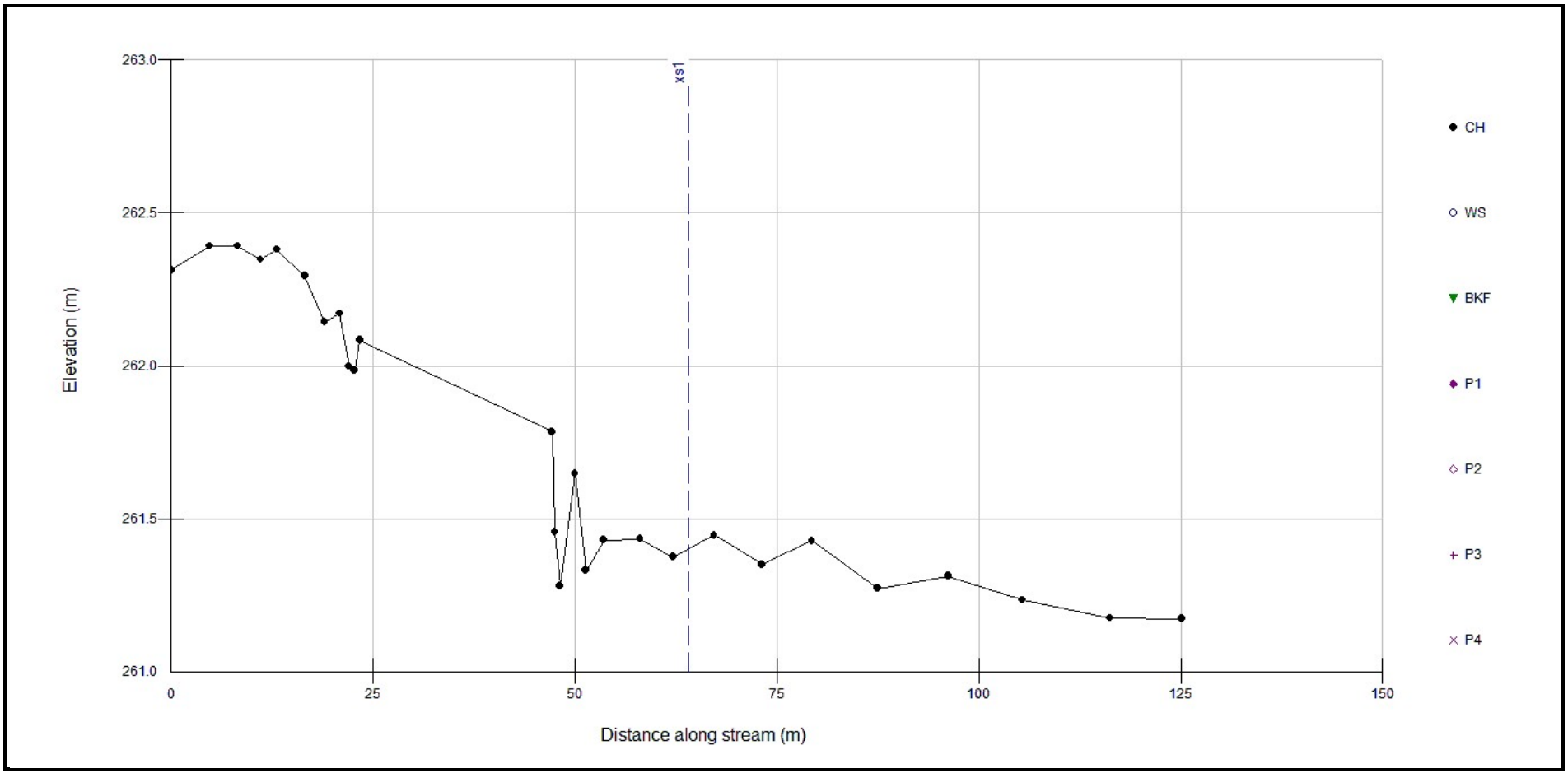


Figure 8: Reach H - Existing Profile

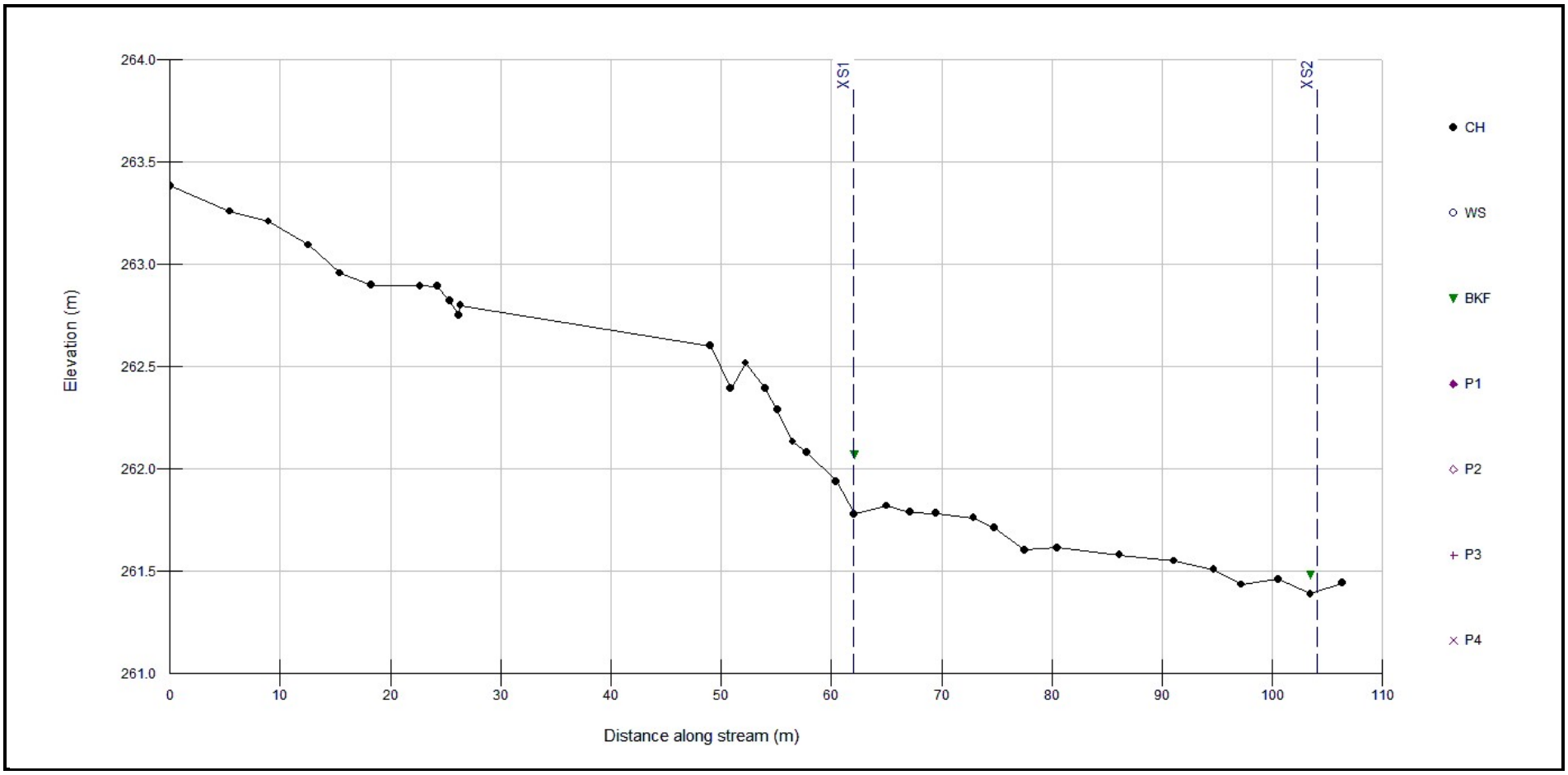


Figure 9: Reach I - Existing Profile

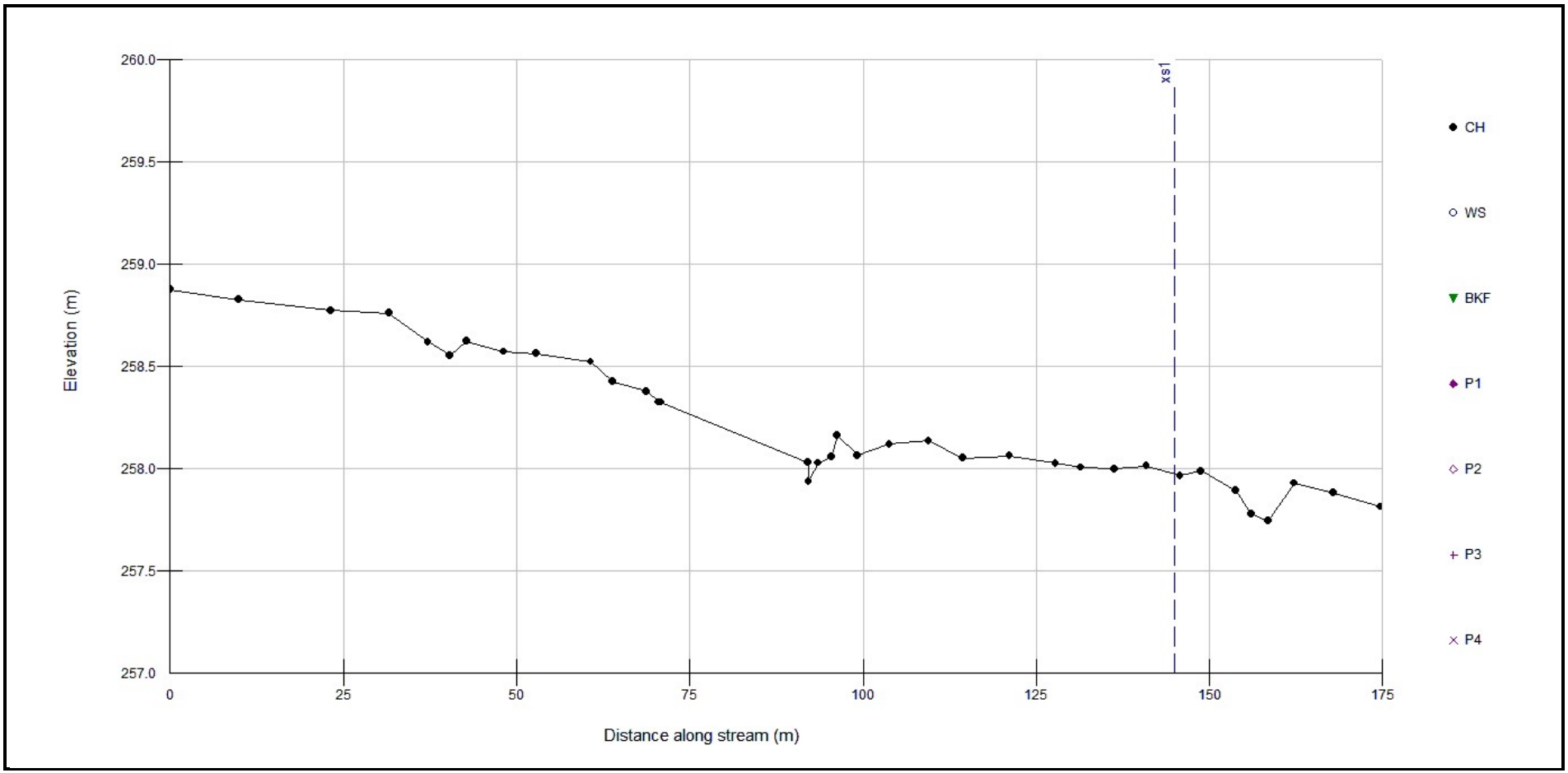


Figure 10: Reach J - Existing Profile

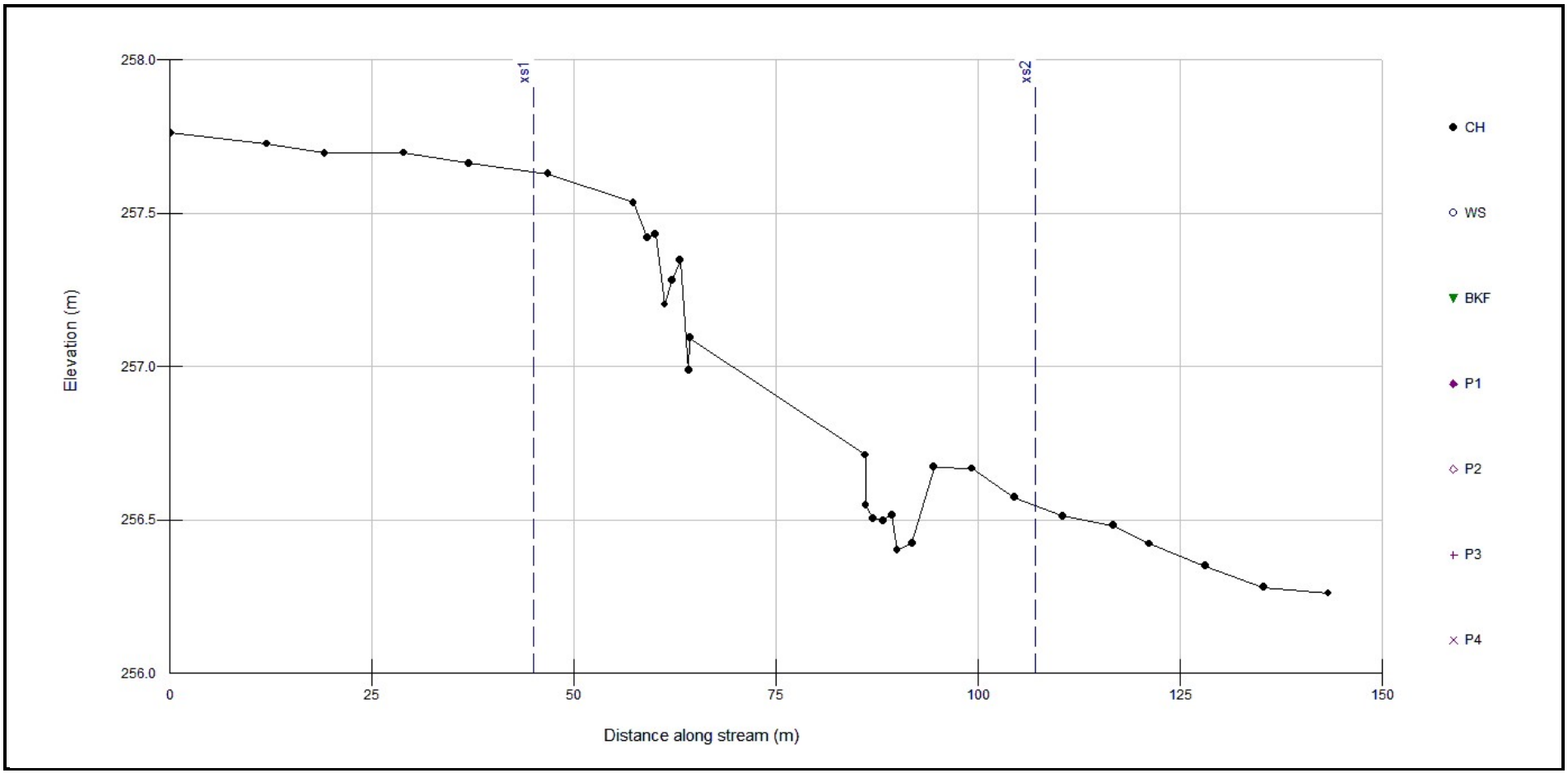


Figure 11: Reach K - Existing Profile

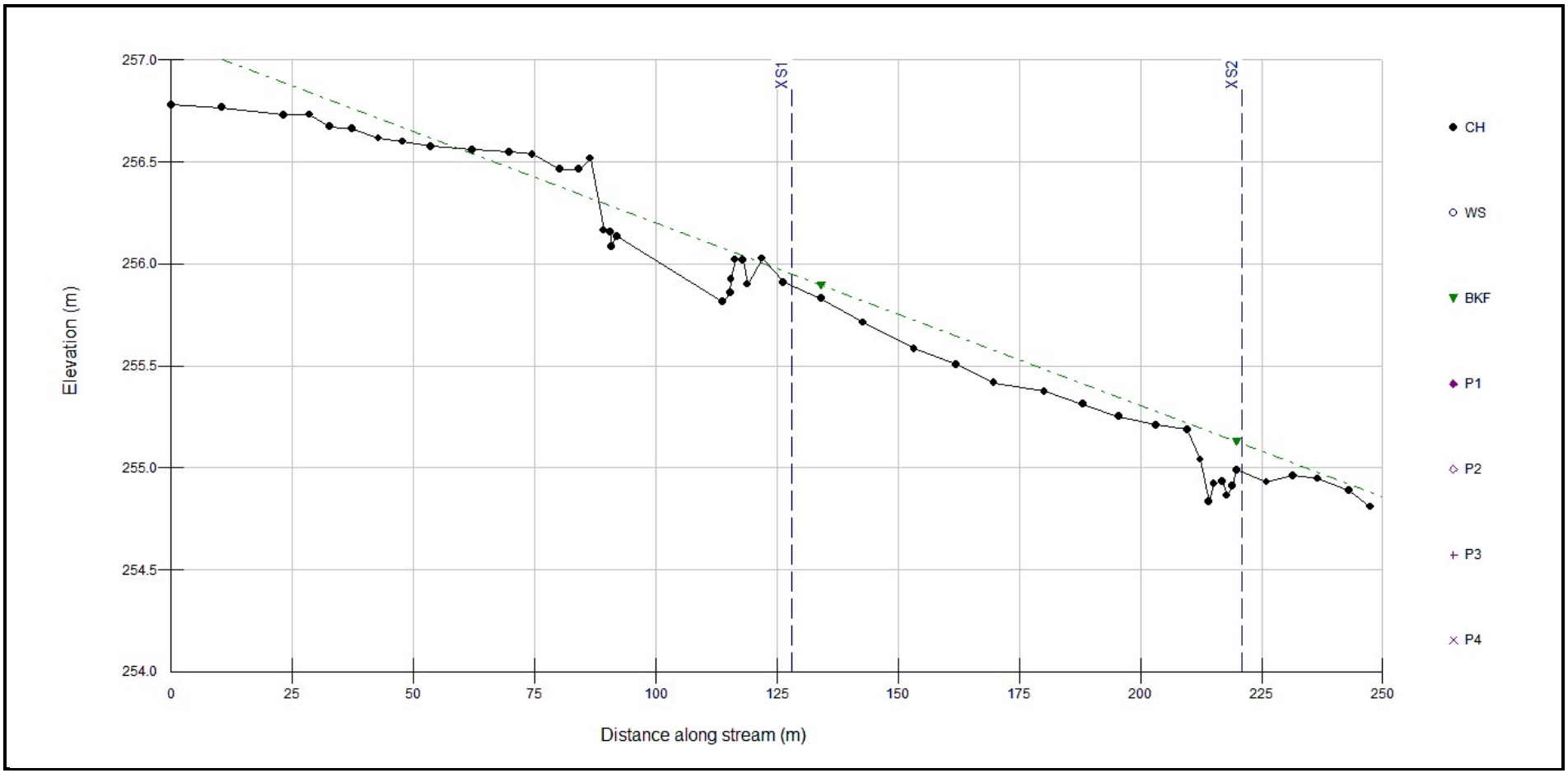


Figure 12: Reach L - Existing Profile

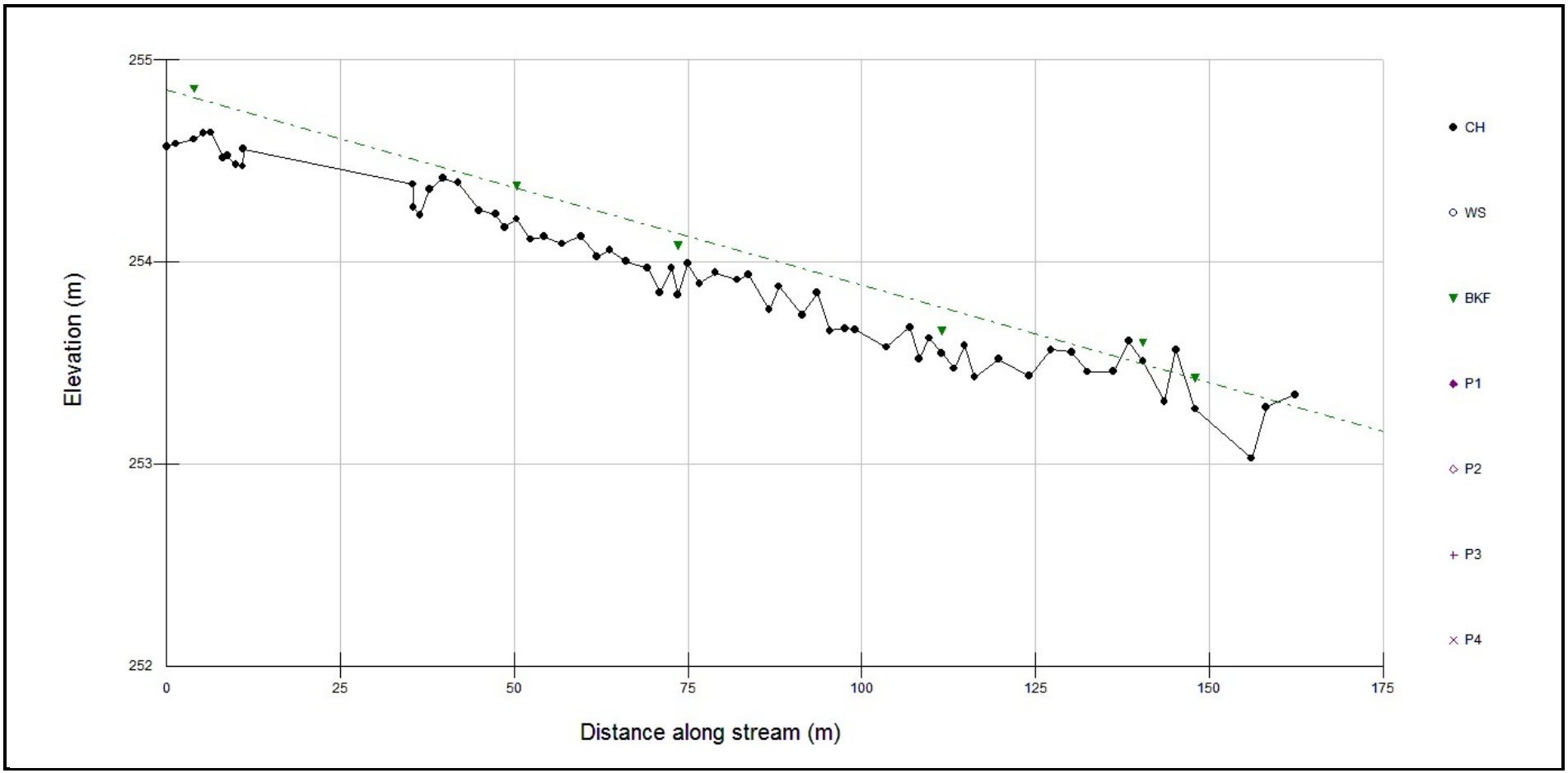


Figure 13: Reach M - Existing Profile

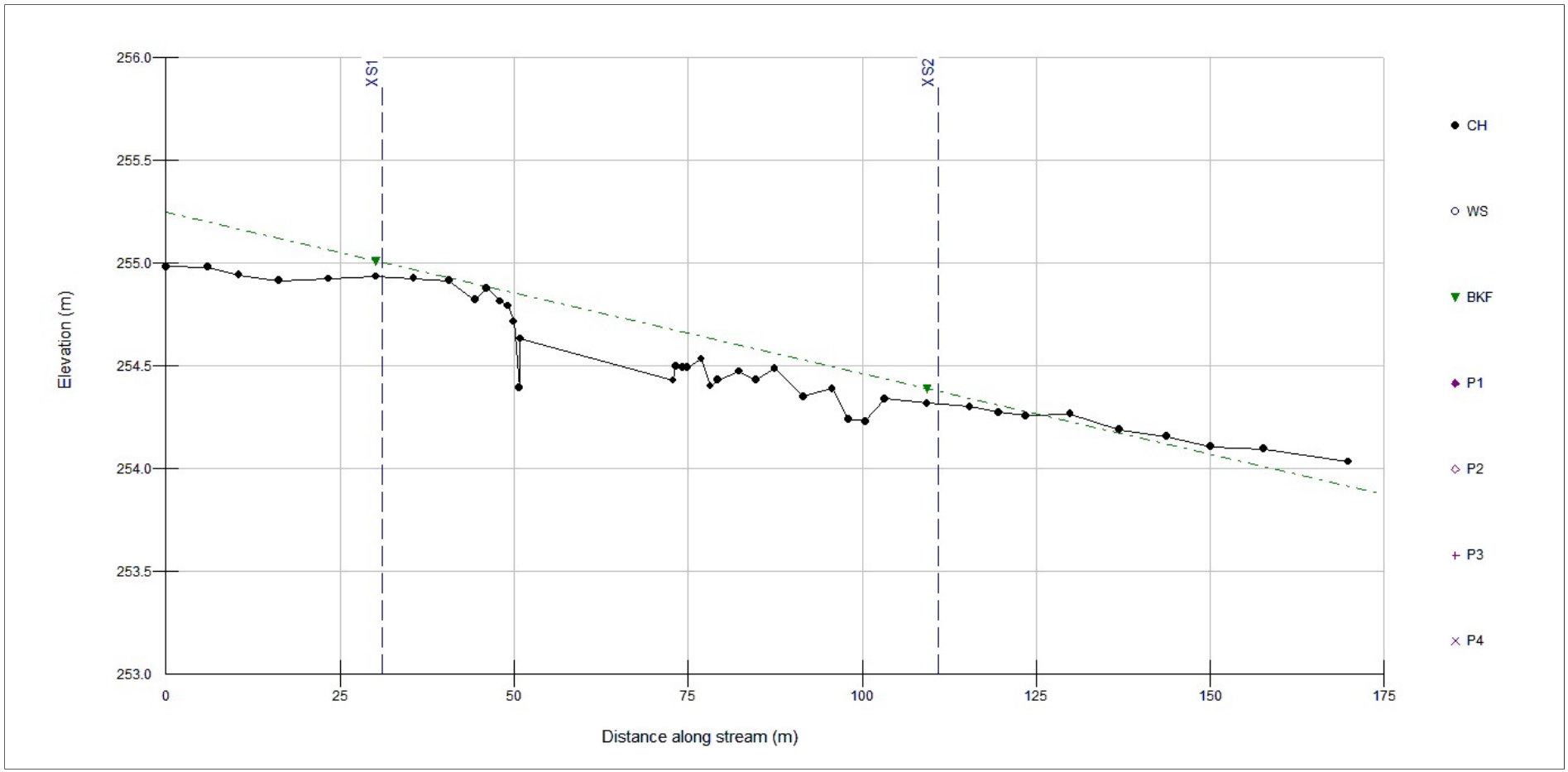


Figure 14: Reach N - Existing Profile

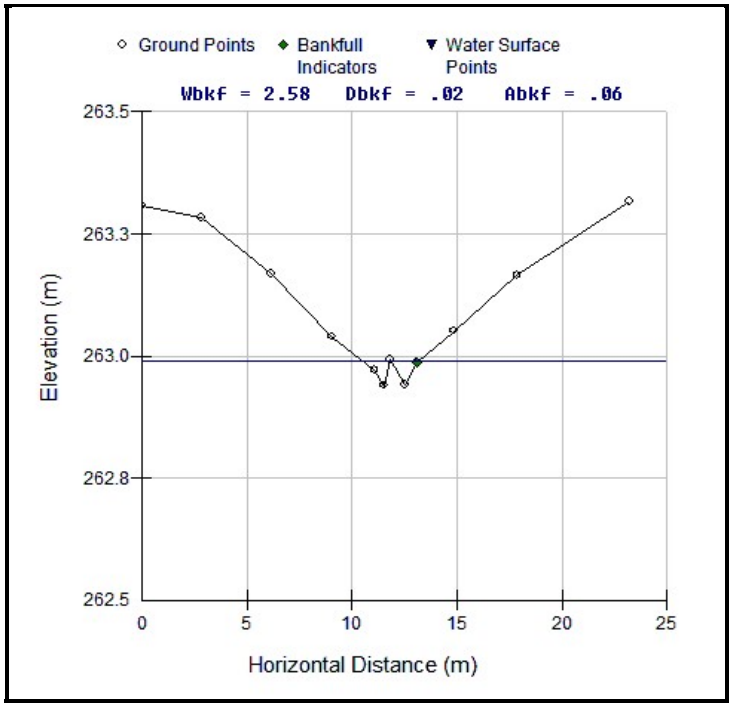


Figure 15: Cross Section RAXS1

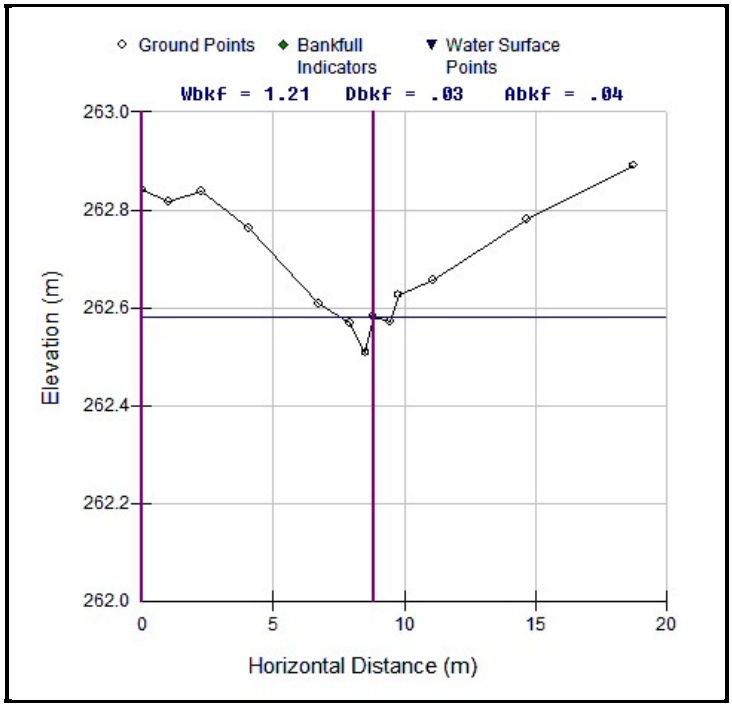


Figure 16: Cross Section RAXS2

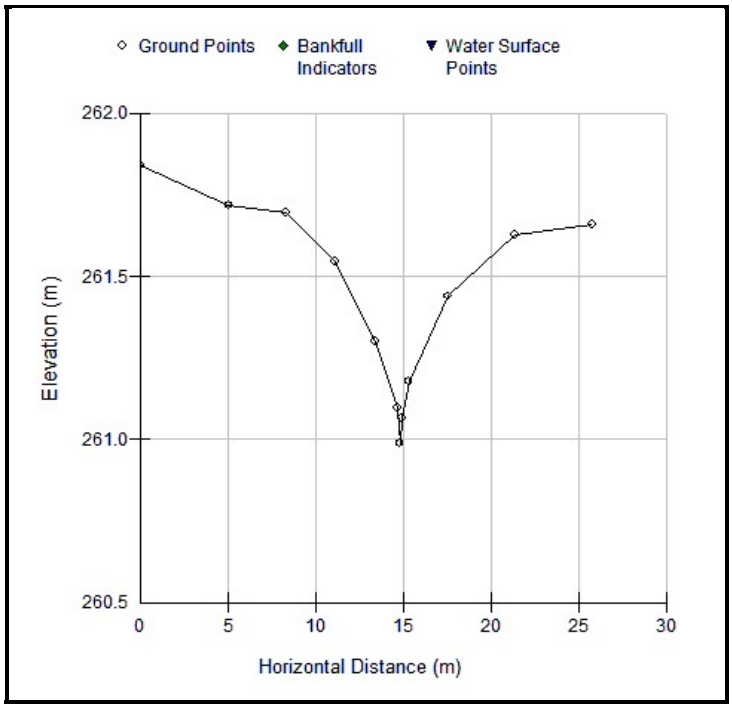


Figure 17: Cross Section RBXS1

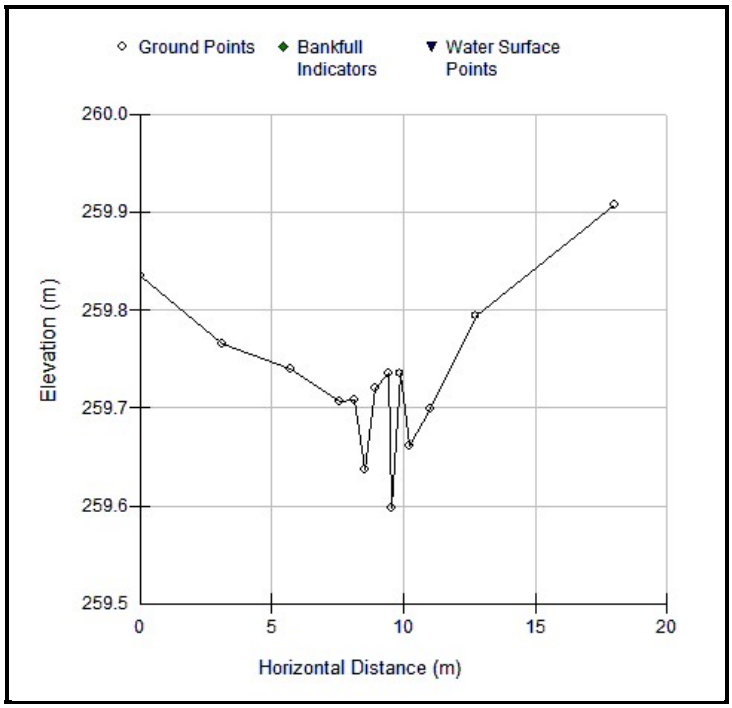


Figure 18: Cross Section RBXS2

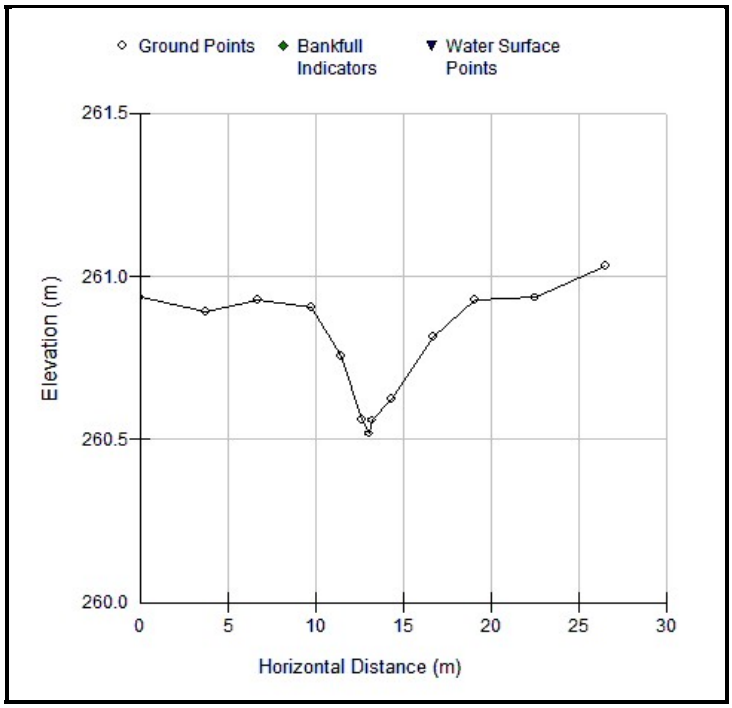


Figure 19: Cross Section RCXS1

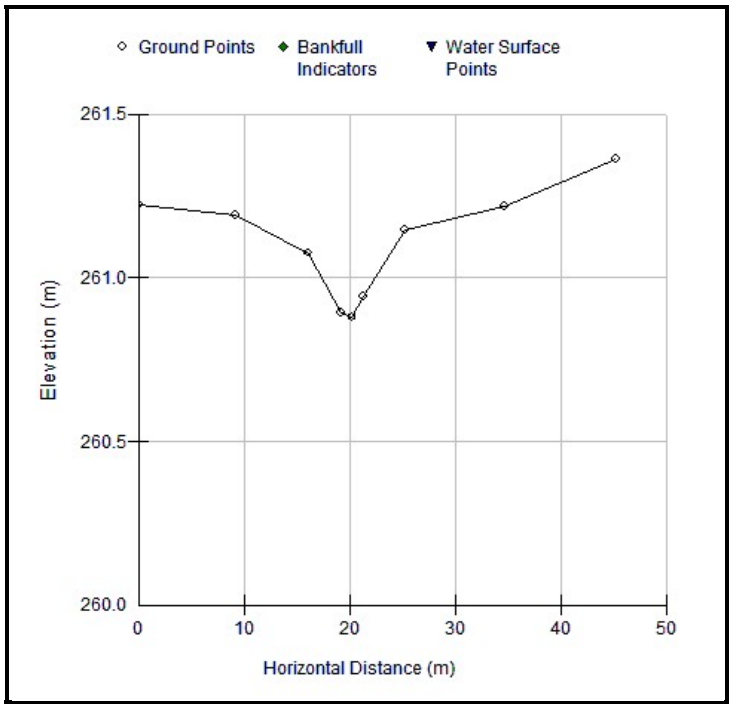


Figure 20: Cross Section RCXS2

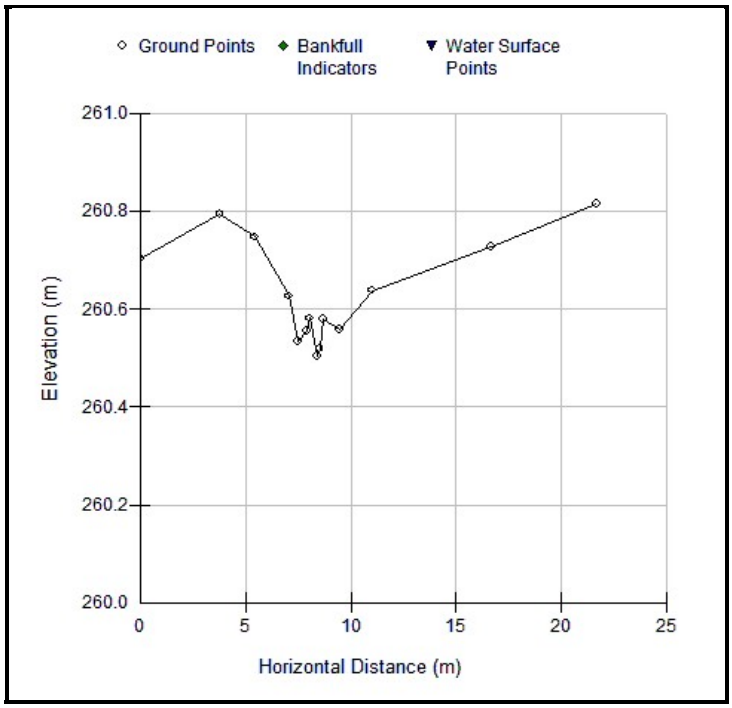


Figure 21: Cross Section RDXS1

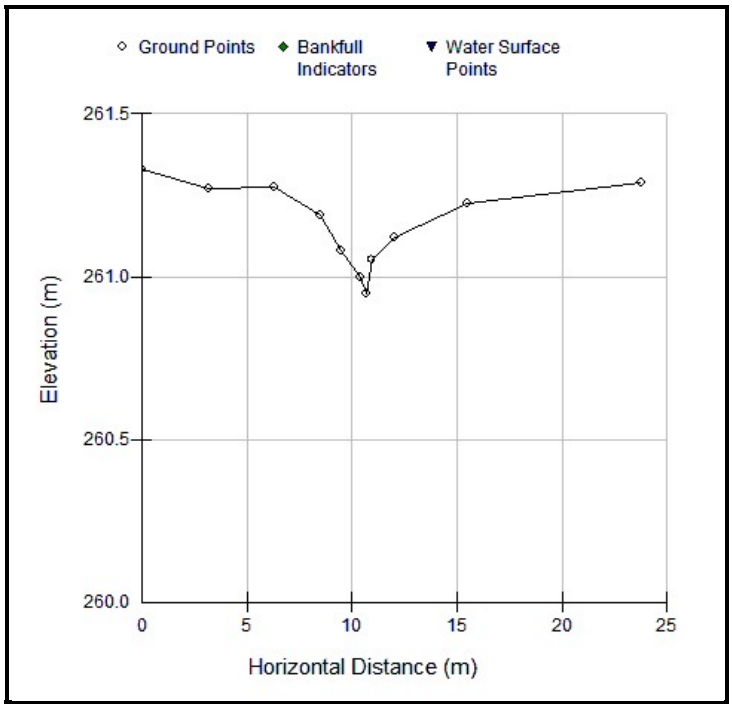


Figure 22: Cross Section RDXS2

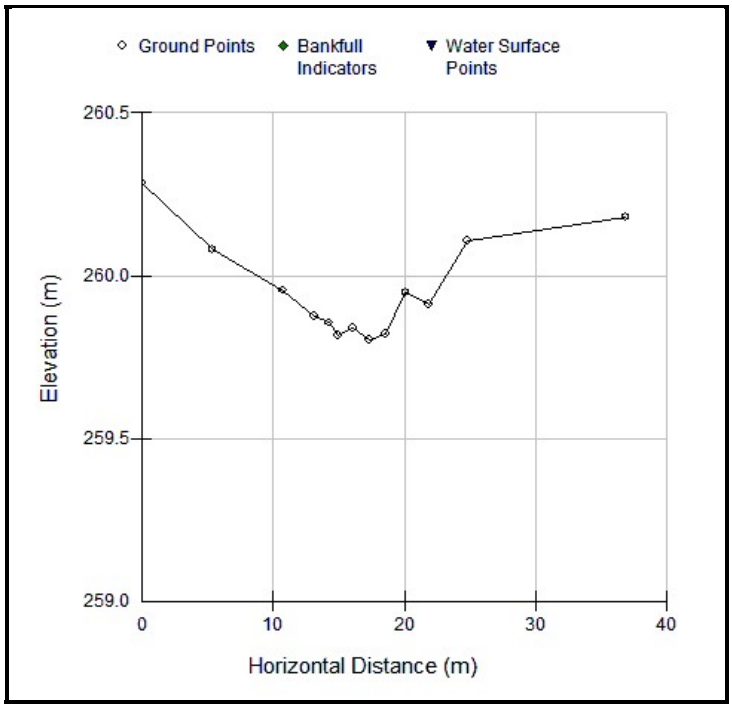
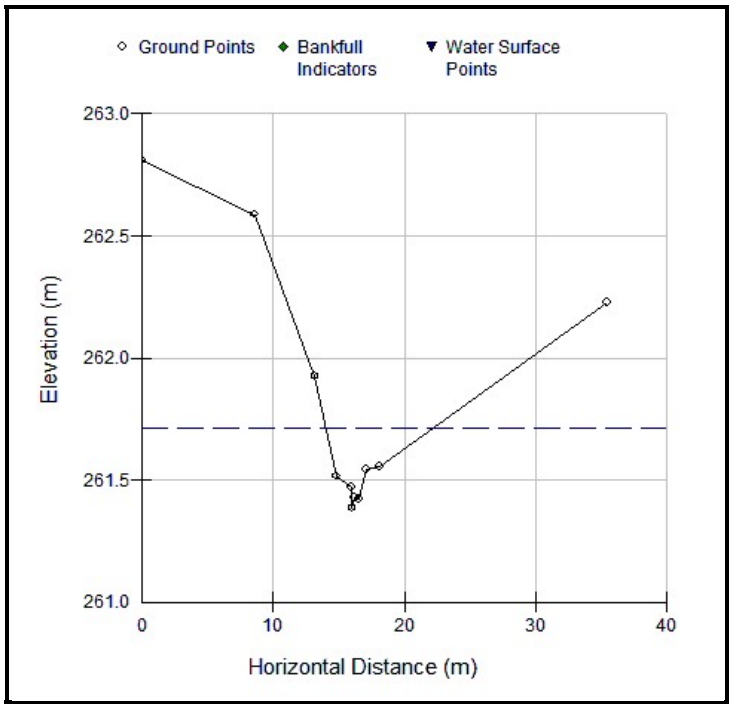


Figure 23: Cross Section REXS1



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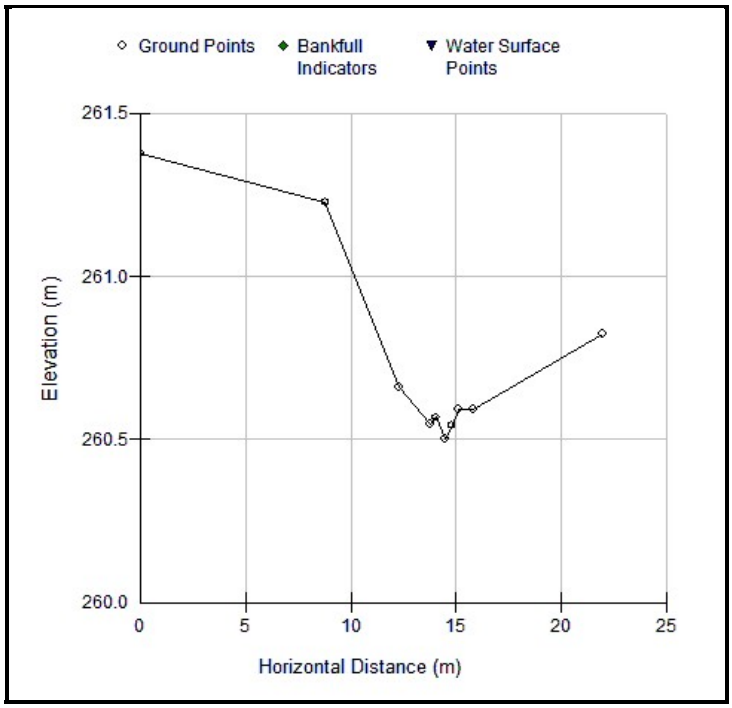


Figure 25: Cross Section RFXS2

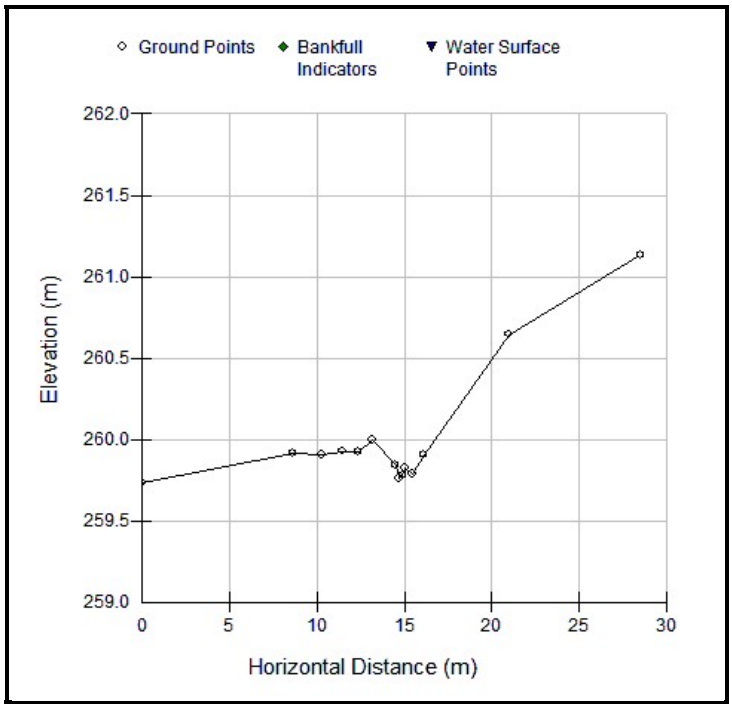


Figure 26: Cross Section RFXS3

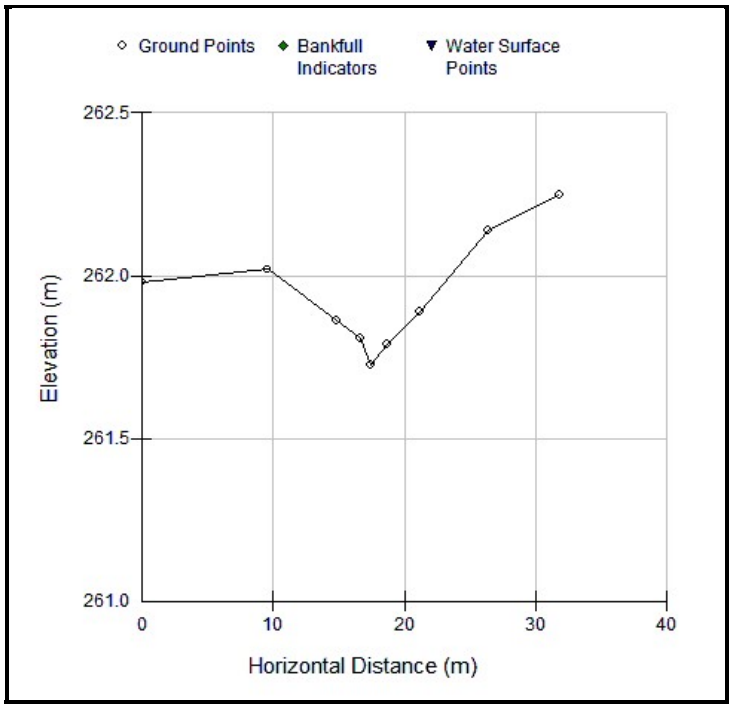


Figure 27: Cross Section RGXS1

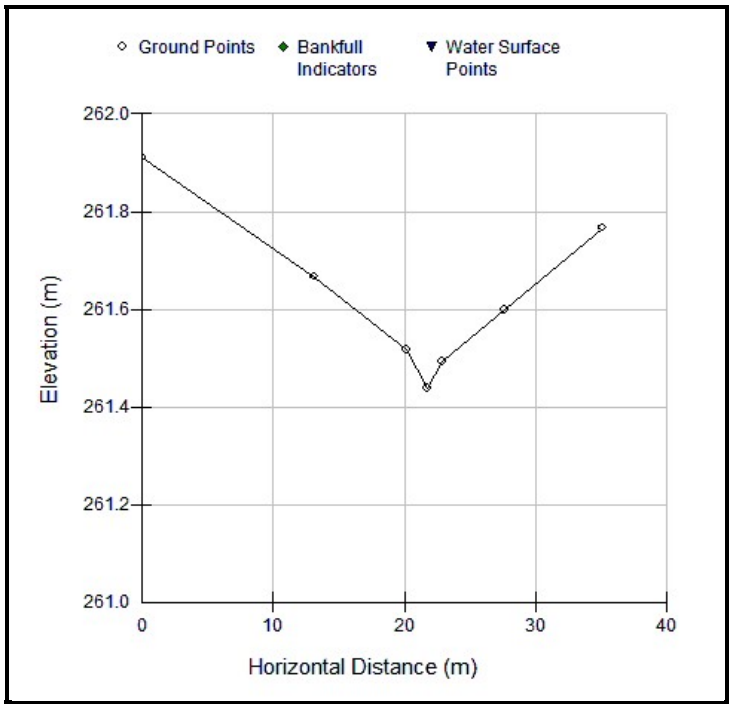


Figure 28: Cross Section RHXS1

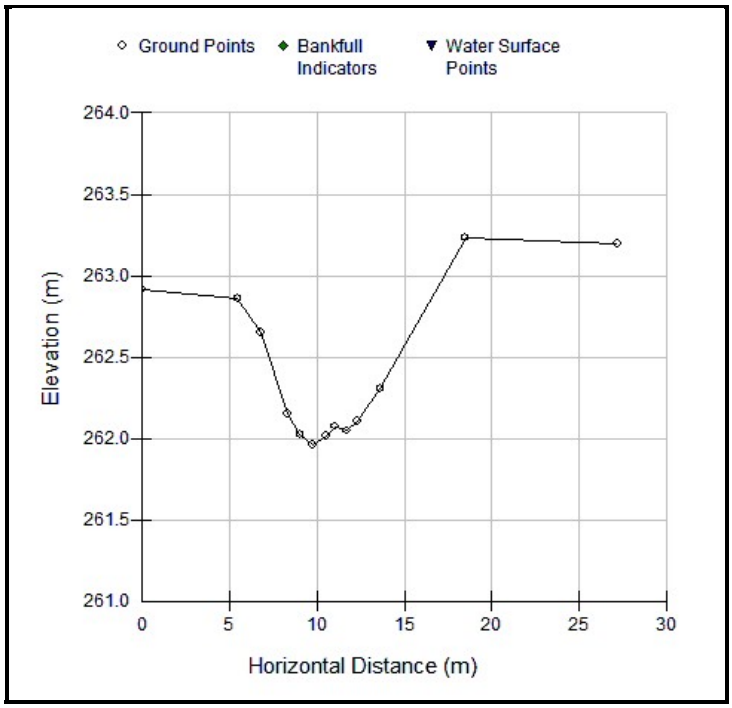


Figure 29: Cross Section RIXS1

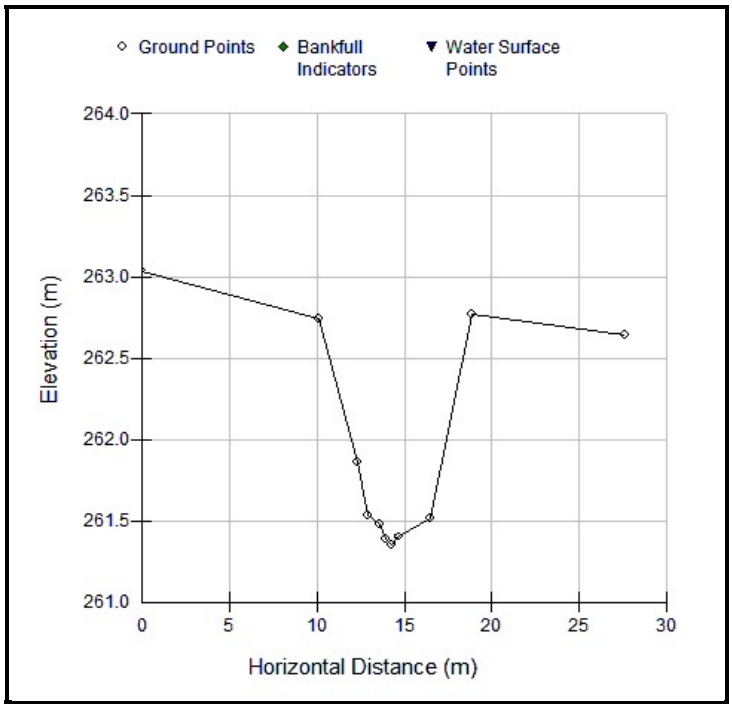


Figure 30: Cross Section RIXS2

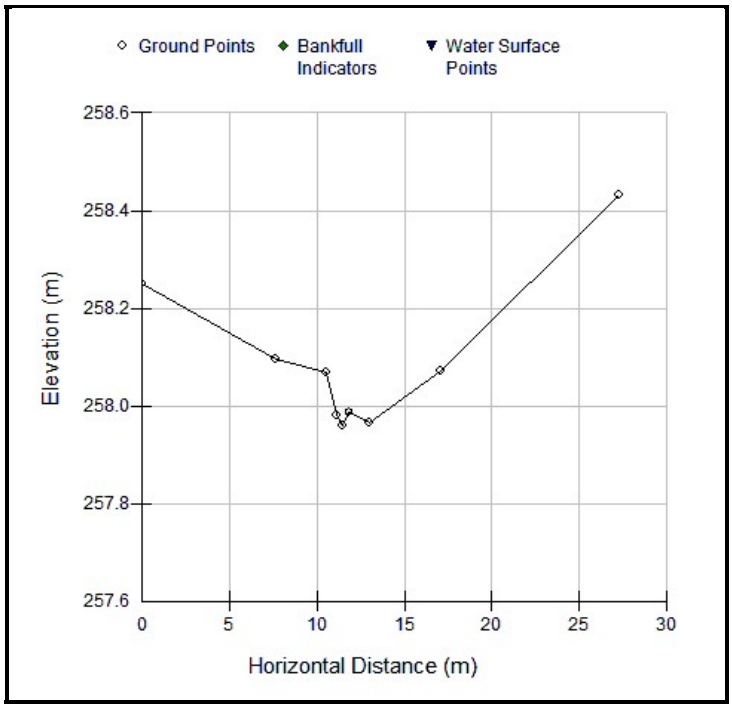


Figure 31: Cross Section RJXS1

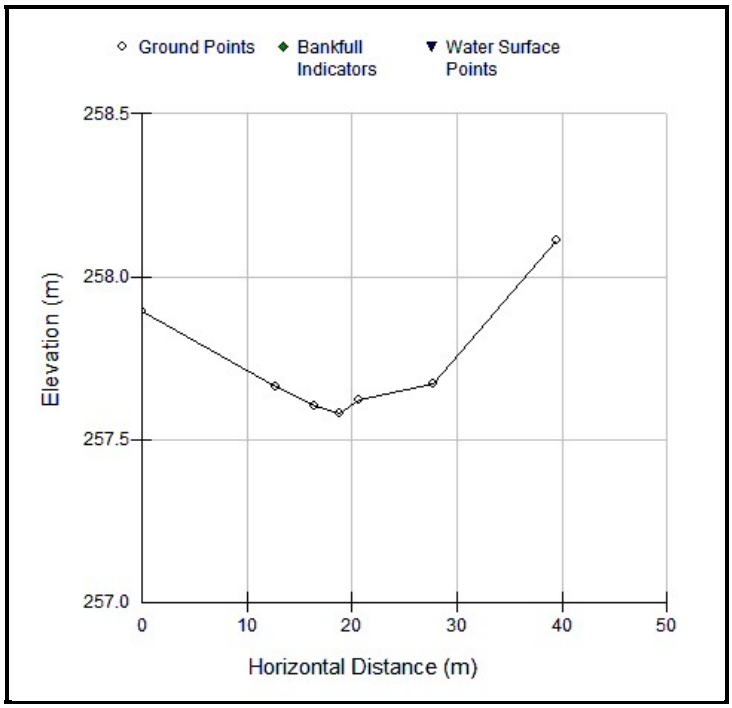


Figure 32: Cross Section RKXS1

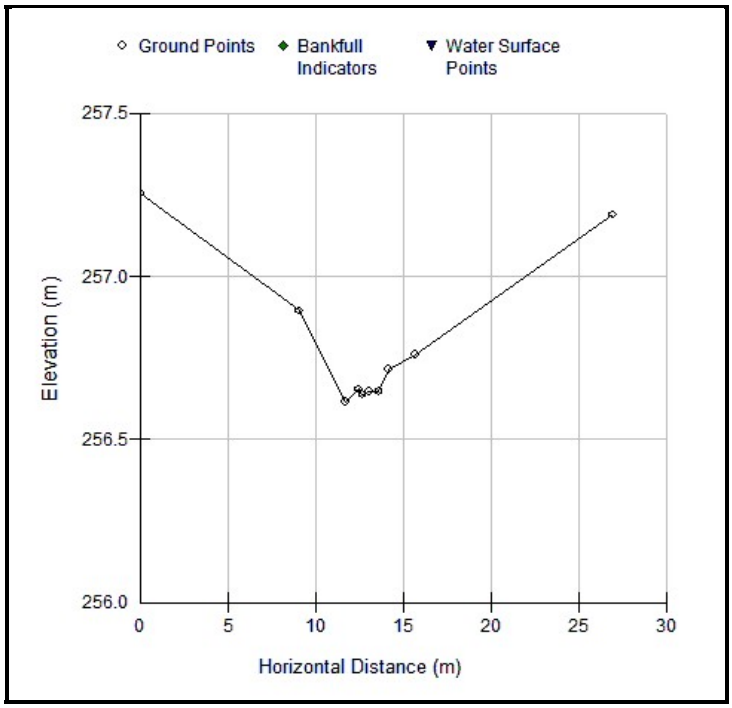


Figure 33: Cross Section RKXS2

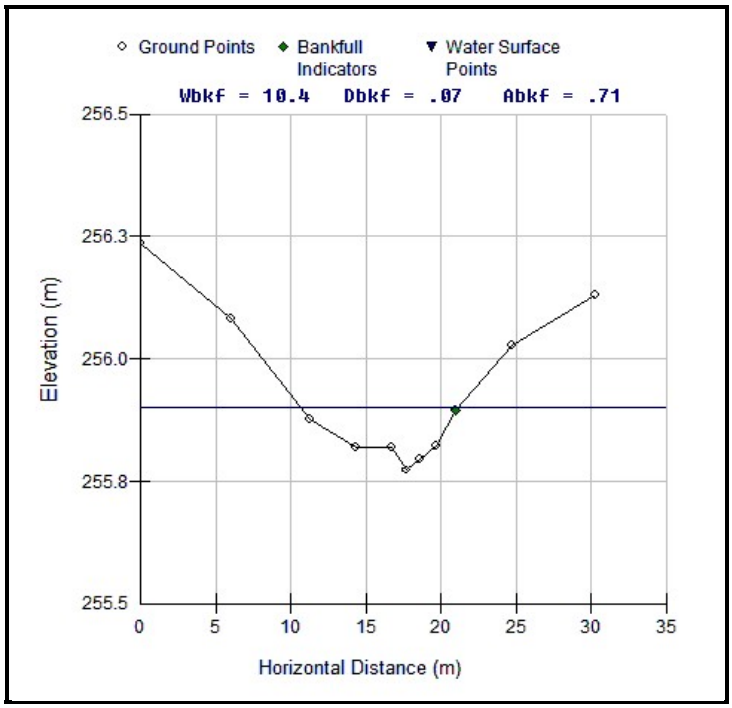


Figure 34: Cross Section RLXS1

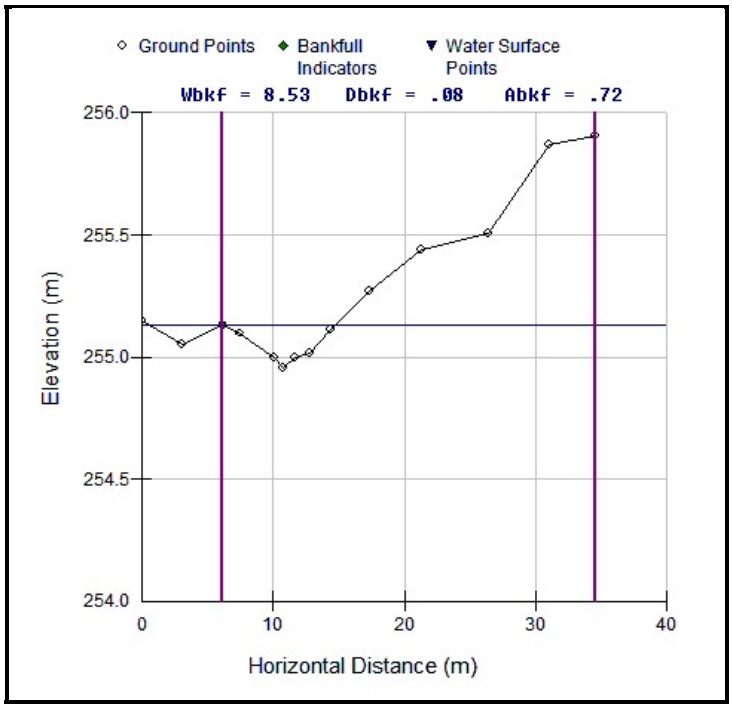


Figure 35: Cross Section RLXS2

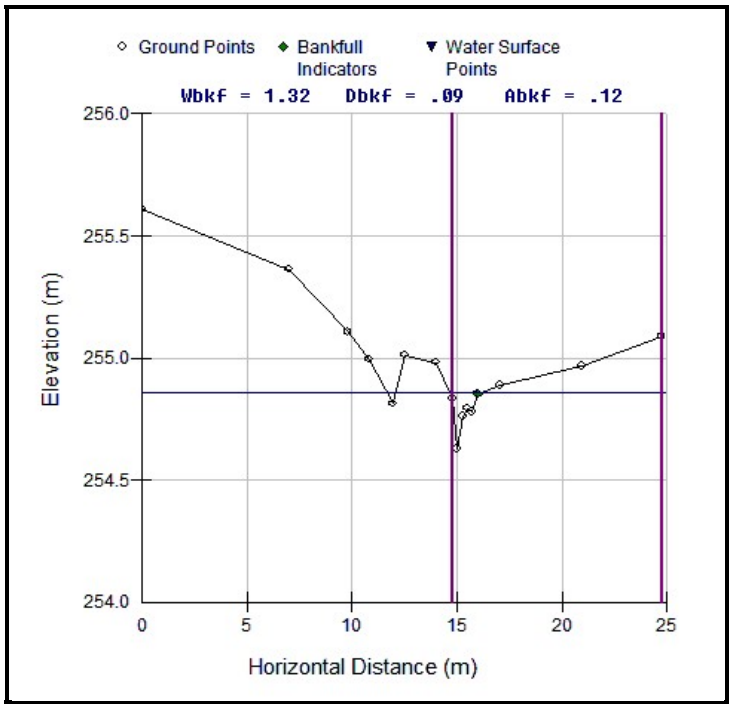


Figure 36: Cross Section RMXS1

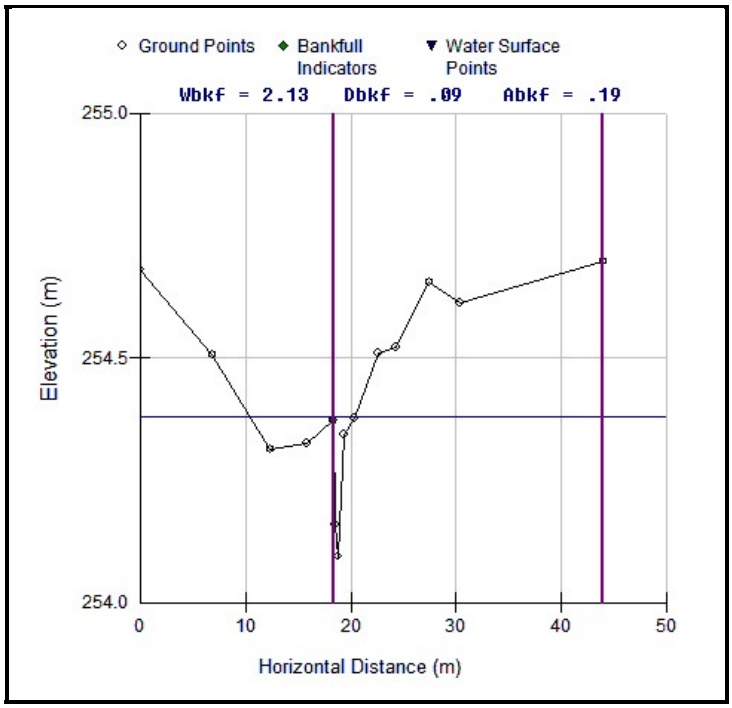


Figure 37: Cross Section RMXS2

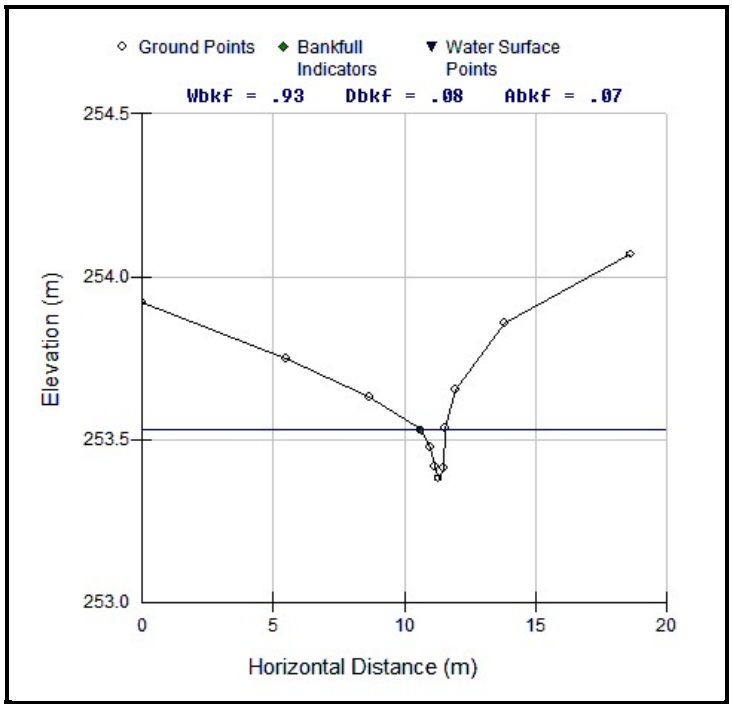


Figure 38: Cross Section RMXS3

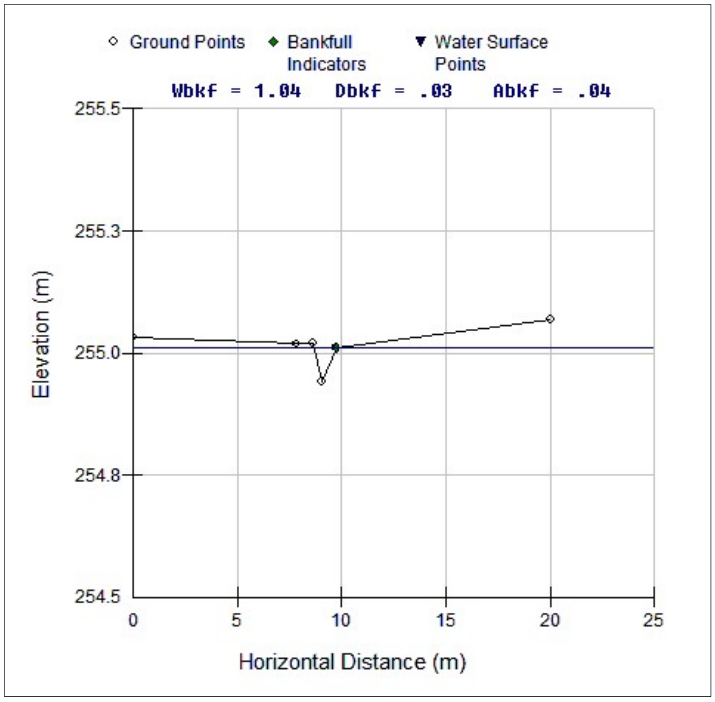


Figure 39: Cross Section RNXS1

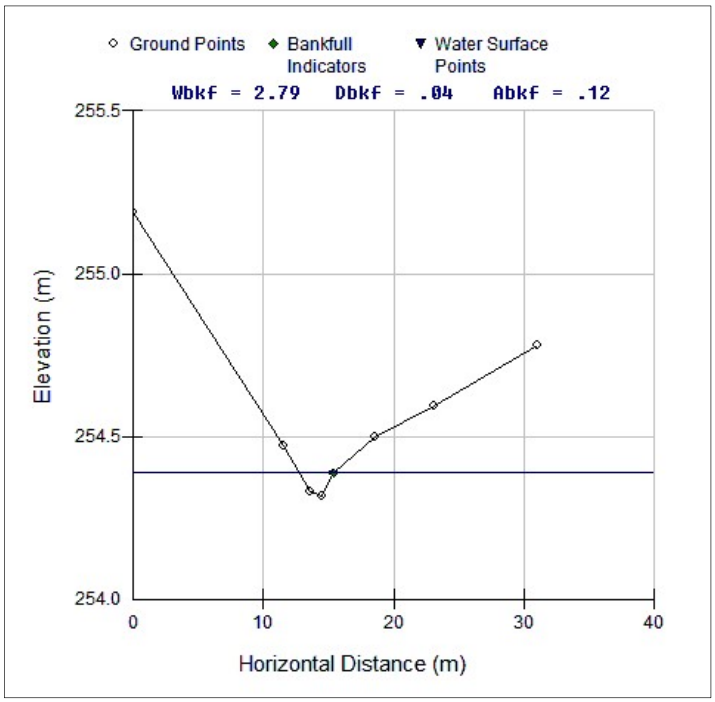


Figure 40: Cross Section RNXS2

APPENDIX B:

Photographs

Various Watercourses Brampton, Ontario

File #:13002

PHOTOGRAPH NO.: 1
FROM:
LOOKING: Upstream
COMMENT: Reach A

PHOTOGRAPH NO.: 2
FROM:
LOOKING: Downstream
COMMENT: Reach A

File #:13002

PHOTOGRAPH NO.: 3
FROM:
LOOKING: Upstream
COMMENT: Reach B

PHOTOGRAPH NO.: 4
FROM:
LOOKING: Upstream
COMMENT: Reach B

File #:13002

PHOTOGRAPH NO.: 5
FROM:
LOOKING: Upstream
COMMENT: Reach D

PHOTOGRAPH NO.: 6
FROM:
LOOKING: At Ditch on downstream side of the road
COMMENT: Reach D

File #:13002

PHOTOGRAPH NO.: 7
FROM:
LOOKING: Upstream
COMMENT: Reach E

PHOTOGRAPH NO.: 8
FROM:
LOOKING: Downstream
COMMENT: Reach F

PHOTOGRAPH NO.: 9
FROM:
LOOKING: Upstream
COMMENT: Reach G

PHOTOGRAPH NO.: 10
FROM:
LOOKING: Downstream
COMMENT: Reach G

File #:13002

PHOTOGRAPH NO.: 11
FROM:
LOOKING: Upstream
COMMENT: Reach H

PHOTOGRAPH NO.: 12
FROM:
LOOKING: Downstream
COMMENT: Reach H

File #:13002

PHOTOGRAPH NO.: 13
FROM:
LOOKING: Upstream
COMMENT: Reach I

PHOTOGRAPH NO.: 14
FROM: R9
LOOKING: Downstream
COMMENT: Reach 9

File #:13002

PHOTOGRAPH NO.: 15
FROM:
LOOKING: Upstream
COMMENT: Reach J

PHOTOGRAPH NO.: 16
FROM:
LOOKING: Downstream
COMMENT: Reach J

PHOTOGRAPH NO.: 17
FROM:
LOOKING: Upstream
COMMENT: Reach K

PHOTOGRAPH NO.: 18
FROM:
LOOKING: Downstream
COMMENT: Reach K

File #:13002

PHOTOGRAPH NO.: 19
FROM:
LOOKING: Upstream
COMMENT: Reach L

PHOTOGRAPH NO.: 20
FROM:
LOOKING: Downstream
COMMENT: Reach L

File #:13002

PHOTOGRAPH NO.: 21
FROM:
LOOKING: Upstream
COMMENT: Reach M

PHOTOGRAPH NO.: 22
FROM:
LOOKING: Downstream
COMMENT: Reach M

CONTAMINATED SOIL REPORT

THURBER ENGINEERING LTD.

CONTAMINATED SOIL ASSESSMENT REPORT
MAYFIELD ROAD
WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD
BRAMPTON/CALEDON, ONTARIO

Report

to

Hatch Mott MacDonald

Mark Farrant, P.Eng.
Project Engineer

Date: November 27, 2015
File: 19-1605-148

Steven Sather, P.Eng.
Review Principal

THURBER

TABLE OF CONTENTS

THURBER

1. INTRODUCTION

This report presents the findings of a Contaminated Soil Assessment for the portion of Mayfield Road between Winston Churchill Boulevard and Chinguacousy Road, located on the border between the City of Brampton and the Town of Caledon. The work was undertaken by Thurber Engineering Ltd. (Thurber) for Hatch Mott Macdonald, as part of a Schedule 'C' Class Environmental Assessment (EA) for the Regional Municipality of Peel. The purpose of the Contaminated Soil Assessment Report was to evaluate the presence of existing or potential concerns in the vicinity of the project right-of-way that may have resulted from previous and/or current land uses or geologic conditions. The work was carried out as outlined in the Regional Municipality of Peel Request for Proposal Document 2012-446P and Thurber's proposal dated September 11, 2012.

The use of this report is subject to the Statement of Limitations and Conditions included at the end of the text. The reader's attention is specifically drawn to these conditions as it is considered essential that they be followed for the proper use and interpretation of this report.

2. SCOPE OF WORK

The Contaminated Soil Assessment included the following tasks:

- A visual reconnaissance of the study area conducted by Ms. Katrina Young, E.I.T. of Thurber on December 6, 2013. A follow-up reconnaissance was conducted by Mr. Mark Farrant, P.Eng. of Thurber on October 28, 2014;
- Review of City of Brampton Zoning Maps to identify existing land usage;
- Review of historic aerial photographs from the Ministry of Natural Resources (MNR) for 1960, 1976, and 1990, and digital imagery for the years 1994, 2000, 2004, and 2013;
- Review of selected city directories from 1958 to 2001 in 5 year intervals;
- Review of local and regional topographic and geologic maps; and,
- Requested Ecolog Environmental Risk Services Ltd. (ERIS) Report for the project corridor, which included searches of various federal, provincial and private source databases for records of potential environmental concerns such as spills, former waste disposal sites, registration of underground/above ground fuel storage tanks, environmental infractions, environmentally sensitive area information and/or other relevant information.

3. SITE DESCRIPTION

The Class EA is for the improvement of Mayfield Road from Winston Churchill Boulevard to Chinguacousy Road in Caledon/Brampton, Ontario (see Drawing No. 19-1605-148 in Appendix A). Mayfield Road is an east-west major arterial road within the jurisdiction of the Regional Municipality of Peel, and forms the boundary between the City of Brampton and Town of Caledon. This section of Mayfield Road is rural, consisting of two lanes with a posted speed limit of 80 km/h (with a reduction to 60 km/h through the Alloa community at Creditview Road) and is utilized by both commuter and truck traffic. The limit of the area studied was a 250 m radius from Mayfield Road between Winston Churchill Boulevard and Chinguacousy Road. For clarity of reporting, Mayfield Road will be considered to run in an east-west direction.

The study area includes two through lanes from Chinguacousy Road to Winston Churchill Boulevard covering a total distance of approximately 5.4 km and including a 50 m right-of-way as designated by the Peel Region Official Plan. A total of six roadways were located within the study area: Mayfield Road, Winston Churchill Boulevard, Heritage Road, Mississauga Road, Creditview Road, and Chinguacousy Road. All roadways consist of two lanes within the limits of the study area. Based on visual observations of the site and a review of the City of Brampton Zoning Maps from 1994 to 2014, the land use west of Mississauga Road is primarily agricultural. The land to the east of Mississauga road has varied uses, consisting of agricultural along with residential, commercial, institutional, open space, floodplain, and mixed use land space. Residential dwellings in the area consist of one- to two-storey detached homes often accompanying agricultural structures, such as barns and silos.

The topography within the study area is gently undulating from a ground surface elevation of approximately 256 m to 267 m above sea level, with a gradual downwards slope towards Lake Ontario. Available geological data indicates that the subsurface material within the area consists of low-relief plains of Halton Till: a highly calcareous silt to silty clay till. The till is of variable thickness and overlies shale, limestone, dolostone, and siltstone of the Queenston Formation. The geological data is consistent with the results of boreholes drilled on Mayfield Road by Thurber in 2013 for an accompanying geotechnical investigation, which indicated that the subsurface material along the corridor consisted of mainly sandy silt, with some silty clay and sand deposits.

The study area is located within a physiographic region known as the South Slope: the southern slope of the Oak Ridges Moraine. The South Slope is smoothed and faintly drumlinized, although no drumlins are present within the study area. An esker is located south of Mayfield

Road 4.3 km east of its intersection with Chinguacousy Road, between Kennedy Road and Heart Lake Road.

The study area is located within the Credit Valley Watershed as part of the Credit Valley Conservation Authority. No conservation areas are located within the study area, however three are located nearby. The Silver Creek Conservation Area and Terra Cotta Conservation Area Two are located northwest of the study area, and the esker east of the study area is part of the Heart Lake Conservation Area, covered by the Toronto & Region Conservation Authority.

4. RECORDS REVIEW

4.1 Aerial Photographs and Digital Imagery

Aerial photographs from the Ministry of Natural Resources (MNR) for the years 1960, 1976, and 1990 were selected and reviewed in order to view development and land use changes over time. Additional digital imagery was available online from the City of Brampton for portions of the study area for 1994 and 2000, and from Google Earth for 2004 and 2013.

The aerial photograph taken in 1960 shows that all six roadways included in the study area had been constructed. The properties within the study area consisted of undeveloped land and farmland.

The aerial photograph taken in 1976 shows a number of residential properties that had been constructed along Mayfield Road since 1960, and that portions of the road had been realigned to eliminate jogs between Winston Churchill Boulevard and Heritage Road, and between Heritage Road and Mississauga Road. Further development since 1960, includes the construction of Alloa Public School at 1248 Mayfield Road, and a Hydro One transformer station at the northwest intersection of Mayfield Road and Chinguacousy Road.

The aerial photograph taken in 1990 shows that additional residential properties had been constructed along Mayfield Road, and what appears to be a Pioneer Hi-Bred Seed Production Facility at 12111 Mississauga Road. The 1994 City of Brampton digital image confirms the presence of the Pioneer Bi-Bred facility. No further major development in the study area is noted since the 1976 photograph. Mottled colouring in much of the undeveloped land was noted in the aerial photographs from 1976 and 1990, indicative of a well-drained subsurface material.

A 2000 City of Brampton digital image shows development of the Gro-Bark Ontario Ltd. property at 816 Mayfield Road. The 2004 Google Earth digital image shows that additional development had occurred at the Gro-Bark property. Multiple soil stockpiles and small ponds are visible in the image.

The most recent Google Earth digital imagery from 2013 shows residential development underway south of Mayfield Road between the Alloa Public School and Creditview Road. No further major development is noted since 2004. The 2013 imagery indicates that with the exception of the properties noted above, the majority of the study area still consists of farmland with occasional woodlots, with structures in the area generally consisting of residential homes and agricultural buildings. Drainage within the farming fields is apparent through frequent narrow gullies.

4.2 City Directories

Thurber conducted a city directory search for address listings on all streets within the study limits. A summary of the city directory listings recorded during the search is included in Appendix B.

Relevant city directories available at the Toronto Reference Library were reviewed at approximate 5-year intervals from 1958 up to the most recent directory available in 2001. No directory listings were found for any of the properties in the study area prior to 1991. In the 1991 directory, all listings found for the study area were residential in nature. The 1996 and 2001 directories included residential, agricultural and commercial listings. Notable listings include 11968 Heritage Road (Mardix Farms) in 1996, 12111 Mississauga Road (Pioneer Hi-Bred Production Ltd.) in 2001, and 816 Mayfield Road (Townsend Enterprises) in 2001.

4.3 Fire Insurance Plans

Thurber conducted a search for Fire Insurance Maps available at the Toronto Reference Library. No maps were found that pertain to the study area.

5. REGULATORY INFORMATION (ECOLOG ERIS REPORT)

The Ecolog ERIS Report (see Appendix C) provides information collected during the search of 61 databases maintained by government and private institutions. The Ecolog ERIS report

requested by Thurber included a search area of all records within 250 m of Mayfield Road from Winston Churchill Boulevard to Chinguacousy Road.

The Ecolog ERIS document in Appendix C reported a total of 78 environmental records located at 55 properties within 250 m of Mayfield Road. The records found at the relevant properties are listed in the Executive Summary: Site Report Summary – Surrounding Properties list, and expanded on in the Detail Report. The locations of the relevant properties are depicted on the Map included in the Ecolog ERIS document. A summary of the relevant results is as follows:

- The Ontario Spills (SPL) database indicated records of isolated spills at the following addresses:
  - 816 Mayfield Road – A container leak in 2003 by Hydro One Networks Inc. resulted in a spill of 200 L of non-PCB transformer oil. Soil contamination was not confirmed.
  - 12134 Mississauga Road – A residential furnace oil tank was found to be leaking underground in 1992; soil contamination was confirmed.
  - Mayfield Road and Creditview Road – A spill occurred in 2006 releasing 200 kg of fertilizer onto the ground. Soil contamination was not confirmed.
  - Mordale Farms Inc. (Mayfield Road and Creditview Road) – A transport truck roll over in 2009 released 25 gallons of diesel into ditch. Soil contamination was confirmed.
- A Certificate of Approval (CA) was given to Central Remediation Services Inc. in 1997 for industrial air emissions at 816 Mayfield Road. A search of the Ontario Environmental Registry indicated that an application made in 1997 for a bio-remediation facility at this property was not approved in 2001 due to a lack of requested information. A Certificate of Approval for sewage works at this property was approved in 2008, for the current occupant, Gro-Bark Ontario Ltd.
- The Ontario Regulation 347 Waste Generators Summary (GEN) included records of properties that have approved generators of various wastes related to the facility at the property. The summary describes the types of wastes at each property, but does not indicate any problems with handling, storage or collection of the wastes. Several records were noted from 2005 to 2012 at 816 Mayfield Road (Gro-Bark) for waste oils,

lubricants, sludges and aliphatic solvents. Previous records were also noted for 2003 and 2004 at 816 Mayfield Road, under the name M. Townsend Enterprises Ltd., although the wastes are not described.

- The Alloa Public School (Peel Board of Education) at 1248 Mayfield Road is listed in the CA and GEN databases for municipal sewage works and disposal of laboratory chemicals and petroleum distillates.

- The ERIS Historical Searches (EHS) database indicates that previous Ecolog ERIS reports have been requested at the following properties: 816 Mayfield Road (Gro-Bark, requested in 2010 and 2011), and a property located at the intersection of Mayfield Road and Creditview Road in 2012 (no address provided).

- The Pesticide Register (PES) includes records of several properties that are limited operators of pesticides, including DKG Landscaping at 624 Mayfield Road and Van Gool's Landscaping and Nurseries Ltd at 1760 Mayfield Road.

- The Record of Site Condition (RSC) database is part of the Ministry of the Environment's Brownfields Environmental Site Registry. An RSC is an official record that a property has been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use proposed to take place on a property. Sites listed in this registry include Walness Developments Inc. and 1367933 Ontario Inc. (both of these properties are near 1635 Mayfield Road and changed from agricultural to residential land use in 2011).

- The remainder of the database records are from the Water Well Information System (WWIS) and indicate the general locations and characteristics of water wells throughout the study area.

6. SITE RECONNAISSANCE

On December 6, 2013, Ms. Katrina Young, E.I.T., of Thurber carried out a visual reconnaissance of the study area. The visual observations were made from the roadway right-of-way without entering on private lands. The weather conditions were clear with no snow cover on the ground during the site reconnaissance. The overall land use of the area was observed and visual signs of potential site contamination (surface staining, drums, storage tanks, stressed vegetation, extraneous debris) were noted. A follow-up site reconnaissance was conducted by Mr. Mark Farrant, P.Eng. of Thurber on October 28, 2014 to confirm the

original observations by Ms. Young. Selected photographs from the site reconnaissance are included in Appendix D, as noted below.

The following properties and conditions were observed in the vicinity of the 5.4 km length of Mayfield Road:

- The primary land usage along Mayfield Road from Winston Churchill Boulevard to Chinguacousy Road was observed to be agricultural, with many open fields and several properties with farms, residential houses, barns, mill towers and other one- to two-storey buildings (Photos 1 and 2). Most of the farm properties were observed to contain some vehicles and tractors. The vegetation observed within the study area was predominately grass and crops, which were green and appeared to be healthy. No visual evidence of site contamination was observed during the site reconnaissance. Observations of specific properties within the study area are noted below.

- The property located at 11968 Heritage Road, at the southwest corner of Mayfield Road and Heritage Road, was observed to contain several barn structures, vehicles and tractors and several piles of soil. A dug-out area of standing water was also observed in front of the property on the south side of Mayfield Road (Photo 3).

- The property at 816 Mayfield Road (Gro-Bark Ontario Ltd.), located on the north side between Heritage Road and Mississauga Road, contains a vegetated berm along the south side, beyond which are many large stockpiles of mulch and other mainly organic soils. Although not clearly visible from the Mayfield Road corridor, the property also contains several small ponds, site buildings, excavation equipment, and transport trucks. Gro-Bark is primarily a producer of landscaping products including mulch and soil. The 816 Mayfield Road property appears to be a large production and storage facility of these products (Photos 4 and 5).

- The property at 12111 Mississauga Road (Pioneer Hi-Bred Production Ltd.), located at the northeast corner of Mayfield Road and Mississauga Road includes one- to two-storey greenhouse and warehouse buildings, vehicles, tractors and open fields. An area of standing water was also observed at the south limit of the property, near Mayfield Road. The facility is used for seed production and is designated as Pioneer's Caledon Research Centre (Photo 6).

- The Alloa Public School is located at 1248 Mayfield Road, on the north side between Mississauga Road and Creditview Road.

- A church is located at the northeast corner of Mayfield Road and Creditview Road. A portion of Creditview Road, north of Mayfield Road was observed to have been recently paved.

- A property containing a one-storey building, garage and several truck trailers was observed at 1637 Mayfield Road, on the south side between Creditview Road and Chinguacousy Road. The official property usage was not confirmed, however digital imagery from 2013 shows several truck trailers in the rear of the property, indicating that the property may be used for storage of this equipment (Photo 7).

- A garden nursery containing several greenhouses is located at 1760 Mayfield Road, on the north side between Creditview Road and Chinguacousy Road.

- A Hydro One transformer station is located at 1966 Mayfield Road, on the north side, just west of Chinguacousy Road. The station is located within a fenced off yard with a gravel ground surface. No ground staining was observed at the transformer station (Photo 8).

- The majority of the area south of Mayfield Road between Mississauga Road and Chinguacousy Road was undergoing development and contained construction equipment, stripped, graded and excavated ground and numerous soil stockpiles. The development included residential subdivision and road construction south of the Mayfield Road corridor, and utility installations along the south side of the road (Photos 9 and 10). Partial lane closures along Mayfield Road were observed during each site reconnaissance. The construction activities were observed to continue east of the study area, to approximately 1 km east of Chinguacousy Road. No specific evidence of site contamination was observed within the construction zone.

7. SUMMARY OF KEY FINDINGS

Based on the site reconnaissance, historical records review, and environmental database information, the key findings of the contaminated soil assessment are summarized as follows:

- The land usage within the study area prior to approximately 1976 was primarily agricultural. Since then, there has been some residential and commercial development, but the majority of the area still consists of farmland with occasional woodlots, with structures consisting of residential homes and agricultural buildings.

- The Pioneer Hi-Bred Seed Production Facility has been located at 12111 Mississauga Road since at least 1990. The facility is not located in close proximity to Mayfield Road (greater than 100 m away), and no records were found to indicate the presence of contamination on the property.

- The Gro-Bark facility for mulch and organic soil production and storage has been located at 816 Mayfield Road since approximately 2005, and the property has been developed since at least 2000. The property was previously occupied by Townsend Enterprises from 2001 to 2004. Prior to 2004, the site was to be used for a bio-remediation facility, but the 1997 application for approval was cancelled in 2001. The Gro-Bark facility contains stockpiled soil, utilizes excavation equipment and transport trucks, a record of an oil spill was noted at the property in 2003, and previous searches for environmental records were requested at the property in 2010 and 2011. The site usage and history indicates that there is a moderate potential for soil contamination at the property.

- The Hydro-One transformer station has been located at 1966 Mayfield Road since at least 1976 and is in close proximity to Mayfield Road (within 100 m). Although no records or visual evidence of contamination were found, the land usage (possible bulk use and handling of transformer oil) indicates that there is a moderate potential for soil contamination at the property.

- The property at 11968 Heritage Road was observed to contain stockpiled soil, a dug-out area of standing water close to Mayfield Road, and several vehicles and tractors. The property has existed since at least 1996 and was listed as Mardix Farms in the 1996 city directory. No records were found to indicate the presence of contamination on the property.

- The property at 1637 Mayfield Road was observed to contain several truck trailers and may be a storage facility. Trailer storage at the property has been visible in digital imagery since at least 2013. No records were found to indicate the presence of contamination on the property.

- Within the study area, confirmed spills have been recorded at the following areas: 12134 Mississauga Road and at the intersection of Mayfield Road and Creditview Road. The spill at 12134 Mississauga Road is considered to not be in close proximity to Mayfield Road (greater than 100 m away). The spills at Mayfield Road and Creditview Road may

have the potential for soil contamination, but the specific locations of the spills are not provided in the database records.

- There are several properties in the study area that are listed as generators of regulated wastes or operators of pesticides. However, there are no records of spills or other environmental occurrences at any of these properties that would raise a concern related to soil disposal.

- A large area along the south side of Mayfield Road between Mississauga Road and Chinguacousy Road is currently under construction for utility installations and a residential subdivision. No specific areas of site contamination associated with the construction works were observed. The previous land usage in this area was mainly agricultural, and therefore the excavated soils disturbed during construction have a low potential for contamination. Maintenance and fueling operations for construction equipment may lead to occasional localized spills, however it is expected that environmental protection measures are being implemented during construction to mitigate such occurrences. Fill soils used during construction and acquired from off-site sources may have the potential to be contaminated. However industry practice for public construction projects includes reviewing analytical test results of imported fill to assess the soil quality prior to use on site. Therefore, the construction operations are not anticipated to result in soil contamination along Mayfield Road.

- There was no visible evidence observed in the remainder of the study area to indicate the presence of any significant environmental contamination during the site reconnaissance.

8. CONCLUSION AND RECOMMENDATIONS

The potential for contaminated properties to impact a project of this nature is expected to occur in three possible ways:

- The acquisition of contaminated property required to increase the right-of-way of the Mayfield Road corridor;

- Spills along the existing ROW; and/or,

- Migration of contaminants into the existing right-of-way from adjacent properties.

Based on the summary of key findings above, the following properties are therefore identified as areas of moderate potential environmental concern that may have an impact on the project as noted above. These properties are identified due to land usage or previous spills that may have caused soil contamination along the Mayfield Road corridor:

- 816 Mayfield Road (Gro-Bark facility: bulk soil storage and handling, mechanical equipment usage, transformer oil spill).
- 1966 Mayfield Road (Hydro-One transformer station: transformer oil usage).
- Intersection of Mayfield Road and Creditview Road (fertilizer and diesel fuel spills).

Where the project requires acquiring properties at the locations noted above, we recommend that further study in the form of a Phase I Environmental Site Assessment (Phase I ESA) be conducted at the relevant property. In conjunction with the Phase I ESA, and based on existing information, consideration may be given to conducting limited Phase II soil testing in the portions of the properties to be acquired.

At the intersection of Mayfield Road and Creditview Road, the spills are likely to have been within the existing right-of-way (ROW) of Mayfield Road and therefore a Phase I ESA is not necessary.

If the Mayfield Road improvements will involve excavations near the above properties (including the intersection of Mayfield Road and Creditview Road), it is recommended that soil samples be collected in their vicinity in order to conduct analytical testing of petroleum hydrocarbons, volatile organic compounds, pesticides, PCBs and heavy metals. The results of the analytical testing will dictate whether excess excavated materials near these properties can be reused as fill, or must be disposed of as contaminated soil.

If the proposed works extend beyond 100 m from the existing ROW of Mayfield Road, this report should be reviewed to identify other relevant properties that may require further study.

THURBER

STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

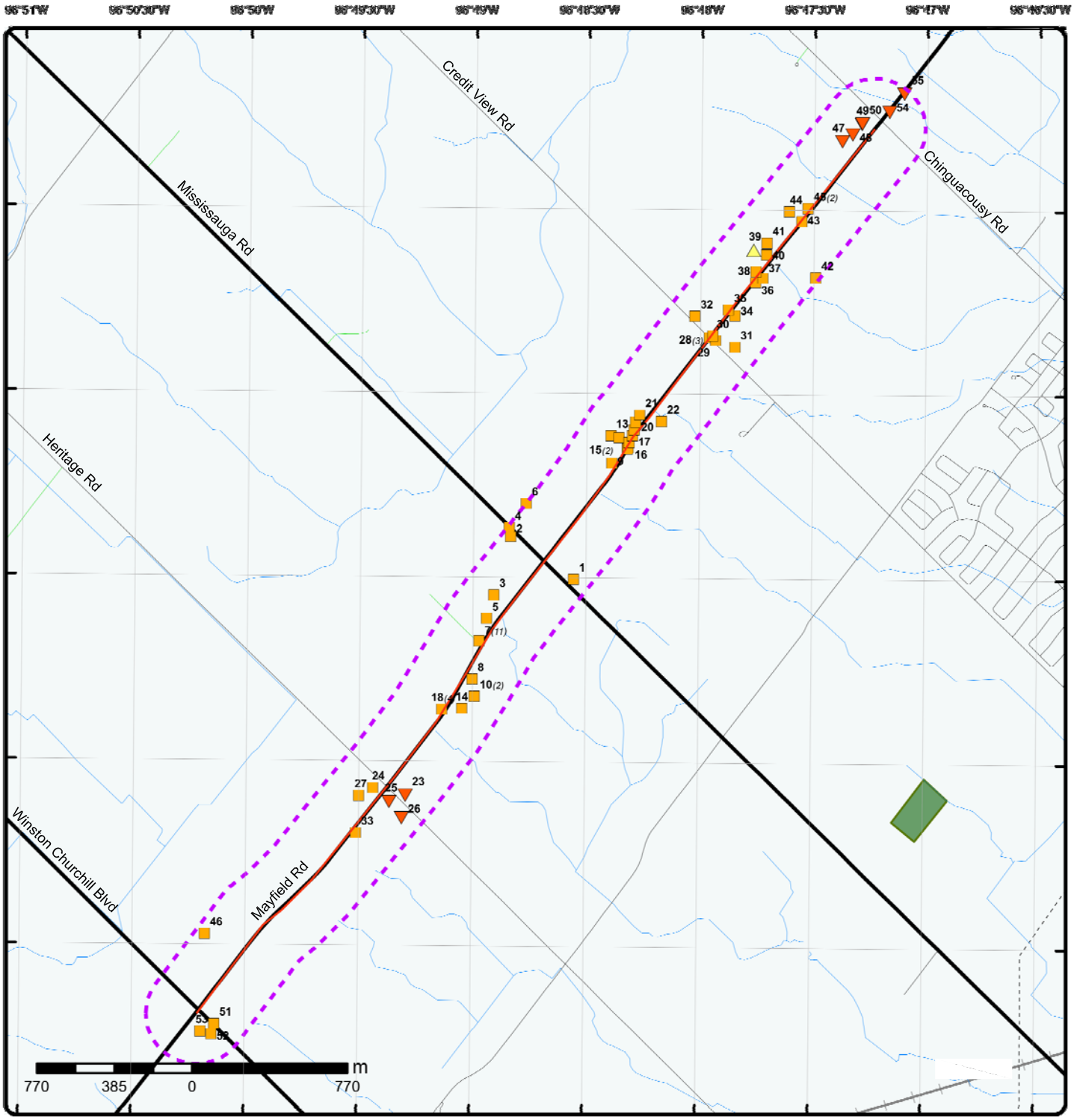
Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

APPENDIX A

SITE LOCATION PLAN



HATCH MOTT MACDONALD

CONTAMINATED SOIL ASSESSMENT
MAYFIELD ROAD
WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD

SITE LOCATION PLAN

JOB# 19-1605-148

BRAMPTON/CALEDON, ON

THURBER ENGINEERING LTD.

ENGINEER:	DRAWN:	APPROVED:
MEF	MFA	SMS
DATE:	SCALE:	DRAWING No.
OCTOBER 2014	NTS	19-1605-148-1

H:\Drafting\19\1605\148\tes5148-Soil_Assessment_Site_Plan.dwg - Layout1 - Oct. 31, 2014 10:02am

APPENDIX B

CITY DIRECTORY SEARCH RESULTS

City Directory Search – Summary of Results
Polk's Halton/Peel Regions, ON Criss Cross

Year: 2001

Street Name	Address No.	Directory Listing
Winston Churchill Blvd 11413 to 11998	11694-11992	-Residential (5 listings)
Mississauga Road 11 000 to 12 113	11157-11719	Residential (5 listings)
	11722	-MALTON INDUSTRIES -Schliler S
	12111	PIONEER HI-BRED PRODUCTION LIMITED
Mayfield Road 500 to 2500	642-781	-Residential (5 listings)
	816	-TOWNSEND ENTERPRISES LTD
	1209-1235	-Residential (3 listings)
	1248	-PEEL DISTRICT SCHOOL BOARD
	1255-1704	-Residential (7 listings)
	1760	-VAN GOOL'S NURSERIES AND GARDEN CENTRE
	1770-2412	-Residential (11 listings)
Heritage Road 11000 to 12773	11043-12791	-Residential (19 listings)
Creditview Road 11136 to 11630	11192	LAUREN PARK EQUESTRIAN -Residential (1 listing)
	11285	STAK CONTRACTING SERVICES INC/STAKE FOLDING WALLS SYSTEMS INC. -Residential (1 listing)
	11351-11630	-Residential (5 listings)
Chinguacousy Road 11100 to 12300	11494-12016	-Residential (4 listings)
	12116	-CONCORD CONSTRUCTION INC -Residential (1 listing)
	12156 - 12259	-Residential (5 listings)

Year: 1996

Street Name	Address No.	Directory Listing
Winston Churchill Blvd 11413 to 11998	11722-11992	-Residential (4 listings)
Mississauga Road 11 000 to 12 113	11248-11413	Residential (2 listings)
	11722	-Not Listed
	12111	-Not Listed
Mayfield Road 500 to 2500	642-781	-Residential (4 listings)
	816	-Not Listed
	1209-1235	-Residential (3 listings)
	1248	-Not Listed
	1255-1704	-Residential (7 listings)
	1760	-Not Listed
	1770-2412	-Residential (8 listings)
Heritage Road 11000 to 12773	11043-12791	-Residential (12 listings)
	11968	-MARDIX FARMS (Not listed in 2001)
Creditview Road	11192	SOLO QUEST FARMS (Change of landowner

11136 to 11630		in 2001) -Residential (1 listing)
	11285	-Residential (2 listings)
	11351 - 11630	-Residential (5 listings)
Chinguacousy Road **11100 to 12300**	11261	-Residential (1 listing)
	11494-12016	-Residential (2 listings)
	12116	-Residential (2 listings)
	12156 - 12259	-Residential (5 listings)

Year: 1991

Street Name	Address No.	Directory Listing
Winston Churchill Blvd **11413 to 11998**	11722-11992	-Not listed
Mississauga Road **11 000 to 12 113**	11248-11413	-Not listed
	11722	-Not Listed
	12111	-Not Listed
Mayfield Road **500 to 2500**	642-781	-Not listed
	816	-Not Listed
	1209-1235	-Residential (2 listings)
	1247	-Residential (1 listing)
	1248	-Not Listed
	1255-1704	-Residential (1 listing)
	1760	-Not Listed
	1770-2412	-Residential (1 listing)
Heritage Road **11000 to 12773**	11043-12791	-Residential (1 listings)
	11968	-Not Listed
Creditview Road **11136 to 11630**	11192	-Not Listed
	11285	-Not Listed
	11351 - 11630	-Not Listed
Chinguacousy Road **11100 to 12300**	11261	-Not Listed
	11494-12016	-Not Listed
	12116	-Not Listed
	12156 - 12259	-Not Listed

Year: 1986

Street Name	Address No.	Directory Listing
Winston Churchill Blvd **11413 to 11998**	11722-11992	-Not listed
Mississauga Road **11 000 to 12 113**	11248-11413	-Not listed
	11722	-Not Listed
	12111	-Not Listed
Mayfield Road **500 to 2500**	642-781	-Not listed
	816	-Not Listed
	1209-1235	-Not Listed
	1247	-Not Listed
	1248	-Not Listed
	1255-1704	-Not Listed
	1760	-Not Listed

	1770-2412	-Not Listed
Heritage Road 11000 to 12773	11043-12791	-Not Listed
	11968	-Not Listed
Creditview Road 11136 to 11630	11192	-Not Listed
	11285	-Not Listed
	11351 - 11630	-Not Listed
Chinguacousy Road 11100 to 12300	11261	-Not Listed
	11494-12016	-Not Listed
	12116	-Not Listed
	12156 - 12259	-Not Listed

APPENDIX C

ECOLOG ERIS REPORT

ERIS

REPORT

Project Property: *Un-named*
Mayfield Rd & Chinguacousy Rd
Brampton ON

Report Type: *Custom-Build Your Own Report*

Order #: *20130910003*

Date: *September 17, 2013*

EcoLog ERIS Ltd.
Environmental Risk
Information Service Ltd. (ERIS)
A division of Glacier Media Inc.
P: 1.866.517.5204
E: info@erisinfo.com

www.erisinfo.com

Table of Contents

Executive Summary

Property Information:

Project Property:	*Un-named* *Mayfield Rd & Chinguacousy Rd Brampton ON*

Order Information:

Order No.:	*20130910003*
Date Requested:	*18/09/2013*
Requested by:	*Thurber Engineering Ltd-Toronto*
Report Type:	*Custom-Build Your Own Report*

Additional Products:

Aerial Photographs	*National Collection - Digital (PDF)*

Executive Summary: Report Summary

Database	Name	Selected	On Site	Boundary to 0.25KM	Total
AAGR	Abandoned Aggregate Inventory	Y	0	0	0
AGR	Aggregate Inventory	Y	0	0	0
AMIS	Abandoned Mine Information System	Y	0	0	0
ANDR	Anderson's Waste Disposal Sites	Y	0	0	0
AUWR	Automobile Wrecking & Supplies	Y	0	0	0
BORE	Borehole	Y	0	0	0
CA	Certificates of Approval	Y	0	4	4
CFOT	Commercial Fuel Oil Tanks	Y	0	0	0
CHEM	Chemical Register	Y	0	0	0
COAL	Inventory of Coal Gasification Plants and Coal Tar Sites	Y	0	0	0
CONV	Compliance and Convictions	Y	0	0	0
CPU	Certificates of Property Use	Y	0	0	0
DRL	Drill Hole Database	Y	0	0	0
EASR	Environmental Activity and Sector Registry	Y	0	0	0
EBR	Environmental Registry	Y	0	0	0
ECA	Environmental Compliance Approval	Y	0	0	0
EEM	Environmental Effects Monitoring	Y	0	0	0
EHS	ERIS Historical Searches	Y	0	3	3
EIIS	Environmental Issues Inventory System	Y	0	0	0
EXP	List of TSSA Expired Facilities	Y	0	0	0
FCON	Federal Convictions	Y	0	0	0
FCS	Contaminated Sites on Federal Land	Y	0	0	0
FOFT	Fisheries & Oceans Fuel Tanks	Y	0	0	0
FST	Fuel Storage Tank	Y	0	0	0
GEN	Ontario Regulation 347 Waste Generators Summary	Y	0	10	10
HINC	TSSA Historic Incidents	Y	0	0	0
IAFT	Indian & Northern Affairs Fuel Tanks	Y	0	0	0
INC	TSSA Incidents	Y	0	0	0
LIMO	Landfill Inventory Management Ontario	Y	0	0	0
MINE	Canadian Mine Locations	Y	0	0	0
MNR	Mineral Occurrences	Y	0	0	0
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0
NCPL	Non-Compliance Reports	Y	0	0	0
NDFT	National Defence & Canadian Forces Fuel Tanks	Y	0	0	0
NDSP	National Defence & Canadian Forces Spills	Y	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0

Database	Name	Selected	On Site	Boundary to 0.25KM	Total
NPCB	National PCB Inventory	Y	0	0	0
NPRI	National Pollutant Release Inventory	Y	0	0	0
OGW	Oil and Gas Wells	Y	0	0	0
OOGW	Ontario Oil and Gas Wells	Y	0	0	0
OPCB	Inventory of PCB Storage Sites	Y	0	0	0
ORD	Orders	Y	0	0	0
PAP	Canadian Pulp and Paper	Y	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	Y	0	0	0
PES	Pesticide Register	Y	0	6	6
PINC	TSSA Pipeline Incidents	Y	0	0	0
PRT	Private and Retail Fuel Storage Tanks	Y	0	0	0
PTTW	Permit to Take Water	Y	0	0	0
REC	Ontario Regulation 347 Waste Receivers Summary	Y	0	0	0
RSC	Record of Site Condition	Y	0	2	2
RST	Retail Fuel Storage Tanks	Y	0	0	0
SCT	Scott's Manufacturing Directory	Y	0	0	0
SPL	Ontario Spills	Y	0	4	4
SRDS	Wastewater Discharger Registration Database	Y	0	0	0
TANK	Anderson's Storage Tanks	Y	0	0	0
TCFT	Transport Canada Fuel Storage Tanks	Y	0	0	0
VAR	TSSA Variances for Abandonment of Underground Storage Tanks	Y	0	0	0
WDS	Waste Disposal Sites - MOE CA Inventory	Y	0	0	0
WDSH	Waste Disposal Sites - MOE 1991 Historical Approval Inventory	Y	0	0	0
WWIS	Water Well Information System	Y	1	48	49
		Total:	1	77	78

Executive Summary: Site Report Summary – Project Property

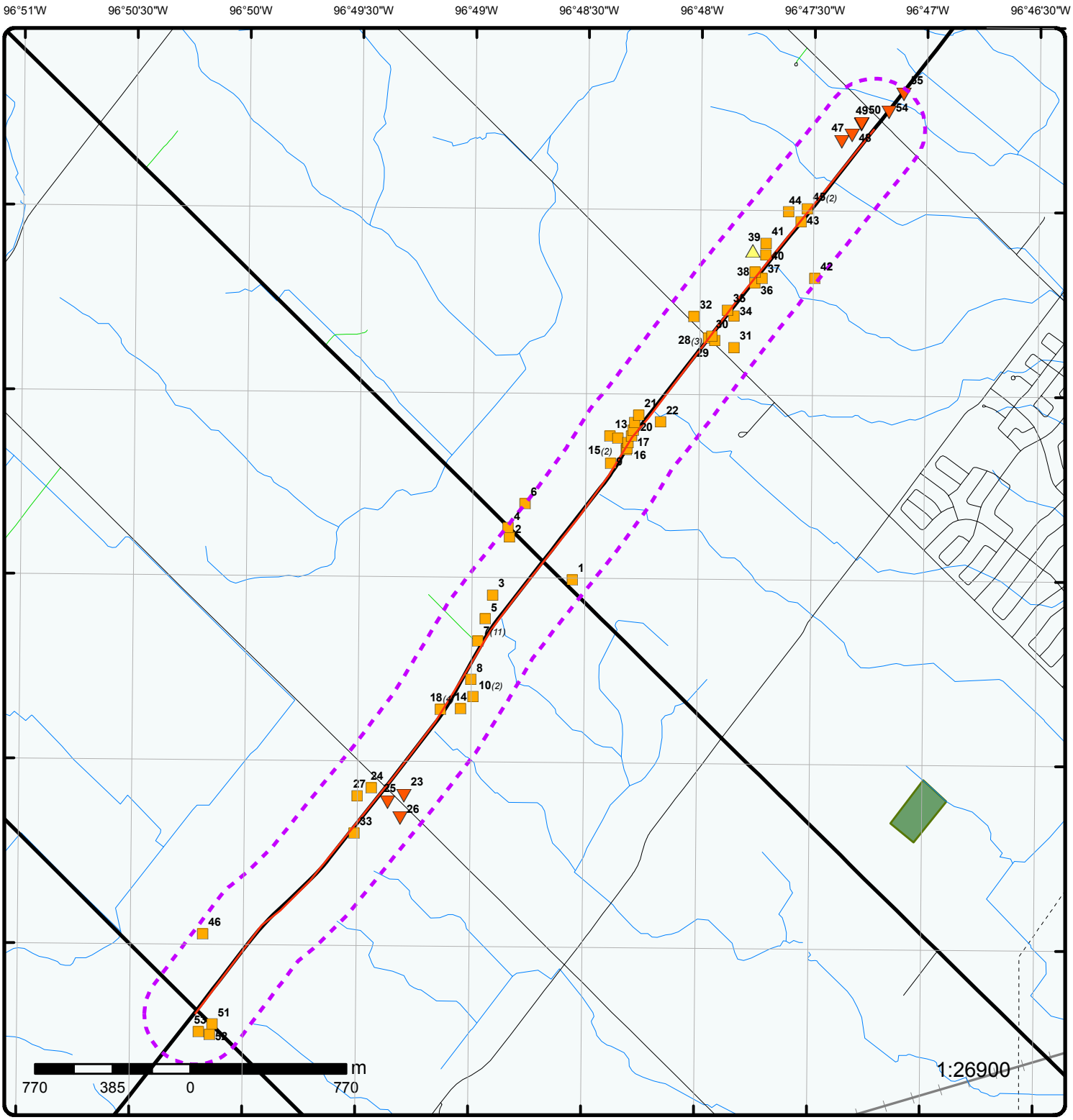
Map Key	DB	Company/Site Name	Address	Page Number
54	WWIS		ON	11

Executive Summary: Site Report Summary – Surrounding Properties

Map Key	*DB*	*Company/Site Name*	*Address*	*Page Number*
1	WWIS		ON	11
2	SPL	PRIVATE RESIDENCE	12134 MISSISSAUGA ROAD FURNACE OIL TANK BRAMPTON CITY ON	12
3	WWIS		ON	12
4	WWIS		ON	13
5	WWIS		ON	13
6	WWIS		ON	14
7	CA	CENTRAL REMEDIATION SERVICES INC.	816 MAYFIELD RD.W., GEORGETOWN HALTON HILLS TOWN ON	15
7	CA	Gro-Bark (Ontario) Ltd.	816 Mayfield Road Caledon ON L7C 0Y6	15
7	EHS		816 Mayfield Road Caledon ON L7C 0Y6	15
7	EHS		816 Mayfield Road West Caledon ON	15
7	GEN	GRO-BARK (ONTARIO) LTD	816 MAYFIELD RD W CALEDON ON L7G 0Y6	16
7	GEN	GRO-BARK (ONTARIO) LTD	816 MAYFIELD RD W CALEDON ON	16
7	GEN	M TOWNSEND ENTERPRISES LIMITED	816 MAYFIELD ROAD RR4 GEORGETOWN ON L7G 4S7	16
7	GEN	GRO-BARK (ONTARIO) LTD	816 MAYFIELD RD W CALEDON ON L7C 0Y6	16
7	GEN	GRO-BARK (ONTARIO) LTD	816 MAYFIELD RD W CALEDON ON	17
7	GEN	GRO-BARK (ONTARIO) LTD	816 MAYFIELD RD W CALEDON ON	17
7	SPL	Hydro One Networks Inc.	816 Mayfield Rd. Caledon ON L7C 0Y6	17
8	WWIS		ON	18
9	WWIS		ON	18
10	WWIS		ON	19
10	WWIS		ON	19
11	WWIS		ON	20
12	WWIS		ON	20

Map Key	DB	Company/Site Name	Address	Page Number
13	WWIS		ON	21
14	WWIS		ON	21
15	WWIS		ON	22
15	WWIS		ON	23
16	WWIS		ON	23
17	WWIS		ON	23
18	PES	D. KEITH GARBUTT	624 MAYFIELD RD CALEDON ON L7C 0Y6	24
18	PES	D K G LANDSCAPING	624 MAYFIELD RD, R R 4 GEORGETOWN ON L7G 4S7	24
18	PES	D. KEITH GARBUTT	624 MAYFIELD RD CALEDON ON L7C 0Y6	24
18	PES	D K G LANDSCAPING	624 MAYFIELD RD CALEDON ON L7C 0Y6	24
19	CA	Peel District School Board	1248 Mayfield Rd W Caledon ON	25
19	CA	Peel District School Board	1248 Mayfield Road West Caledon ON	25
19	GEN	PEEL DISTRICT SCHOOL BOARD	ALLOA PUBLIC SCHOOL 1248 MAYFIELD ROAD WEST BRAMPTON ON L6V 1A1	25
19	GEN	PEEL DISTRICT SCHOOL BOARD	ALLOA PUBLIC SCHOOL 1248 MAYFIELD RD. WEST BRAMPTON ON L6V 1A1	26
19	GEN	PEEL BOARD OF EDUCATION 30-283	ALLOA PUBLIC SCHOOL 1248 MAYFIELD RD. WEST BRAMPTON ON L6V 1A1	26
19	GEN	PEEL BOARD OF EDUCATION	ALLOA PUBLIC SCHOOL 1248 MAYFIELD RD. WEST BRAMPTON ON L6V 1A1	26
20	WWIS		ON	26
21	WWIS		ON	27
22	WWIS		ON	27
23	WWIS		ON	28
24	WWIS		ON	28
25	WWIS		ON	29
26	WWIS		ON	30
27	WWIS		ON	30
28	EHS		Mayfield Rd & Creditview Rd Brampton ON L7C	31
28	SPL		Mayfield and Creditview Rds MAYFIELD AND CREDITVIEW RDS<UNOFFICIAL> Brampton ON	31
28	SPL	Mordale Farms Inc.<UNOFFICIAL>	Mayfield Rd & Creditview Rd Caledon ON	31

Map Key	DB	Company/Site Name	Address	Page Number
29	WWIS		ON	31
30	WWIS		ON	32
31	WWIS		ON	32
32	WWIS		ON	33
33	WWIS		ON	33
34	WWIS		ON	34
35	WWIS		ON	34
36	RSC	Walness Developments inc.	1635 MAYFIELD RD, BRAMPTON, ON, L7A 0C3, ON L7A 0C3	34
37	WWIS		ON	35
38	WWIS		ON	35
39	WWIS		ON	36
40	WWIS		ON	36
41	WWIS		ON	37
42	RSC	1367933 Ontario Inc.	No Municipal Address Available, BRAMPTON ON	38
43	WWIS		ON	38
44	WWIS		ON	39
45	PES	VAN GOOL'S LANDSCAPING AND NURSERIESLIMITED	R.R. #2, 1760 MAYFIELD ROAD WEST BRAMPTON ON L6V 1A1	39
45	PES	VAN GOOL'S LANDSCAPING AND NURSERIES	1760 MAYFIELD ROAD WEST, R.R. #2 BRAMPTON ON L6V 1A1	39
46	WWIS		ON	39
47	WWIS		ON	40
48	WWIS		ON	40
49	WWIS		ON	41
50	WWIS		ON	42
51	WWIS		ON	42
52	WWIS		ON	42
53	WWIS		ON	43
55	WWIS		ON	43



Map

Order No: 20130910003

Address: Mayfield Rd & Chinguacousy Rd, Brampton, ON

- Project Property
- Eris Sites with Higher Elevation
- Eris Sites with Same Elevation
- Eris Sites with Lower Elevation
- Eris Sites with Unknown Elevation
- Expressway
- Principal Highway
- Secondary Highway
- Major Road
- Local road
- Trail
- Proposed Road
- Ferry Route/Ice Road
- Industrial and Resource - Regions
- Main Line
- Sidetrack
- Transit Line
- Abandoned Line
- National Park
- Provincial or Territorial Park
- Other Park
- Golf Course or Driving Range
- Park or Sports Field
- Other Recreation Area

Aerial

Order No: 20130910003

Address: Mayfield Rd & Chinguacousy Rd, Brampton, ON

Source: ESRI World Imagery, Updated December 2012

Detail Report

Map Key	Number of Records	Elevation m	Site	DB
54	1 of 1	254.7	ON	WWIS

Well Id:	7052303	Lot:	
Concession:		Concession Name:	
County:	PEEL	Municipality:	BRAMPTON
Easting Nad83:	592994	Northing Nad83:	4840805
Zone:	17	Utm Reliability:	margin of error : 10 - 30 m
Primary Water Use:	Monitoring	Construction Date:	24-OCT-07
Sec. Water Use:		Well Depth:	20 ft
Pump Rate:		Static Water Level:	
Flow Rate:		Clear/Cloudy:	
Specific Capacity:		Final Well Status:	Observation Wells
Construction Method:	Boring	Flowing (y/n):	
Elevation (m):	257.94	Elevation Reliability:	
Depth to Bedrock:		Overburden/Bedrock:	
Water Type:		Casing Material:	PLASTIC

--- Details ---

Thickness:	10 ft	Original Depth:	10 ft
Material Colour:	BROWN	Material:	SILT, TILL, HARD
+			
Thickness:	10 ft	Original Depth:	20 ft
Material Colour:	GREY	Material:	SILT

Map Key	Number of Records	Elevation m	Site	DB
1	1 of 1	257.8	ON	WWIS

Well Id:	4901920	Lot:	017
Concession:	04	Concession Name:	HS W
County:	PEEL	Municipality:	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	591428.5	Northing Nad83:	4838493
Zone:	17	Utm Reliability:	margin of error : 100 m - 300 m
Primary Water Use:	Livestock	Construction Date:	15-SEP-62
Sec. Water Use:	Domestic	Well Depth:	53 ft
Pump Rate:	1 GPM	Static Water Level:	41 ft
Flow Rate:		Clear/Cloudy:	CLEAR
Specific Capacity:		Final Well Status:	Water Supply
Construction Method:	Boring	Flowing (y/n):	N
Elevation (m):	262.4	Elevation Reliability:	
Depth to Bedrock:	21	Overburden/Bedrock:	Bedrock
Water Type:	FRESH	Casing Material:	CONCRETE

--- Details ---

Thickness:	11 ft	Original Depth:	11 ft
Material Colour:	BROWN	Material:	CLAY, MEDIUM SAND, BOULDERS
+			
Thickness:	10 ft	Original Depth:	21 ft
Material Colour:	RED	Material:	CLAY, BOULDERS
+			

Map Key	Number of Records	Elevation m	Site	DB

Thickness:	32 ft	*Original Depth:*	53 ft
Material Colour:	RED	*Material:*	SHALE

2 **1 of 1** **257.8** ***PRIVATE RESIDENCE*** **SPL**
12134 MISSISSAUGA ROAD FURNACE OIL TANK
BRAMPTON CITY ON

Ref No.:	69499
Incident Dt:	4/21/1992
MOE Reported Dt:	4/21/1992
Contaminant Name:	
Contaminant Quantity:	
Incident Summary:	PRIVATE: FURNACE OIL TANKFOUND TO BE LEAKING
Incident Cause:	UNDERGROUND TANK LEAK
Incident Reason:	UNKNOWN
Nature of Impact:	Soil contamination
Receiving Medium:	LAND
Environmental Impact:	CONFIRMED

3 **1 of 1** **257.8** **WWIS**
ON

Well Id:	4906313	*Lot:*	018
Concession:	05	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	591033.5	*Northing Nad83:*	4838416
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	07-MAY-85
Sec. Water Use:		*Well Depth:*	94 ft
Pump Rate:	4 GPM	*Static Water Level:*	11 ft
Flow Rate:		*Clear/Cloudy:*	CLOUDY
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	265.14	*Elevation Reliability:*	
Depth to Bedrock:	94	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	3 ft	*Original Depth:*	3 ft
Material Colour:	BROWN	*Material:*	TOPSOIL, STONES, LOOSE
+			
Thickness:	14 ft	*Original Depth:*	17 ft
Material Colour:	GREY	*Material:*	CLAY, STONES, DENSE
+			
Thickness:	24 ft	*Original Depth:*	41 ft
Material Colour:	BLUE	*Material:*	CLAY, STONES, DENSE
+			
Thickness:	32 ft	*Original Depth:*	73 ft
Material Colour:	RED	*Material:*	CLAY, STONES, DENSE
+			
Thickness:	10 ft	*Original Depth:*	83 ft
Material Colour:	BLUE	*Material:*	CLAY, STONES, DENSE
+			
Thickness:	11 ft	*Original Depth:*	94 ft
Material Colour:	RED	*Material:*	CLAY, STONES, DENSE

Map Key	Number of Records	Elevation m	Site	DB

+

Thickness:	26 ft	*Original Depth:*	120 ft
Material Colour:	RED	*Material:*	SHALE, HARD

4 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4908611	*Lot:*	018
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	591110	*Northing Nad83:*	4838750
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:		*Construction Date:*	15-FEB-00
Sec. Water Use:		*Well Depth:*	60 ft
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Abandoned-Supply
Construction Method:	Rotary (Convent.)	*Flowing (y/n):*	
Elevation (m):	266.91	*Elevation Reliability:*	
Depth to Bedrock:	40	*Overburden/Bedrock:*	Bedrock
Water Type:		*Casing Material:*	

--- Details ---

Thickness:	14 ft	*Original Depth:*	14 ft
Material Colour:	BROWN	*Material:*	CLAY, SOFT, SILT
+			
Thickness:	7 ft	*Original Depth:*	21 ft
Material Colour:	GREY	*Material:*	CLAY, SILT, SOFT
+			
Thickness:	7 ft	*Original Depth:*	28 ft
Material Colour:	GREY	*Material:*	SAND, SILT, CLAY
+			
Thickness:	2 ft	*Original Depth:*	30 ft
Material Colour:	GREY	*Material:*	SAND, GRAVEL, SOFT
+			
Thickness:	2 ft	*Original Depth:*	32 ft
Material Colour:	GREY	*Material:*	SAND, SILT, SOFT
+			
Thickness:	8 ft	*Original Depth:*	40 ft
Material Colour:	GREY	*Material:*	TILL, SILT, HARD
+			
Thickness:	6 ft	*Original Depth:*	46 ft
Material Colour:	RED	*Material:*	SHALE, SOFT
+			
Thickness:	14 ft	*Original Depth:*	60 ft
Material Colour:	RED	*Material:*	SHALE, HARD

5 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4906936	*Lot:*	018
Concession:	05	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	590997.5	*Northing Nad83:*	4838300

Map Key	Number of Records	Elevation m	Site	DB

Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Domestic	*Construction Date:*	15-SEP-88
Sec. Water Use:		*Well Depth:*	72 ft
Pump Rate:	3 GPM	*Static Water Level:*	40 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	264.79	*Elevation Reliability:*	
Depth to Bedrock:	60	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	30 ft	*Original Depth:*	30 ft
Material Colour:	GREY	*Material:*	SAND
+			
Thickness:	15 ft	*Original Depth:*	45 ft
Material Colour:	GREY	*Material:*	SAND
+			
Thickness:	15 ft	*Original Depth:*	60 ft
Material Colour:	GREY	*Material:*	SAND
+			
Thickness:	12 ft	*Original Depth:*	72 ft
Material Colour:	GREY	*Material:*	SHALE

6 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4906270	*Lot:*	018
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	591193.5	*Northing Nad83:*	4838868
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	09-NOV-84
Sec. Water Use:		*Well Depth:*	38 ft
Pump Rate:	10 GPM	*Static Water Level:*	14 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	266.24	*Elevation Reliability:*	
Depth to Bedrock:	23	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	CONCRETE,GALVANIZED

--- Details ---

Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:	BROWN	*Material:*	TOPSOIL
+			
Thickness:	13 ft	*Original Depth:*	14 ft
Material Colour:	BROWN	*Material:*	CLAY, PACKED
+			
Thickness:	3 ft	*Original Depth:*	17 ft
Material Colour:	BLUE	*Material:*	CLAY, SOFT
+			
Thickness:	6 ft	*Original Depth:*	23 ft
Material Colour:	GREY	*Material:*	CLAY, STONES, PACKED
+			

Map Key	Number of Records	Elevation m	Site	DB

Thickness:	15 ft	*Original Depth:*	38 ft
Material Colour:	RED	*Material:*	SHALE, SOFT, HARD

7 **1 of 11** **257.8** ***CENTRAL REMEDIATION SERVICES INC.*** **CA**
816 MAYFIELD RD.W., GEORGETOWN
HALTON HILLS TOWN ON

Certificate #:	8-3364-97-
Application Year:	97
Issue Date:	12/11/1997
Approval Type:	Industrial air
Status:	Approved
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	BIOREMEDIATION OF SOILS/NON-HAZ. WASTES
Contaminants:	
Emission Control:	

7 **2 of 11** **257.8** ***Gro-Bark (Ontario) Ltd.*** **CA**
816 Mayfield Road
Caledon ON L7C 0Y6

Certificate #:	4207-7K9R93
Application Year:	2008
Issue Date:	10/16/2008
Approval Type:	Municipal and Private Sewage Works
Status:	Approved
Application Type:	
Client Name:	
Client Address:	
Client City:	
Client Postal Code:	
Project Description:	
Contaminants:	
Emission Control:	

7 **3 of 11** **257.8** ***816 Mayfield Road*** **EHS**
Caledon ON L7C 0Y6

Order No.:	20111116033
Report Date:	11/25/2011
Report Type:	Custom Report
Search Radius (km):	0.25
Addit. Info Ordered:	

7 **4 of 11** **257.8** ***816 Mayfield Road West*** **EHS**
Caledon ON

Order No.:	20100119004
Report Date:	1/25/2010
Report Type:	Custom Report
Search Radius (km):	0.25
Addit. Info Ordered:	

Map Key	Number of Records	Elevation m	Site	DB
7	**5 of 11**	**257.8**	**GRO-BARK (ONTARIO) LTD 816 MAYFIELD RD W CALEDON ON L7G 0Y6**	**GEN**

SIC Code: 339990
SIC Description: All Other Miscellaneous Manufacturing
Generator #: ON1930703
Approval Yrs: 05,06,07,08

--- Details ---
Waste Code: 251
Waste Description: OIL SKIMMINGS & SLUDGES
+
Waste Code: 252
Waste Description: WASTE OILS & LUBRICANTS
+
Waste Code: 212
Waste Description: ALIPHATIC SOLVENTS

Map Key	Number of Records	Elevation m	Site	DB
7	**6 of 11**	**257.8**	**GRO-BARK (ONTARIO) LTD 816 MAYFIELD RD W CALEDON ON**	**GEN**

SIC Code: 339990
SIC Description: All Other Miscellaneous Manufacturing
Generator #: ON1930703
Approval Yrs: 2009

--- Details ---
Waste Code: 212
Waste Description: ALIPHATIC SOLVENTS
+
Waste Code: 251
Waste Description: OIL SKIMMINGS & SLUDGES
+
Waste Code: 252
Waste Description: WASTE OILS & LUBRICANTS

Map Key	Number of Records	Elevation m	Site	DB
7	**7 of 11**	**257.8**	**M TOWNSEND ENTERPRISES LIMITED 816 MAYFIELD ROAD RR4 GEORGETOWN ON L7G 4S7**	**GEN**

SIC Code:
SIC Description:
Generator #: ON3012594
Approval Yrs: 03,04

Map Key	Number of Records	Elevation m	Site	DB
7	**8 of 11**	**257.8**	**GRO-BARK (ONTARIO) LTD 816 MAYFIELD RD W CALEDON ON L7C 0Y6**	**GEN**

SIC Code:
SIC Description:
Generator #: ON1930703
Approval Yrs: As of Apr 2012

--- Details ---

Map Key	Number of Records	Elevation m	Site	DB

Waste Code: 212
Waste Description: Aliphatic solvents and residues
+
Waste Code: 251
Waste Description: Waste oils/sludges (petroleum based)
+
Waste Code: 252
Waste Description: Waste crankcase oils and lubricants

---

7 **9 of 11** **257.8** **GRO-BARK (ONTARIO) LTD**
816 MAYFIELD RD W
CALEDON ON **GEN**

SIC Code: 339990
SIC Description: All Other Miscellaneous Manufacturing
Generator #: ON1930703
Approval Yrs: 2010

--- Details ---
Waste Code: 252
Waste Description: WASTE OILS & LUBRICANTS
+
Waste Code: 251
Waste Description: OIL SKIMMINGS & SLUDGES
+
Waste Code: 212
Waste Description: ALIPHATIC SOLVENTS

---

7 **10 of 11** **257.8** **GRO-BARK (ONTARIO) LTD**
816 MAYFIELD RD W
CALEDON ON **GEN**

SIC Code: 339990
SIC Description: All Other Miscellaneous Manufacturing
Generator #: ON1930703
Approval Yrs: 2011

--- Details ---
Waste Code: 251
Waste Description: OIL SKIMMINGS & SLUDGES
+
Waste Code: 212
Waste Description: ALIPHATIC SOLVENTS
+
Waste Code: 252
Waste Description: WASTE OILS & LUBRICANTS

---

7 **11 of 11** **257.8** **Hydro One Networks Inc.**
816 Mayfield Rd.
Caledon ON L7C 0Y6 **SPL**

Ref No.: 0035-5P3NFQ
Incident Dt: 7/2/2003
MOE Reported Dt: 7/2/2003
Contaminant Name: TRANSFORMER OIL (N.O.S.)
Contaminant Quantity: 200 L
Incident Summary: Hydro One - 200 L transformer non PCB oil
Incident Cause: Container Leak (Fuel Tank Barrels)
Incident Reason: Corrosion - All forms of internal/external corrosion
Nature of Impact: Soil Contamination

Map Key	Number of Records	Elevation m	Site	DB

Receiving Medium: Land
Environmental Impact: Possible

8 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4902026	*Lot:*	017
Concession:	05	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	590925.5	*Northing Nad83:*	4837999
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	27-AUG-62
Sec. Water Use:		*Well Depth:*	56 ft
Pump Rate:	1 GPM	*Static Water Level:*	22 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	262.62	*Elevation Reliability:*	
Depth to Bedrock:	37	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	2 ft	*Original Depth:*	2 ft
Material Colour:	BLACK	*Material:*	TOPSOIL
+			
Thickness:	20 ft	*Original Depth:*	22 ft
Material Colour:	BROWN	*Material:*	CLAY
+			
Thickness:	8 ft	*Original Depth:*	30 ft
Material Colour:	GREY	*Material:*	CLAY, GRAVEL
+			
Thickness:	7 ft	*Original Depth:*	37 ft
Material Colour:		*Material:*	CLAY, SILT, MEDIUM SAND
+			
Thickness:	19 ft	*Original Depth:*	56 ft
Material Colour:	RED	*Material:*	SHALE

9 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4901921	*Lot:*	017
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	591618.5	*Northing Nad83:*	4839069
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	15-JAN-62
Sec. Water Use:		*Well Depth:*	41 ft
Pump Rate:		*Static Water Level:*	23 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	265.31	*Elevation Reliability:*	
Depth to Bedrock:	33	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	CONCRETE,STEEL

--- Details ---

Thickness:	33 ft	*Original Depth:*	33 ft
Material Colour:		*Material:*	PREVIOUSLY DUG
+			
Thickness:	8 ft	*Original Depth:*	41 ft
Material Colour:	RED	*Material:*	SHALE

10 **1 of 2** **257.8** **ON** **WWIS**

Well Id:	4906987	*Lot:*	017
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	590935.5	*Northing Nad83:*	4837913
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Domestic	*Construction Date:*	20-SEP-88
Sec. Water Use:		*Well Depth:*	34 ft
Pump Rate:	10 GPM	*Static Water Level:*	10 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	261.43	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden
Water Type:	Not stated	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	10 ft	*Original Depth:*	10 ft
Material Colour:	BROWN	*Material:*	CLAY, , HARD
+			
Thickness:	10 ft	*Original Depth:*	20 ft
Material Colour:	GREY	*Material:*	CLAY, , HARD
+			
Thickness:	14 ft	*Original Depth:*	34 ft
Material Colour:	GREY	*Material:*	GRAVEL, , PACKED

10 **2 of 2** **257.8** **ON** **WWIS**

Well Id:	4906793	*Lot:*	017
Concession:		*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	590935.5	*Northing Nad83:*	4837913
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Domestic	*Construction Date:*	27-JAN-87
Sec. Water Use:		*Well Depth:*	95 ft
Pump Rate:	7 GPM	*Static Water Level:*	10 ft
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	261.43	*Elevation Reliability:*	
Depth to Bedrock:	64	*Overburden/Bedrock:*	Bedrock
Water Type:	Not stated	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	22 ft	*Original Depth:*	22 ft
Material Colour:	BROWN	*Material:*	CLAY
+			

Map Key	Number of Records	Elevation m	Site	DB

Thickness:	13 ft	*Original Depth:*	35 ft
Material Colour:	BLUE	*Material:*	CLAY
+			
Thickness:	29 ft	*Original Depth:*	64 ft
Material Colour:	RED	*Material:*	SAND, GRAVEL, DIRTY
+			
Thickness:	31 ft	*Original Depth:*	95 ft
Material Colour:	RED	*Material:*	SHALE

11 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4901922	*Lot:*	017
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	591695.5	*Northing Nad83:*	4839137
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	02-MAR-62
Sec. Water Use:		*Well Depth:*	90 ft
Pump Rate:	4 GPM	*Static Water Level:*	35 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	266.61	*Elevation Reliability:*	
Depth to Bedrock:	34	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	24 ft	*Original Depth:*	24 ft
Material Colour:		*Material:*	PREVIOUSLY DUG
+			
Thickness:	10 ft	*Original Depth:*	34 ft
Material Colour:	BLUE	*Material:*	CLAY
+			
Thickness:	56 ft	*Original Depth:*	90 ft
Material Colour:	RED	*Material:*	SHALE

12 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4907770	*Lot:*	017
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	591697.9	*Northing Nad83:*	4839144
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Domestic	*Construction Date:*	12-AUG-93
Sec. Water Use:		*Well Depth:*	27 ft
Pump Rate:	2 GPM	*Static Water Level:*	38 ft
Flow Rate:		*Clear/Cloudy:*	CLOUDY
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Rotary (Convent.)	*Flowing (y/n):*	N
Elevation (m):	266.61	*Elevation Reliability:*	
Depth to Bedrock:	27	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	STEEL

--- Details ---

Map Key	Number of Records	Elevation m	Site	DB

Thickness:	15 ft	*Original Depth:*	15 ft
Material Colour:	BROWN	*Material:*	CLAY, SILT
+			
Thickness:	3 ft	*Original Depth:*	18 ft
Material Colour:	RED	*Material:*	CLAY, SILT, SAND
+			
Thickness:	9 ft	*Original Depth:*	27 ft
Material Colour:	GREEN	*Material:*	CLAY, GRAVEL, SILT
+			
Thickness:	114 ft	*Original Depth:*	141 ft
Material Colour:	RED	*Material:*	SHALE, LAYERED, SOFT

13 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4905047	*Lot:*	018
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	591614.5	*Northing Nad83:*	4839203
Zone:	17	*Utm Reliability:*	margin of error : 30 m - 100 m
Primary Water Use:	Public	*Construction Date:*	17-SEP-76
Sec. Water Use:		*Well Depth:*	4 ft
Pump Rate:	3 GPM	*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Rotary (Reverse)	*Flowing (y/n):*	N
Elevation (m):	267.55	*Elevation Reliability:*	
Depth to Bedrock:	16	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	STEEL

--- Details ---

Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:		*Material:*	TOPSOIL
+			
Thickness:	3 ft	*Original Depth:*	4 ft
Material Colour:	BROWN	*Material:*	CLAY
+			
Thickness:	12 ft	*Original Depth:*	16 ft
Material Colour:	RED	*Material:*	CLAY
+			
Thickness:	165 ft	*Original Depth:*	181 ft
Material Colour:	RED	*Material:*	SHALE

14 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4902027	*Lot:*	017
Concession:	05	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	590874.5	*Northing Nad83:*	4837854
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	31-AUG-67
Sec. Water Use:		*Well Depth:*	9 ft
Pump Rate:	1 GPM	*Static Water Level:*	17 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR

Map Key	Number of Records	Elevation m	Site	DB

Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	260.85	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden
Water Type:	FRESH	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	2 ft	*Original Depth:*	32 ft
Material Colour:		*Material:*	MEDIUM SAND
+			
Thickness:	2 ft	*Original Depth:*	2 ft
Material Colour:		*Material:*	TOPSOIL
+			
Thickness:	7 ft	*Original Depth:*	9 ft
Material Colour:	BROWN	*Material:*	CLAY
+			
Thickness:	8 ft	*Original Depth:*	17 ft
Material Colour:	BROWN	*Material:*	HARDPAN
+			
Thickness:	7 ft	*Original Depth:*	24 ft
Material Colour:		*Material:*	GRAVEL, CLAY
+			
Thickness:	4 ft	*Original Depth:*	28 ft
Material Colour:		*Material:*	GRAVEL
+			
Thickness:	2 ft	*Original Depth:*	30 ft
Material Colour:	BLUE	*Material:*	CLAY

---

15 ***1 of 2*** ***257.8*** ***ON*** ***WWIS***

Well Id:	4901925	*Lot:*	018
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	591654.5	*Northing Nad83:*	4839193
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Public	*Construction Date:*	15-DEC-60
Sec. Water Use:		*Well Depth:*	36 ft
Pump Rate:	4 GPM	*Static Water Level:*	18 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	266.99	*Elevation Reliability:*	
Depth to Bedrock:	36	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	36 ft	*Original Depth:*	36 ft
Material Colour:		*Material:*	PREVIOUSLY DUG
+			
Thickness:	122 ft	*Original Depth:*	158 ft
Material Colour:	RED	*Material:*	SHALE

Map Key	Number of Records	Elevation m	Site	DB
15	2 of 2	257.8	ON	WWIS

Well Id:	4901924	Lot:	018
Concession:	04	Concession Name:	HS W
County:	PEEL	Municipality:	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	591654.5	Northing Nad83:	4839193
Zone:	17	Utm Reliability:	margin of error : 100 m - 300 m
Primary Water Use:		Construction Date:	13-DEC-60
Sec. Water Use:		Well Depth:	36 ft
Pump Rate:		Static Water Level:	
Flow Rate:		Clear/Cloudy:	
Specific Capacity:		Final Well Status:	Abandoned-Supply
Construction Method:	Boring	Flowing (y/n):	
Elevation (m):	266.99	Elevation Reliability:	
Depth to Bedrock:	28	Overburden/Bedrock:	Bedrock
Water Type:		Casing Material:	CONCRETE

--- Details ---

Thickness:	28 ft	Original Depth:	28 ft
Material Colour:	RED	Material:	CLAY
+			
Thickness:	8 ft	Original Depth:	36 ft
Material Colour:	RED	Material:	SHALE

Map Key	Number of Records	Elevation m	Site	DB
16	1 of 1	257.8	ON	WWIS

Well Id:	4906720	Lot:	017
Concession:	03	Concession Name:	HS W
County:	PEEL	Municipality:	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	591703.5	Northing Nad83:	4839169
Zone:	17	Utm Reliability:	margin of error : 10 - 30 m
Primary Water Use:	Domestic	Construction Date:	18-SEP-86
Sec. Water Use:		Well Depth:	49 ft
Pump Rate:		Static Water Level:	36 ft
Flow Rate:		Clear/Cloudy:	
Specific Capacity:		Final Well Status:	Water Supply
Construction Method:	Boring	Flowing (y/n):	N
Elevation (m):	266.48	Elevation Reliability:	
Depth to Bedrock:	30	Overburden/Bedrock:	Bedrock
Water Type:	FRESH	Casing Material:	CONCRETE,OPEN HOLE

--- Details ---

Thickness:	1 ft	Original Depth:	1 ft
Material Colour:	BROWN	Material:	TOPSOIL
+			
Thickness:	29 ft	Original Depth:	30 ft
Material Colour:	BROWN	Material:	CLAY, CLAY
+			
Thickness:	19 ft	Original Depth:	49 ft
Material Colour:	RED	Material:	SHALE, SHALE

Map Key	Number of Records	Elevation m	Site	DB
17	1 of 1	257.8	ON	WWIS

Well Id:	4908107	Lot:	017

Map Key	Number of Records	Elevation m	Site	DB

Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	591720.5	*Northing Nad83:*	4839203
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Domestic	*Construction Date:*	27-JUL-95
Sec. Water Use:		*Well Depth:*	96 ft
Pump Rate:	2 GPM	*Static Water Level:*	18 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	265.78	*Elevation Reliability:*	
Depth to Bedrock:	50	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:	BLACK	*Material:*	TOPSOIL
+			
Thickness:	17 ft	*Original Depth:*	18 ft
Material Colour:	GREY	*Material:*	SAND, GRAVEL, CLAY
+			
Thickness:	32 ft	*Original Depth:*	50 ft
Material Colour:	RED	*Material:*	CLAY
+			
Thickness:	46 ft	*Original Depth:*	96 ft
Material Colour:	RED	*Material:*	SHALE

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18 ***1 of 4*** ***257.8*** ***D. KEITH GARBUTT*** ***PES***
624 MAYFIELD RD
CALEDON ON L7C 0Y6

Licence No.:
Licence Type:

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18 ***2 of 4*** ***257.8*** ***D K G LANDSCAPING*** ***PES***
624 MAYFIELD RD, R R 4
GEORGETOWN ON L7G 4S7

Licence No.: 02-01-04574-0
Licence Type: Operator

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18 ***3 of 4*** ***257.8*** ***D. KEITH GARBUTT*** ***PES***
624 MAYFIELD RD
CALEDON ON L7C 0Y6

Licence No.:
Licence Type: Operator

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18 ***4 of 4*** ***257.8*** ***D K G LANDSCAPING*** ***PES***
624 MAYFIELD RD
CALEDON ON L7C 0Y6

Licence No.:

Map Key	Number of Records	Elevation m	Site	DB

Licence Type: Operator

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19 **1 of 6** **257.8** **Peel District School Board**
1248 Mayfield Rd W
Caledon ON

CA

Certificate #: 1424-6QKJSF
Application Year: 2008
Issue Date: 12/15/2008
Approval Type: Municipal and Private Sewage Works
Status: Approved
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

---

19 **2 of 6** **257.8** **Peel District School Board**
1248 Mayfield Road West
Caledon ON

CA

Certificate #: 1424-6QKJSF
Application Year: 2006
Issue Date: 7/19/2006
Approval Type: Municipal and Private Sewage Works
Status: Amended
Application Type:
Client Name:
Client Address:
Client City:
Client Postal Code:
Project Description:
Contaminants:
Emission Control:

---

19 **3 of 6** **257.8** **PEEL DISTRICT SCHOOL BOARD**
ALLOA PUBLIC SCHOOL 1248 MAYFIELD ROAD WEST
BRAMPTON ON L6V 1A1

GEN

SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.
Generator #: ON0359859
Approval Yrs: 98,99,00,01

--- Details ---
Waste Code: 148
Waste Description: INORGANIC LABORATORY CHEMICALS
+
Waste Code: 213
Waste Description: PETROLEUM DISTILLATES
+
Waste Code: 263
Waste Description: ORGANIC LABORATORY CHEMICALS

Map Key	Number of Records	Elevation m	Site	DB
19	**4 of 6**	**257.8**	**PEEL DISTRICT SCHOOL BOARD** **ALLOA PUBLIC SCHOOL 1248 MAYFIELD RD. WEST** **BRAMPTON ON L6V 1A1**	**GEN**

SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.
Generator #: ON0359859
Approval Yrs: 97

--- Details ---
Waste Code: 148
Waste Description: INORGANIC LABORATORY CHEMICALS
+
Waste Code: 213
Waste Description: PETROLEUM DISTILLATES
+
Waste Code: 263
Waste Description: ORGANIC LABORATORY CHEMICALS

Map Key	Number of Records	Elevation m	Site	DB
19	**5 of 6**	**257.8**	**PEEL BOARD OF EDUCATION 30-283** **ALLOA PUBLIC SCHOOL 1248 MAYFIELD RD. WEST** **BRAMPTON ON L6V 1A1**	**GEN**

SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.
Generator #: ON0359859
Approval Yrs: 94,95,96

--- Details ---
Waste Code: 263
Waste Description: ORGANIC LABORATORY CHEMICALS
+
Waste Code: 148
Waste Description: INORGANIC LABORATORY CHEMICALS
+
Waste Code: 213
Waste Description: PETROLEUM DISTILLATES

Map Key	Number of Records	Elevation m	Site	DB
19	**6 of 6**	**257.8**	**PEEL BOARD OF EDUCATION** **ALLOA PUBLIC SCHOOL 1248 MAYFIELD RD. WEST** **BRAMPTON ON L6V 1A1**	**GEN**

SIC Code: 8511
SIC Description: ELEMT./SECON. EDUC.
Generator #: ON0359859
Approval Yrs: 86,87,88,89,90,92,93

--- Details ---
Waste Code: 148
Waste Description: INORGANIC LABORATORY CHEMICALS
+
Waste Code: 213
Waste Description: PETROLEUM DISTILLATES
+
Waste Code: 263
Waste Description: ORGANIC LABORATORY CHEMICALS

Map Key	Number of Records	Elevation m	Site	DB
20	**1 of 1**	**257.8**	**ON**	**WWIS**

Map Key	Number of Records	Elevation m	Site	DB

Well Id:	4901923	*Lot:*	017
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	591736.5	*Northing Nad83:*	4839270
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	21-APR-62
Sec. Water Use:		*Well Depth:*	44 ft
Pump Rate:	1 GPM	*Static Water Level:*	24 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	265.43	*Elevation Reliability:*	
Depth to Bedrock:	28	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	28 ft	*Original Depth:*	28 ft
Material Colour:	BROWN	*Material:*	TOPSOIL, CLAY
+			
Thickness:	16 ft	*Original Depth:*	44 ft
Material Colour:	RED	*Material:*	SHALE

---

21 ***1 of 1*** ***257.8*** ***WWIS***

ON

Well Id:	4909579	*Lot:*	018
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	591757	*Northing Nad83:*	4839306
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:		*Construction Date:*	23-APR-04
Sec. Water Use:		*Well Depth:*	7.5 m
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Observation Wells
Construction Method:	Other Method	*Flowing (y/n):*	
Elevation (m):	265.48	*Elevation Reliability:*	
Depth to Bedrock:	21	*Overburden/Bedrock:*	Bedrock
Water Type:		*Casing Material:*	PLASTIC

--- Details ---

Thickness:	1.5 m	*Original Depth:*	1.5 m
Material Colour:	BROWN	*Material:*	CLAY, SILT
+			
Thickness:	2.5 m	*Original Depth:*	4 m
Material Colour:	RED	*Material:*	CLAY, SILT
+			
Thickness:	2.5 m	*Original Depth:*	6.5 m
Material Colour:	BROWN	*Material:*	SILT, CLAY
+			
Thickness:	1 m	*Original Depth:*	7.5 m
Material Colour:	RED	*Material:*	SHALE, LIMESTONE

---

22 ***1 of 1*** ***257.8*** ***WWIS***

ON

Map Key	Number of Records	Elevation m	Site	DB

Well Id:	4905120	*Lot:*	017
Concession:	04	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	591864.5	*Northing Nad83:*	4839273
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	23-MAY-77
Sec. Water Use:		*Well Depth:*	28 ft
Pump Rate:	2 GPM	*Static Water Level:*	12 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	264.62	*Elevation Reliability:*	
Depth to Bedrock:	20	*Overburden/Bedrock:*	Bedrock
Water Type:	Not stated	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	10 ft	*Original Depth:*	10 ft
Material Colour:	BROWN	*Material:*	TOPSOIL
+			
Thickness:	10 ft	*Original Depth:*	20 ft
Material Colour:	GREY	*Material:*	CLAY
+			
Thickness:	8 ft	*Original Depth:*	28 ft
Material Colour:	RED	*Material:*	SHALE, WATER-BEARING

23 **1 of 1** **256.1** **ON** **WWIS**

Well Id:	4906319	*Lot:*	017
Concession:	05	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	590594.5	*Northing Nad83:*	4837423
Zone:	17	*Utm Reliability:*	margin of error : 30 m - 100 m
Primary Water Use:	Domestic	*Construction Date:*	21-JUN-85
Sec. Water Use:		*Well Depth:*	54 ft
Pump Rate:	1 GPM	*Static Water Level:*	15 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	260.3	*Elevation Reliability:*	
Depth to Bedrock:	54	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	12 ft	*Original Depth:*	12 ft
Material Colour:	BROWN	*Material:*	CLAY, STONES, DENSE
+			
Thickness:	42 ft	*Original Depth:*	54 ft
Material Colour:	BLUE	*Material:*	CLAY, STONES, DENSE
+			
Thickness:	66 ft	*Original Depth:*	120 ft
Material Colour:	RED	*Material:*	SHALE, HARD

24 **1 of 1** **257.8** **ON** **WWIS**

Map Key	Number of Records	Elevation m	Site	DB

Well Id:	4903082	*Lot:*	018
Concession:	06	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	590434.5	*Northing Nad83:*	4837463
Zone:	17	*Utm Reliability:*	margin of error : 30 m - 100 m
Primary Water Use:	Domestic	*Construction Date:*	10-JUN-68
Sec. Water Use:		*Well Depth:*	5 ft
Pump Rate:		*Static Water Level:*	5 ft
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	262.44	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden
Water Type:	FRESH	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	5 ft	*Original Depth:*	5 ft
Material Colour:		*Material:*	TOPSOIL, CLAY
+			
Thickness:	20 ft	*Original Depth:*	25 ft
Material Colour:		*Material:*	CLAY
+			
Thickness:	10 ft	*Original Depth:*	35 ft
Material Colour:		*Material:*	STONES
+			
Thickness:	11 ft	*Original Depth:*	46 ft
Material Colour:		*Material:*	MEDIUM SAND

---

25 ***1 of 1*** ***257.1*** ***ON*** ***WWIS***

Well Id:	4905569	*Lot:*	017
Concession:	06	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	590514.5	*Northing Nad83:*	4837393
Zone:	17	*Utm Reliability:*	margin of error : 30 m - 100 m
Primary Water Use:	Domestic	*Construction Date:*	22-NOV-79
Sec. Water Use:	Livestock	*Well Depth:*	34 ft
Pump Rate:	14 GPM	*Static Water Level:*	15 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	261.07	*Elevation Reliability:*	
Depth to Bedrock:	19	*Overburden/Bedrock:*	Overburden below Bedrock
Water Type:	FRESH	*Casing Material:*	CONCRETE,GALVANIZED

--- Details ---

Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:	BROWN	*Material:*	TOPSOIL
+			
Thickness:	12 ft	*Original Depth:*	13 ft
Material Colour:	BROWN	*Material:*	CLAY, PACKED
+			
Thickness:	6 ft	*Original Depth:*	19 ft
Material Colour:	BLUE	*Material:*	CLAY, GRAVEL, LAYERED
+			

Thickness:	8 ft	*Original Depth:*	27 ft
Material Colour:	RED	*Material:*	CHERT, STONES, HARD
+			
Thickness:	6 ft	*Original Depth:*	33 ft
Material Colour:	BROWN	*Material:*	SAND, GRAVEL, LOOSE
+			
Thickness:	1 ft	*Original Depth:*	34 ft
Material Colour:	RED	*Material:*	SHALE

26 ***1 of 1*** ***255.8*** ***WWIS***

ON

Well Id:	4907895	*Lot:*	017
Concession:	06	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	590575	*Northing Nad83:*	4837312
Zone:	17	*Utm Reliability:*	margin of error : < 3 m
Primary Water Use:		*Construction Date:*	26-JAN-93
Sec. Water Use:		*Well Depth:*	
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	
Construction Method:	Not Known	*Flowing (y/n):*	
Elevation (m):	258.55	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	No formation data
Water Type:		*Casing Material:*	

27 ***1 of 1*** ***257.8*** ***WWIS***

ON

Well Id:	4905555	*Lot:*	018
Concession:	06	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	590364.5	*Northing Nad83:*	4837423
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	30-OCT-79
Sec. Water Use:		*Well Depth:*	49 ft
Pump Rate:	14 GPM	*Static Water Level:*	15 ft
Flow Rate:		*Clear/Cloudy:*	CLOUDY
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	262.06	*Elevation Reliability:*	
Depth to Bedrock:	37	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:	BROWN	*Material:*	TOPSOIL
+			
Thickness:	13 ft	*Original Depth:*	14 ft
Material Colour:	BROWN	*Material:*	CLAY, PACKED
+			
Thickness:	9 ft	*Original Depth:*	23 ft
Material Colour:	GREY	*Material:*	CLAY, STONES, SOFT
+			

Map Key	Number of Records	Elevation m	Site	DB

Thickness:	14 ft	*Original Depth:*	37 ft
Material Colour:	GREY	*Material:*	CLAY, SAND
+			
Thickness:	12 ft	*Original Depth:*	49 ft
Material Colour:	RED	*Material:*	SHALE

28 **1 of 3** **257.8** **Mayfield Rd & Creditview Rd**
Brampton ON L7C **EHS**

Order No.:	20120410019
Report Date:	4/19/2012 1:34:46 PM
Report Type:	Standard Report
Search Radius (km):	0.25
Addit. Info Ordered:	Fire Insur. Maps and/or Site Plans;

28 **2 of 3** **257.8** **Mayfield and Creditview Rds MAYFIELD AND CREDITVIEW RDS<UNOFFICIAL>**
Brampton ON **SPL**

Ref No.:	3178-6U5LM2
Incident Dt:	9/30/2006
MOE Reported Dt:	9/30/2006
Contaminant Name:	FERTILIZER
Contaminant Quantity:	200 kg
Incident Summary:	Fertilizer spill, works dept cleaning
Incident Cause:	
Incident Reason:	
Nature of Impact:	Soil Contamination
Receiving Medium:	Land
Environmental Impact:	Possible

28 **3 of 3** **257.8** **Mordale Farms Inc.<UNOFFICIAL>**
Mayfield Rd & Creditview Rd
Caledon ON **SPL**

Ref No.:	1743-7XZPGK
Incident Dt:	
MOE Reported Dt:	11/21/2009
Contaminant Name:	
Contaminant Quantity:	
Incident Summary:	TT roll over 25 gal diesel to ditch
Incident Cause:	Other Transport Accident
Incident Reason:	
Nature of Impact:	Soil Contamination
Receiving Medium:	
Environmental Impact:	Confirmed

29 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	7051682	*Lot:*	017
Concession:	03	*Concession Name:*	
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	592132	*Northing Nad83:*	4839675
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m

Map Key	Number of Records	Elevation m	Site	DB

Primary Water Use:		*Construction Date:*	22-OCT-07
Sec. Water Use:		*Well Depth:*	
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Abandoned-Other
Construction Method:		*Flowing (y/n):*	
Elevation (m):	263.03	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	
Water Type:		*Casing Material:*	

--- Details ---

Thickness:	m	*Original Depth:*	m
Material Colour:		*Material:*	

---

30 ***1 of 1*** ***257.8*** ***WWIS***

ON

Well Id:	4906719	*Lot:*	017
Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	592119	*Northing Nad83:*	4839697
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Domestic	*Construction Date:*	14-MAY-86
Sec. Water Use:		*Well Depth:*	32 ft
Pump Rate:	6 GPM	*Static Water Level:*	11 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	262.96	*Elevation Reliability:*	
Depth to Bedrock:	24	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:	BROWN	*Material:*	TOPSOIL
+			
Thickness:	23 ft	*Original Depth:*	24 ft
Material Colour:	BROWN	*Material:*	CLAY, CLAY, STONES
+			
Thickness:	8 ft	*Original Depth:*	32 ft
Material Colour:	RED	*Material:*	SHALE

---

31 ***1 of 1*** ***257.8*** ***WWIS***

ON

Well Id:	7192520	*Lot:*	
Concession:		*Concession Name:*	
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	592228	*Northing Nad83:*	4839641
Zone:	17	*Utm Reliability:*	margin of error : 30 m - 100 m
Primary Water Use:		*Construction Date:*	17-NOV-12
Sec. Water Use:		*Well Depth:*	
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	
Construction Method:		*Flowing (y/n):*	
Elevation (m):		*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	

Map Key	Number of Records	Elevation m	Site	DB

Water Type: *Casing Material:*

---

32 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4901831	*Lot:*	018
Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	592029.5	*Northing Nad83:*	4839794
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	24-AUG-60
Sec. Water Use:		*Well Depth:*	32 ft
Pump Rate:		*Static Water Level:*	14 ft
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	264.42	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden
Water Type:	FRESH	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	13 ft	*Original Depth:*	13 ft
Material Colour:	BROWN	*Material:*	CLAY
+			
Thickness:	19 ft	*Original Depth:*	32 ft
Material Colour:	BLUE	*Material:*	CLAY, BOULDERS

---

33 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4902101	*Lot:*	017
Concession:	06	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	590348.5	*Northing Nad83:*	4837238
Zone:	17	*Utm Reliability:*	unknown UTM
Primary Water Use:	Domestic	*Construction Date:*	15-OCT-57
Sec. Water Use:		*Well Depth:*	65 ft
Pump Rate:	4 GPM	*Static Water Level:*	15 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	260.79	*Elevation Reliability:*	
Depth to Bedrock:	35	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	20 ft	*Original Depth:*	20 ft
Material Colour:		*Material:*	CLAY
+			
Thickness:	15 ft	*Original Depth:*	35 ft
Material Colour:		*Material:*	CLAY, GRAVEL
+			
Thickness:	30 ft	*Original Depth:*	65 ft
Material Colour:	RED	*Material:*	SHALE

Map Key	Number of Records	Elevation m	Site	DB
34	**1 of 1**	**257.8**	**ON**	**WWIS**

Well Id:	7051723	*Lot:*	017
Concession:	03	*Concession Name:*	
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	592228	*Northing Nad83:*	4839797
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Not Used	*Construction Date:*	23-MAY-07
Sec. Water Use:		*Well Depth:*	
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Abandoned-Other
Construction Method:		*Flowing (y/n):*	
Elevation (m):	262.36	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	
Water Type:		*Casing Material:*	STEEL

Map Key	Number of Records	Elevation m	Site	DB
35	**1 of 1**	**257.8**	**ON**	**WWIS**

Well Id:	4901829	*Lot:*	017
Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	592194.5	*Northing Nad83:*	4839826
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	09-MAY-64
Sec. Water Use:		*Well Depth:*	62 ft
Pump Rate:	3 GPM	*Static Water Level:*	16 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	262.51	*Elevation Reliability:*	
Depth to Bedrock:	34	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:	BLACK	*Material:*	TOPSOIL
+			
Thickness:	13 ft	*Original Depth:*	14 ft
Material Colour:	BROWN	*Material:*	CLAY, MEDIUM SAND
+			
Thickness:	20 ft	*Original Depth:*	34 ft
Material Colour:	GREY	*Material:*	CLAY, GRAVEL
+			
Thickness:	4 ft	*Original Depth:*	38 ft
Material Colour:	RED	*Material:*	SHALE, GRAVEL
+			
Thickness:	24 ft	*Original Depth:*	62 ft
Material Colour:	RED	*Material:*	SHALE

Map Key	Number of Records	Elevation m	Site	DB
36	**1 of 1**	**257.8**	**Walness Developments inc.** **1635 MAYFIELD RD, BRAMPTON, ON, L7A 0C3,** **ON L7A 0C3**	**RSC**

Date Submitted:	15-Apr-11
Date Acknowledg.:	
Date Returned:	
Certification Date:	30-Dec-10
Soil Type:	
Restoration Type:	
Registration #:	98515
Stratified (Y/N):	
Criteria:	
Consultant:	
District Office:	BRAMPTON
Intended Prop Use:	Residential
Current Property Use:	Agriculture/Other
Certificate Prop Use #:	No CPU
Applicable Standards:	ESA Phase 1
Legal Description:	Part of Lot 17, Concession 3 West of Hurontario Street (Geographic Township of Chinguacousy) designated as Part 1, Plan 43R-30677, City of Brampton, Regional Municipality of Peel
Prop. Identification #:	14365 - 0046 (LT)
Entire legal prop. (y/n):	Yes
UTM Coordinates:	NAD83 17-592537-4839891
Latitude & Longitude:	43.70627320N 79.85145410W (converted from UTM)
Accuracy Estimate:	6 to 10 meters
Measurement Method:	Digitized from a satellite image
CPU Issued Sect 1686:	No

37 ***1 of 1*** ***257.8*** ***WWIS***

ON

Well Id:	7042431	*Lot:*	017
Concession:	03	*Concession Name:*	
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	592367	*Northing Nad83:*	4839983
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Not Used	*Construction Date:*	01-MAR-07
Sec. Water Use:		*Well Depth:*	
Pump Rate:		*Static Water Level:*	4.27 m
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Abandoned-Other
Construction Method:	Digging	*Flowing (y/n):*	
Elevation (m):	260.59	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	No formation data
Water Type:		*Casing Material:*	CONCRETE

38 ***1 of 1*** ***257.8*** ***WWIS***

ON

Well Id:	4901826	*Lot:*	017
Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	592332.5	*Northing Nad83:*	4840015
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	04-MAY-63
Sec. Water Use:		*Well Depth:*	44 ft
Pump Rate:	2 GPM	*Static Water Level:*	20 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	260.42	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden

Map Key	Number of Records	Elevation m	Site	DB

Water Type:	FRESH	*Casing Material:*	CONCRETE
--- Details ---			
Thickness:	12 ft	*Original Depth:*	12 ft
Material Colour:	BROWN	*Material:*	TOPSOIL, CLAY
+			
Thickness:	30 ft	*Original Depth:*	42 ft
Material Colour:	GREY	*Material:*	CLAY
+			
Thickness:	2 ft	*Original Depth:*	44 ft
Material Colour:		*Material:*	GRAVEL

39 ***1 of 1*** ***257.8*** ***ON*** ***WWIS***

Well Id:	4906872	*Lot:*	018
Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	592319.5	*Northing Nad83:*	4840120
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Domestic	*Construction Date:*	27-JUL-87
Sec. Water Use:		*Well Depth:*	42 ft
Pump Rate:	8 GPM	*Static Water Level:*	14 ft
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	260.24	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden
Water Type:	FRESH	*Casing Material:*	CONCRETE
--- Details ---			
Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:	BROWN	*Material:*	TOPSOIL
+			
Thickness:	14 ft	*Original Depth:*	15 ft
Material Colour:	BROWN	*Material:*	CLAY
+			
Thickness:	7 ft	*Original Depth:*	22 ft
Material Colour:	GREY	*Material:*	CLAY, , PACKED
+			
Thickness:	3 ft	*Original Depth:*	25 ft
Material Colour:	GREY	*Material:*	MUCK, , SOFT
+			
Thickness:	14 ft	*Original Depth:*	39 ft
Material Colour:	GREY	*Material:*	CLAY
+			
Thickness:	3 ft	*Original Depth:*	42 ft
Material Colour:	GREY	*Material:*	SAND

40 ***1 of 1*** ***257.8*** ***ON*** ***WWIS***

Well Id:	4901828	*Lot:*	017
Concession:	03	*Concession Name:*	HS W

Map Key	Number of Records	Elevation m	Site	DB

County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	592384.5	*Northing Nad83:*	4840099
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	04-APR-64
Sec. Water Use:		*Well Depth:*	42 ft
Pump Rate:	10 GPM	*Static Water Level:*	20 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	260.06	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden
Water Type:	FRESH	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	12 ft	*Original Depth:*	12 ft
Material Colour:	BROWN	*Material:*	TOPSOIL, CLAY
+			
Thickness:	28 ft	*Original Depth:*	40 ft
Material Colour:	GREY	*Material:*	CLAY
+			
Thickness:	2 ft	*Original Depth:*	42 ft
Material Colour:		*Material:*	GRAVEL

41	1 of 1	257.8	ON	WWIS

Well Id:	4906873	*Lot:*	018
Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	592386.5	*Northing Nad83:*	4840156
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Domestic	*Construction Date:*	16-JUN-87
Sec. Water Use:		*Well Depth:*	41 ft
Pump Rate:	12 GPM	*Static Water Level:*	12 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	260.28	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden
Water Type:	FRESH	*Casing Material:*	CONCRETE,GALVANIZED

--- Details ---

Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:	BROWN	*Material:*	TOPSOIL
+			
Thickness:	14 ft	*Original Depth:*	15 ft
Material Colour:	BROWN	*Material:*	CLAY, , PACKED
+			
Thickness:	10 ft	*Original Depth:*	25 ft
Material Colour:	BLUE	*Material:*	CLAY, , SOFT
+			
Thickness:	6 ft	*Original Depth:*	31 ft
Material Colour:	GREY	*Material:*	CLAY, SAND, PACKED
+			
Thickness:	9 ft	*Original Depth:*	40 ft
Material Colour:	GREY	*Material:*	CLAY, , PACKED

Map Key	Number of Records	Elevation m	Site	DB

+

Thickness:	1 ft	*Original Depth:*	41 ft
Material Colour:	GREY	*Material:*	MEDIUM SAND, STONES

42 **1 of 1** **257.8** **1367933 Ontario Inc.** **RSC**
No Municipal Address Available,
BRAMPTON ON

Date Submitted:	14-Apr-11
Date Acknowledg.:	
Date Returned:	
Certification Date:	30-Dec-10
Soil Type:	
Restoration Type:	
Registration #:	98514
Stratified (Y/N):	
Criteria:	
Consultant:	
District Office:	BRAMPTON
Intended Prop Use:	Residential
Current Property Use:	Agriculture/Other
Certificate Prop Use #:	No CPU
Applicable Standards:	ESA Phase 1
Legal Description:	Part of Lot 17, Concession 3 West of Hurontario Street (Geographic Township of Chinguacousy) designated as Part 1, Plan 43R-30676, City of Brampton, Regional Municipality of Peel
Prop. Identification #:	14365 - 0045 (LT)
Entire legal prop. (y/n):	Yes
UTM Coordinates:	NAD83 17-592628-4839985
Latitude & Longitude:	43.70710800N 79.85030870W (converted from UTM)
Accuracy Estimate:	6 to 10 meters
Measurement Method:	Digitized from a satellite image
CPU Issued Sect 1686:	No

43 **1 of 1** **257.8** **WWIS**
ON

Well Id:	7129459	*Lot:*	
Concession:		*Concession Name:*	
County:	PEEL	*Municipality:*	BRAMPTON
Easting Nad83:	592559	*Northing Nad83:*	4840263
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m,margin of error : 30 m - 100 m
Primary Water Use:	Test Hole	*Construction Date:*	16-JUL-09
Sec. Water Use:	Monitoring	*Well Depth:*	9 ft
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Test Hole
Construction Method:	Auger	*Flowing (y/n):*	
Elevation (m):	258.99	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	
Water Type:		*Casing Material:*	PLASTIC

--- Details ---

Thickness:	9 ft	*Original Depth:*	9 ft
Material Colour:	RED	*Material:*	TILL, HARD

+

Thickness:	26 ft	*Original Depth:*	35 ft
Material Colour:	GREY	*Material:*	TILL, SOFT

Map Key	Number of Records	Elevation m	Site	DB

44 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4901832	*Lot:*	018
Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	592497.5	*Northing Nad83:*	4840313
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	22-AUG-62
Sec. Water Use:		*Well Depth:*	50 ft
Pump Rate:	50 GPM	*Static Water Level:*	6 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	260.12	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden
Water Type:	FRESH	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	12 ft	*Original Depth:*	12 ft
Material Colour:	BROWN	*Material:*	TOPSOIL, CLAY
+			
Thickness:	37 ft	*Original Depth:*	49 ft
Material Colour:	GREY	*Material:*	CLAY
+			
Thickness:	1 ft	*Original Depth:*	50 ft
Material Colour:		*Material:*	GRAVEL

45 **1 of 2** **257.8** **VAN GOOL'S LANDSCAPING AND NURSERIESLIMITED**
R.R. #2, 1760 MAYFIELD ROAD WEST
BRAMPTON ON L6V 1A1 **PES**

Licence No.:
Licence Type: Operator

45 **2 of 2** **257.8** **VAN GOOL'S LANDSCAPING AND NURSERIES**
1760 MAYFIELD ROAD WEST, R.R. #2
BRAMPTON ON L6V 1A1 **PES**

Licence No.:
Licence Type: Vendor

46 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	4902102	*Lot:*	018
Concession:	06	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	589599.5	*Northing Nad83:*	4836740
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Livestock	*Construction Date:*	14-APR-64
Sec. Water Use:	Domestic	*Well Depth:*	92 ft
Pump Rate:	6 GPM	*Static Water Level:*	30 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR

Map Key	Number of Records	Elevation m	Site	DB

Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	263.32	*Elevation Reliability:*	
Depth to Bedrock:	48	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	25 ft	*Original Depth:*	25 ft
Material Colour:	BROWN	*Material:*	CLAY
+			
Thickness:	15 ft	*Original Depth:*	40 ft
Material Colour:	BLUE	*Material:*	CLAY
+			
Thickness:	8 ft	*Original Depth:*	48 ft
Material Colour:		*Material:*	CLAY, MEDIUM SAND
+			
Thickness:	44 ft	*Original Depth:*	92 ft
Material Colour:	RED	*Material:*	SHALE

47 ***1 of 1*** ***256.0*** ***ON*** ***WWIS***

Well Id:	4901833	*Lot:*	018
Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	592761.5	*Northing Nad83:*	4840659
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	02-DEC-63
Sec. Water Use:		*Well Depth:*	58 ft
Pump Rate:	10 GPM	*Static Water Level:*	17 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Boring	*Flowing (y/n):*	N
Elevation (m):	259.49	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	Overburden
Water Type:	FRESH	*Casing Material:*	CONCRETE

--- Details ---

Thickness:	15 ft	*Original Depth:*	15 ft
Material Colour:	BROWN	*Material:*	CLAY, BOULDERS
+			
Thickness:	23 ft	*Original Depth:*	38 ft
Material Colour:	BLUE	*Material:*	CLAY
+			
Thickness:	17 ft	*Original Depth:*	55 ft
Material Colour:	BLUE	*Material:*	CLAY, BOULDERS
+			
Thickness:	3 ft	*Original Depth:*	58 ft
Material Colour:	BLUE	*Material:*	CLAY, BOULDERS

48 ***1 of 1*** ***255.8*** ***ON*** ***WWIS***

Well Id:	4904660	*Lot:*	018
Concession:	03	*Concession Name:*	HS W

Map Key	Number of Records	Elevation m	Site	DB

County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	592811.5	*Northing Nad83:*	4840694
Zone:	17	*Utm Reliability:*	margin of error : 30 m - 100 m
Primary Water Use:	Domestic	*Construction Date:*	19-MAY-75
Sec. Water Use:		*Well Depth:*	80 ft
Pump Rate:	7 GPM	*Static Water Level:*	4 ft
Flow Rate:		*Clear/Cloudy:*	CLOUDY
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	258.58	*Elevation Reliability:*	
Depth to Bedrock:	63	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	17 ft	*Original Depth:*	17 ft
Material Colour:		*Material:*	PREVIOUSLY DUG
+			
Thickness:	15 ft	*Original Depth:*	32 ft
Material Colour:	GREY	*Material:*	SAND
+			
Thickness:	31 ft	*Original Depth:*	63 ft
Material Colour:	BROWN	*Material:*	SAND, STONES
+			
Thickness:	17 ft	*Original Depth:*	80 ft
Material Colour:	BLUE	*Material:*	SHALE

49	1 of 1	255.7	ON	WWIS

Well Id:	4910258	*Lot:*	018
Concession:	03	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	592859	*Northing Nad83:*	4840745
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Domestic	*Construction Date:*	27-JUN-06
Sec. Water Use:		*Well Depth:*	4.26 m
Pump Rate:	11.35 LPM	*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Rotary (Convent.)	*Flowing (y/n):*	
Elevation (m):	258.01	*Elevation Reliability:*	
Depth to Bedrock:	108	*Overburden/Bedrock:*	Bedrock
Water Type:		*Casing Material:*	OPEN HOLE,STEEL

--- Details ---

Thickness:	4.26 m	*Original Depth:*	4.26 m
Material Colour:	BROWN	*Material:*	CLAY
+			
Thickness:	20.12 m	*Original Depth:*	24.38 m
Material Colour:	GREY	*Material:*	CLAY, STONES
+			
Thickness:	8.53 m	*Original Depth:*	32.91 m
Material Colour:	GREY	*Material:*	STONES, CLAY, HARD
+			
Thickness:	4.27 m	*Original Depth:*	37.18 m
Material Colour:	RED	*Material:*	SHALE

Map Key	Number of Records	Elevation m	Site	DB

50 **1 of 1** **255.7** **ON** **WWIS**

Well Id:	4910312	*Lot:*	018
Concession:	03	*Concession Name:*	
County:	PEEL	*Municipality:*	CALEDON TOWN (CHINGUACOUSY)
Easting Nad83:	592859	*Northing Nad83:*	4840748
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:		*Construction Date:*	05-JUL-06
Sec. Water Use:		*Well Depth:*	
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Abandoned-Other
Construction Method:		*Flowing (y/n):*	
Elevation (m):	258.02	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	No formation data
Water Type:		*Casing Material:*	

51 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	7154448	*Lot:*	
Concession:		*Concession Name:*	
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	589646	*Northing Nad83:*	4836293
Zone:	17	*Utm Reliability:*	margin of error : 10 - 30 m
Primary Water Use:	Test Hole	*Construction Date:*	08-JUN-10
Sec. Water Use:	Monitoring	*Well Depth:*	21.5 ft
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Observation Wells
Construction Method:	Other Method	*Flowing (y/n):*	
Elevation (m):	265.54	*Elevation Reliability:*	
Depth to Bedrock:		*Overburden/Bedrock:*	
Water Type:		*Casing Material:*	PLASTIC

--- Details ---

Thickness:	16 ft	*Original Depth:*	16 ft
Material Colour:	BROWN	*Material:*	CLAY
+			
Thickness:	5.5 ft	*Original Depth:*	21.5 ft
Material Colour:	RED	*Material:*	SHALE, ROCK

52 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	2801611	*Lot:*	017
Concession:	11	*Concession Name:*	CON
County:	HALTON	*Municipality:*	HALTON HILLS TOWN (ESQUESING)
Easting Nad83:	589632.5	*Northing Nad83:*	4836242
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	07-JUL-62
Sec. Water Use:		*Well Depth:*	92 ft
Pump Rate:	8 GPM	*Static Water Level:*	30 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N

Map Key	Number of Records	Elevation m	Site	DB

Elevation (m):	265.68	*Elevation Reliability:*	
Depth to Bedrock:	29	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL
--- Details ---			
Thickness:	15 ft	*Original Depth:*	15 ft
Material Colour:	BROWN	*Material:*	CLAY
+			
Thickness:	14 ft	*Original Depth:*	29 ft
Material Colour:	RED	*Material:*	CLAY
+			
Thickness:	63 ft	*Original Depth:*	92 ft
Material Colour:	RED	*Material:*	SHALE

53 **1 of 1** **257.8** **ON** **WWIS**

Well Id:	2801610	*Lot:*	017
Concession:	11	*Concession Name:*	CON
County:	HALTON	*Municipality:*	HALTON HILLS TOWN (ESQUESING)
Easting Nad83:	589577.5	*Northing Nad83:*	4836257
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Domestic	*Construction Date:*	06-MAR-62
Sec. Water Use:		*Well Depth:*	22 ft
Pump Rate:	1 GPM	*Static Water Level:*	35 ft
Flow Rate:		*Clear/Cloudy:*	CLEAR
Specific Capacity:		*Final Well Status:*	Water Supply
Construction Method:	Cable Tool	*Flowing (y/n):*	N
Elevation (m):	265.84	*Elevation Reliability:*	
Depth to Bedrock:	22	*Overburden/Bedrock:*	Bedrock
Water Type:	FRESH	*Casing Material:*	OPEN HOLE,STEEL
--- Details ---			
Thickness:	22 ft	*Original Depth:*	22 ft
Material Colour:		*Material:*	PREVIOUSLY DUG
+			
Thickness:	88 ft	*Original Depth:*	110 ft
Material Colour:	RED	*Material:*	SHALE

55 **1 of 1** **254.7** **ON** **WWIS**

Well Id:	4901717	*Lot:*	017
Concession:	02	*Concession Name:*	HS W
County:	PEEL	*Municipality:*	BRAMPTON (CHINGUACOUSY)
Easting Nad83:	593067.5	*Northing Nad83:*	4840895
Zone:	17	*Utm Reliability:*	margin of error : 100 m - 300 m
Primary Water Use:	Not Used	*Construction Date:*	22-JAN-64
Sec. Water Use:		*Well Depth:*	76 ft
Pump Rate:		*Static Water Level:*	
Flow Rate:		*Clear/Cloudy:*	
Specific Capacity:		*Final Well Status:*	Test Hole
Construction Method:	Rotary (Convent.)	*Flowing (y/n):*	
Elevation (m):	257.96	*Elevation Reliability:*	
Depth to Bedrock:	152	*Overburden/Bedrock:*	Bedrock
Water Type:		*Casing Material:*	

Map Key	Number of Records	Elevation m	Site	DB

--- Details ---

Thickness:	19 ft	*Original Depth:*	20 ft
Material Colour:		*Material:*	CLAY, GRAVEL, BOULDERS
+			
Thickness:	1 ft	*Original Depth:*	1 ft
Material Colour:		*Material:*	TOPSOIL
+			
Thickness:	34 ft	*Original Depth:*	54 ft
Material Colour:		*Material:*	SILT, FINE SAND, GRAVEL
+			
Thickness:	22 ft	*Original Depth:*	76 ft
Material Colour:		*Material:*	CLAY, GRAVEL
+			
Thickness:	27 ft	*Original Depth:*	103 ft
Material Colour:		*Material:*	MEDIUM SAND, CLAY, SILT
+			
Thickness:	26 ft	*Original Depth:*	129 ft
Material Colour:	RED	*Material:*	CLAY, MEDIUM SAND
+			
Thickness:	23 ft	*Original Depth:*	152 ft
Material Colour:		*Material:*	CLAY, MEDIUM SAND, GRAVEL
+			
Thickness:	8 ft	*Original Depth:*	160 ft
Material Colour:		*Material:*	SHALE

Unplottable Report

Site:
Mayfield Road Caledon ON

Database:
CA

Certificate #:	3357-56AJB5
Application Year:	02
Issue Date:	1/17/02
Approval Type:	Municipal & Private water
Status:	Approved
Application Type:	New Certificate of Approval
Client Name:	The Corporation of the Regional Municipality of Peel
Client Address:	10 Peel Centre Drive, Fourth Floor
Client City:	Brampton
Client Postal Code:	L6T 4B9
Project Description:	This application is for approval to install a watermain on Mayfield Road
Contaminants:	
Emission Control:	

Site:
Heritage Road Brampton ON

Database:
EHS

Order No.:	20060213008
Report Date:	2/16/2006
Report Type:	Basic Report
Search Radius (km):	0.25
Addit. Info Ordered:	

Site:
On Mayfield Rd. just east of Hurontario St. Brampton ON

Database:
SPL

Ref No.:	1750-6UMMSF
Incident Dt:	10/16/2006
MOE Reported Dt:	10/16/2006
Contaminant Name:	HYDRAULIC OIL
Contaminant Quantity:	100 L
Incident Summary:	Brampton: Spill of DSL impacting Creek(unknown name)
Incident Cause:	
Incident Reason:	Equipment Failure
Nature of Impact:	Surface Water Pollution
Receiving Medium:	Water
Environmental Impact:	Possible

Appendix: Database Descriptions

Ecolog Environmental Risk Information Services Ltd can search the following databases. The extent of Historical information varies with each database and current information is determined by what is publicity available to Ecolog ERIS at the time of update. ***Note:*** *Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.*

Abandoned Aggregate Inventory: Up to Sept 2002 Provincial AAGR
The MAAP Program maintains a database of all abandoned pits and quarries. Please note that the database is only referenced by lot and concession and city/town location. The database provides information regarding the location, type, size, land use, status and general comments.

Aggregate Inventory: Up to Aug 2012 Provincial AGR
The Ontario Ministry of Natural Resources maintains a database of all active pits and quarries. Please note that the database is only referenced by lot\concession and city/town location. The database provides information regarding the registered owner/operator, location, status, licence type, and maximum tonnage.

Abandoned Mine Information System: 1800-Feb 2013 Provincial AMIS
The Abandoned Mines Information System contains data on known abandoned and inactive mines located on both Crown and privately held lands. The information was provided by the Ministry of Northern Development and Mines (MNDM), with the following disclaimer: "the database provided has been compiled from various sources, and the Ministry of Northern Development and Mines makes no representation and takes no responsibility that such information is accurate, current or complete". Reported information includes official mine name, status, background information, mine start/end date, primary commodity, mine features, hazards and remediation.

Anderson's Waste Disposal Sites: 1860s-Present Private ANDR
The information provided in this database was collected by examining various historical documents which aimed to characterize the likely position of former waste disposal sites from 1860 to present. The research initiative behind the creation of this database was to identify those sites that are missing from the Ontario MOE Waste Disposal Site Inventory, as well as to provide revisions and corrections to the positions and descriptions of sites currently listed in the MOE inventory. In addition to historic waste disposal facilities, the database also identifies certain auto wreckers and scrap yards that have been extrapolated from documentary sources. Please note that the data is not warranted to be complete, exhaustive or authoritive. The information was collected for research purposes only.

Automobile Wrecking & Supplies: 2001-Jun 2010 Private AUWR
This database provides an inventory of all known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Borehole: 1875-Aug 2011 Provincial BORE
A borehole is the generalized term for any narrow shaft drilled in the ground, either vertically or horizontally. The information here includes geotechnical investigations or environmental site assessments, mineral exploration, or as a pilot hole for installing piers or underground utilities. Information is from many sources such as the Ministry of Transportation (MTO) boreholes from engineering reports and projects from the 1950 to 1990's in Southern Ontario. Boreholes from the Ontario Geological Survey (OGS) including The Urban Geology Analysis Information System (UGAIS) and the York Peel Durham Toronto (YPDT) database of the Conservation Authority Moraine Coalition. This database will include fields such as location, stratigraphy, depth, elevation, year drilled, etc. For all water well data or oil and gas well data for Ontario please refer to WWIS and OOGW.

Certificates of Approval: 1985-Oct 30, 2011* Provincial CA

This database contains the following types of approvals: Air & Noise, Industrial Sewage, Municipal & Private Sewage, Waste Management Systems and Renewable Energy Approvals. The MOE in Ontario states that any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste, must have a Certificate of Approval before it can operate lawfully. Fields include approval number, business name, address, approval date, approval type and status. This database will no longer be updated, as CofA's have been replaced by either Environmental Activity and Sector Registry (EASR) or Environmental Compliance Approval (ECA). Please refer to those individual databases for any information after Oct.31, 2011.

Commercial Fuel Oil Tanks: 1948-Apr 2013 Provincial CFOT

Since May 2002, Ontario developed a new act where it became mandatory for fuel oil tanks to be registered with Technical Standards & Safety Authority (TSSA). This data would include all commercial underground fuel oil tanks in Ontario with fields such as location, registration number, tank material, age of tank and tank size.

Chemical Register: 1992, 1999-Jun 2010 Private CHEM

This database includes information from both a one time study conducted in 1992 and private source and is a listing of facilities that manufacture or distribute chemicals. The production of these chemical substances may involve one or more chemical reactions and/or chemical separation processes (i.e. fractionation, solvent extraction, crystallization, etc.).

Inventory of Coal Gasification Plants and Coal Tar Sites: Apr 1987 and Nov 1988* Provincial COAL

This inventory includes both the "Inventory of Coal Gasification Plant Waste Sites in Ontario-April 1987" and the Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario-November 1988) collected by the MOE. It identifies industrial sites that produced and continue to produce or use coal tar and other related tars. Detailed information is available and includes: facility type, size, land use, information on adjoining properties, soil condition, site operators/occupants, site description, potential environmental impacts and historic maps available. This was a one-time inventory.*

Compliance and Convictions: 1989-Jun 2013 Provincial CONV

This database summarizes the fines and convictions handed down by the Ontario courts beginning in 1989. Companies and individuals named here have been found guilty of environmental offenses in Ontario courts of law.

Certificates of Property Use: 1994-Jul 2013 Provincial CPU

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all CPU's on the registry such as (EPA s. 168.6) - Certificate of Property Use.

Drill Hole Database: 1886-Jun 2013 Provincial DRL

The Ontario Drill Hole Database contains information on more than 113,000 percussion, overburden, sonic and diamond drill holes from assessment files on record with the department of Mines and Minerals. Please note that limited data is available for southern Ontario, as it was the last area to be completed. The database was created when surveys submitted to the Ministry were converted in the Assessment File Research Image Database (AFRI) project. However, the degree of accuracy (coordinates) as to the exact location of drill holes is dependent upon the source document submitted to the MNDM. Levels of accuracy used to locate holes are: centering on the mining claim; a sketch of the mining claim; a 1:50,000 map; a detailed company map; or from submitted a "Report of Work".

Environmental Activity and Sector Registry: Oct 31, 2011-Jul 2013 Provincial EASR

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. The EASR allows businesses to register certain activities with the ministry, rather than apply for an approval. The registry is available for common systems and processes, to which preset rules of operation can be applied. The EASR is currently available for: heating systems, standby power systems and automotive refinishing. Businesses whose activities aren't subject to the EASR may apply for an ECA (Environmental Compliance Approval), Please see our ECA database.

Environmental Registry: 1994-Jul 2013 Provincial EBR

The Environmental Registry lists proposals, decisions and exceptions regarding policies, Acts, instruments, or regulations that could significantly affect the environment. Through the Registry, thirteen provincial ministries notify the public of upcoming proposals and invite their comments. For example, if a local business is requesting a permit, license, or certificate of approval to release substances into the air or water; these are notified on the registry. Data includes: Approval for discharge into the natural environment other than water (i.e. Air) - EPA s. 9, Approval for sewage works - OWRA s. 53(1), and EPA s. 27 - Approval for a waste disposal site. For information regarding Permit to Take Water (PTTW), Certificate of Property Use (CPU) and (ORD) Orders please refer to those individual databases.

Environmental Compliance Approval: Oct 31, 2011-Jul 2013 Provincial ECA

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. In the past, a business had to apply for multiple approvals (known as certificates of approval) for individual processes and pieces of equipment. Today, a business either registers itself, or applies for a single approval, depending on the types of activities it conducts. Businesses whose activities aren't subject to the EASR may apply for an ECA. A single ECA addresses all of a business's emissions, discharges and wastes. Separate approvals for air, noise and waste are no longer required. This database will also include Renewable Energy Approvals. For CofA's prior to Nov 1st, 2011, please refer to the CA database. For all Waste Disposal Sites please refer to the WDS database.

Environmental Effects Monitoring: 1992-2007* Federal EEM

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

ERIS Historical Searches: 1999-Mar 2013 Private EHS

EcoLog ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Environmental Issues Inventory System: 1992-2001* Federal EIIS

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

List of TSSA Expired Facilities: Current to Feb 2012 Provincial EXP

This is a list of all expired facilities that fall under the TSSA (TSSA Act & Safety Regulations), including the six regulations that exist under the Fuels Safety Division. It will include facilities such as private fuel outlets, bulk plants, fuel oil tanks, gasoline stations, marinas, propane filling stations, liquid fuel tanks, piping systems, etc. These tanks have been removed and automatically fall under the expired facilities inventory held by TSSA.

Federal Convictions: 1988-Jun 2007* Federal FCON

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Contaminated Sites on Federal Land: June 2000-Jan 2013 Federal FCS

The Federal Contaminated Sites Inventory includes information on all known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government.

Fisheries & Oceans Fuel Tanks: 1964-Sept 2003 Federal FOFT

Fisheries & Oceans Canada maintains an inventory of all aboveground & underground fuel storage tanks located on Fisheries & Oceans property or controlled by DFO. Our inventory provides information on the site name, location, tank owner, tank operator, facility type, storage tank location, tank contents & capacity, and date of tank installation.

Fuel Storage Tank: Current to Jun 2011 Provincial FST

The Technical Standards & Safety Authority (TSSA), under the Technical Standards & Safety Act of 2000 maintains a database of registered private and retail fuel storage tanks in Ontario with fields such as location, tank status, license date, tank type, tank capacity, fuel type, installation year and facility type.

Ontario Regulation 347 Waste Generators Summary: 1986-Apr 2012 Provincial GEN

Regulation 347 of the Ontario EPA defines a waste generation site as any site, equipment and/or operation involved in the production, collection, handling and/or storage of regulated wastes. A generator of regulated waste is required to register the waste generation site and each waste produced, collected, handled, or stored at the site. This database contains the registration number, company name and address of registered generators including the types of hazardous wastes generated. It includes data on waste generating facilities such as: drycleaners, waste treatment and disposal facilities, machine shops, electric power distribution etc. This information is a summary of all years from 1986 including the most currently available data. Some records may contain, within the company name, the phrase "See & Use..." followed by a series of letters and numbers. This occurs when one company is amalgamated with or taken over by another registered company. The number listed as "See & Use", refers to the new ownership and the other identification number refers to the original ownership. This phrase serves as a link between the 2 companies until operations have been fully transferred.

TSSA Historic Incidents: 2006-June 2009 Provincial HINC

This database will cover all incidences recorded by TSSA with their older system, before they moved to their new management system. TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. The TSSA works to protect the public, the environment and property from fuel-related hazards such as spills, fires and explosions. This database will include spills and leaks from pipelines, diesel, fuel oil, gasoline, natural gas, propane and hydrogen recorded by the TSSA.

Indian & Northern Affairs Fuel Tanks: 1950-Aug 2003* Federal IAFT

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of all aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

TSSA Incidents: June 2009-Apr 2013 Provincial INC

TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. Includes incidents from fuel-related hazards such as spills, fires and explosions. This database will include spills and leaks from diesel, fuel oil, gasoline, natural gas, propane and hydrogen recorded by the TSSA.

Landfill Inventory Management Ontario: 2012 Provincial LIMO

The Landfill Inventory Management Ontario (LIMO) database is updated every year, as the ministry compiles new and updated information. The inventory will include small and large landfills. Additionally, each year the ministry will request operators of the larger landfills complete a landfill data collection form that will be used to update LIMO and will include the following information from the previous operating year. This will include additional information such as estimated amount of total waste received, landfill capacity, estimated total remaining landfill capacity, fill rates, engineering designs, reporting and monitoring details, size of location, service area, approved waste types, leachate of site treatment, contaminant attenuation zone and more. The small landfills will include information such as site owner, site location and certificate of approval # and status.

Canadian Mine Locations: 1998-2009 Private MINE

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Mineral Occurrences: 1846-Apr 2013 Provincial MNR

In the early 70's, the Ministry of Northern Development and Mines created an inventory of approximately 19,000 mineral occurrences in Ontario, in regard to metallic and industrial minerals, as well as some information on building stones and aggregate deposits. Please note that the "Horizontal Positional Accuracy" is approximately +/- 200 m. Many reference elements for each record were derived from field sketches using pace or chain/tape measurements against claim posts or topographic features in the area. The primary limiting factor for the level of positional accuracy is the scale of the source material. The testing of horizontal accuracy of the source materials was accomplished by comparing the planimetric (X and Y) coordinates of that point with the coordinates of the same point as defined from a source of higher accuracy.

National Analysis of Trends in Emergencies System (NATES): 1974-1994* Federal NATE

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Non-Compliance Reports: 1992(water only), 1994-2010 Provincial NCPL

The Ministry of the Environment provides information about non-compliant discharges of contaminants to air and water that exceed legal allowable limits, from regulated industrial and municipal facilities. A reported non-compliance failure may be in regard to a Control Order, Certificate of Approval, Sectoral Regulation or specific regulation/act.

National Defence & Canadian Forces Fuel Tanks: Up to May 2001* Federal NDFT

The Department of National Defence and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

National Defence & Canadian Forces Spills: Mar 1999-Aug 2010 Federal NDSP

The Department of National Defence and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

National Defence & Canadian Forces Waste Disposal Sites: 2001-Apr 2007* Federal NDWD

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

National Environmental Emergencies System (NEES): 1974-2003* Federal NEES

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for all previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

National PCB Inventory: 1988-2008* Federal NPCB

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. All federal out-of-service PCB containing equipment and all PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites.

National Pollutant Release Inventory: 1993-2011 Federal NPRI

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances.

Oil and Gas Wells: 1988-Jun 2013 Private OGW

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Ontario Oil and Gas Wells: 1800-Jul 2013 Provincial OOGW

In 1998, the MNR handed over to the Ontario Oil, Gas and Salt Resources Corporation, the responsibility of maintaining a database of oil and gas wells drilled in Ontario. The OGSR Library has over 20,000+ wells in their database. Information available for all wells in the ERIS database include well owner/operator, location, permit issue date, well cap date, licence no., status, depth and the primary target (rock unit) of the well being drilled. All geology/stratigraphy table information, plus all water table information is also provide for each well record.

Inventory of PCB Storage Sites: 1987-Oct 2004 Provincial OPCB

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of PCB storage sites within the province. Ontario Regulation 11/82 (Waste Management - PCB) and Regulation 347 (Generator Waste Management) under the Ontario EPA requires the registration of inactive PCB storage equipment and/or disposal sites of PCB waste with the Ontario Ministry of Environment. This database contains information on: 1) waste quantities; 2) major and minor sites storing liquid or solid waste; and 3) a waste storage inventory.

Orders: 1994-Jul 2013 Provincial ORD

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all Orders on the registry such as (EPA s. 17) - Order for remedial work, (EPA s. 18) - Order for preventative measures, (EPA s. 43) - Order for removal of waste and restoration of site, (EPA s. 44) - Order for conformity with Act for waste disposal sites, (EPA s. 136) - Order for performance of environmental measures.

Canadian Pulp and Paper: 1999, 2002, 2004, 2005, 2009 Private PAP

This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Parks Canada Fuel Storage Tanks: 1920-Jan 2005* Federal PCFT

Canadian Heritage maintains an inventory of all known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Pesticide Register: 1988-Jun 2013 Provincial PES

The Ontario Ministry of Environment maintains a database of all manufacturers and vendors of registered pesticides.

TSSA Pipeline Incidents: June 2009-Mar 2012 Provincial PINC

TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. This database will include spills, strike and leaks from recorded by the TSSA.

Private and Retail Fuel Storage Tanks: 1989-1996* Provincial PRT

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks and licensed retail fuel outlets. This database includes an inventory of locations that have gasoline, oil, waste oil, natural gas and/or propane storage tanks on their property. The MCCR no longer collects this information. This information is now collected by the Technical Standards and Safety Authority (TSSA).

Permit to Take Water: 1994-Jul 2013 Provincial PTTW

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all PTTW's on the registry such as OWRA s. 34 - Permit to take water.

Ontario Regulation 347 Waste Receivers Summary: 1986-2011 Provincial REC

Part V of the Ontario Environmental Protection Act ("EPA") regulates the disposal of regulated waste through an operating waste management system or a waste disposal site operated or used pursuant to the terms and conditions of a Certificate of Approval or a Provisional Certificate of Approval. Regulation 347 of the Ontario EPA defines a waste receiving site as any site or facility to which waste is transferred by a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents registered receivers of regulated wastes, identified by registration number, company name and address, and includes receivers of waste such as: landfills, incinerators, transfer stations, PCB storage sites, sludge farms and water pollution control plants. This information is a summary of all years from 1986 including the most currently available data.

Record of Site Condition: 1997-Sept 2001, Oct 2004-Jun 2013 Provincial RSC

The Record of Site Condition (RSC) is part of the Ministry of the Environment's Brownfields Environmental Site Registry. Protection from environmental cleanup orders for property owners is contingent upon documentation known as a record of site condition (RSC) being filed in the Environmental Site Registry. In order to file an RSC, the property must have been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use (such as residential) proposed to take place on the property. The Record of Site Condition Regulation (O. Reg. 153/04) details requirements related to site assessment and clean up.
RSCs filed after July 1, 2011 will also be included as part of the new (O.Reg. 511/09).

Retail Fuel Storage Tanks: 1999-Jun 2010 Private RST

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Scott's Manufacturing Directory: 1992-Mar 2011 Private SCT

Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Ontario Spills: 1988-Aug 2012 Provincial SPL

This database identifies information such as location (approximate), type and quantity of contaminant, date of spill, environmental impact, cause, nature of impact, etc. Information from 1988-2002 was part of the ORIS (Occurrence Reporting Information System). The SAC (Spills Action Centre) handles all spills reported in Ontario. Regulations for spills in Ontario are part of the MOE's Environmental Protection Act, Part X.

Wastewater Discharger Registration Database: 1990-2011 Provincial SRDS

Information under this heading is combination of the following 2 programs. The Municipal/Industrial Strategy for Abatement (MISA) division of the Ontario Ministry of Environment maintained a database of all direct dischargers of toxic pollutants within nine sectors including: Electric Power Generation; Mining; Petroleum Refining; Organic Chemicals; Inorganic Chemicals; Pulp & Paper; Metal Casting; Iron & Steel; and Quarries. All sampling information is now collected and stored within the Sample Result Data Store (SRDS).

Anderson's Storage Tanks: 1915-1953* Private TANK

The information provided in this database was collected by examining various historical documents, which identified the location of former storage tanks, containing substances such as fuel, water, gas, oil, and other various types of miscellaneous products. Information is available in regard to business operating at tank site, tank location, permit year, permit & installation type, no. of tanks installed & configuration and tank capacity. Data contained within this database pertains only to the city of Toronto and is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Transport Canada Fuel Storage Tanks: 1970-Mar 2007 Federal TCFT

With the provinces of BC, MB, NB, NF, ON, PE, and QC; Transport Canada currently owns and operates 90 fuel storage tanks. Our inventory provides information on the site name, location, tank age, capacity and fuel type.

TSSA Variances for Abandonment of Underground Storage Tanks: Current to Jun 2013 Provincial VAR

The TSSA, Under the Liquid Fuels Handling Code and the Fuel Oil Code, all underground storage tanks must be removed within two years of disuse. If removal of a tank is not feasible, you may apply to seek a variance from this code requirement. This is a list of all variances granted for abandoned tanks.

Waste Disposal Sites - MOE CA Inventory: 1970-Jul 2013 Provincial WDS

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of known open (active or inactive) and closed disposal sites in the Province of Ontario. Active sites maintain a Certificate of Approval, are approved to receive and are receiving waste. Inactive sites maintain Certificate(s) of Approval but are not receiving waste. Closed sites are not receiving waste. The data contained within this database was compiled from the MOE's Certificate of Approval database. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number. All new Environmental Compliance Approvals handed out after Oct 31, 2011 for Waste Disposal Sites will still be found in this database.

Waste Disposal Sites - MOE 1991 Historical Approval Inventory: Up to Oct 1990* Provincial WDSH

In June 1991, the Ontario Ministry of Environment, Waste Management Branch, published the "June 1991 Waste Disposal Site Inventory", of all known active and closed waste disposal sites as of October 30st, 1990. For each "active" site as of October 31st 1990, information is provided on site location, site/CA number, waste type, site status and site classification. For each "closed" site as of October 31st 1990, information is provided on site location, site/CA number, closure date and site classification. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number.

Water Well Information System: 1955-May 2013 Provincial WWIS

This database describes locations and characteristics of water wells found within Ontario in accordance with Regulation 903. It includes such information as coordinates, construction date, well depth, primary and secondary use, pump rate, static water level, well status, etc. Also included are detailed stratigraphy information, approximate depth to bedrock and the approximate depth to the water table.

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries". All values are an approximation.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property, within the report search radius, and the surrounding area outside the search radius.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red upside down triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and were included as reference.

APPENDIX D

SITE PHOTOGRAPHS

PHOTO 1: Agricultural and residential usage along Mayfield Road. Looking north at Mayfield Road between Winston Churchill Boulevard and Heritage Road.

PHOTO 2: Agricultural usage along Mayfield Road. Looking north between Creditview Road and Chinguacousy Road.

PHOTO 3: Looking southeast towards 11968 Mayfield Road.

PHOTO 4: Looking north towards 816 Mayfield Road (Gro-Bark).

THURBER ENGINEERING LTD.	**MAYFIELD ROAD CONTAMINATED SOIL ASSESSMENT** **SITE RECONNAISSANCE PHOTOS**	**PROJECT NO**.: 19-1605-148 **TAKEN BY**: MEF **PHOTOS TAKEN**: OCT 2014

PHOTO 5: Looking west from Mississauga Road towards 816 Mayfield Road (Gro-Bark) at mulch and soil stockpiles.

PHOTO 6: Looking north from Mayfield Road towards 12111 Mississauga Road (Pioneer Hi-Bred Seed Production Facility).

PHOTO 7: Looking south towards 1637 Mayfield Road at truck trailer storage. Recent construction visible in foreground of photo.

PHOTO 8: Looking north towards 1966 Mayfield Road at Hydro One transformer station.

PHOTO 9: Looking south from Mayfield Road at residential development between Mississauga Road and Creditview Road.

PHOTO 10: Looking west at utility construction along the south side of Mayfield Road between Creditview Road and Chinguacousy Road.

J

ARCHAEOLOGICAL REVIEW

Stage 1 Report

ORIGINAL

Stage 1 Archaeological Assessment
(Background Research and Property Inspection)

Mayfield Road Class Environmental Assessment
Chinguacousy Road to West of Winston Churchill Boulevard
Regional Municipality of Peel and Regional Municipality of Halton, Ontario

Prepared for:

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Stage 1 Archaeological Assessment
(Background Research and Property Inspection)

Mayfield Road Class Environmental Assessment
Chinguacousy Road to 300 m West of Winston Churchill Boulevard
Regional Municipality of Peel and Regional Municipality of Halton, Ontario

EXECUTIVE SUMMARY

Archaeological Services Inc. (ASI) was contracted by Hatch Mott MacDonald (HMM) (Mississauga) on behalf of the Regional Municipality of Peel, to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Mayfield Road from Chinguacousy Road to 300 m west of Winston Churchill Boulevard Class Environmental Assessment (EA) study. The study area aligns with Mayfield Road and extends from Chinguacousy Road in the east to 300 m west of Winston Churchill Boulevard in the west in the City of Brampton and the Town of Caledon, Regional Municipality of Peel, and Town of Halton Hills, Regional Municipality of Halton, Ontario. The purpose of the study is to evaluate improvements to Mayfield Road from Chinguacousy Road to 300 m west of Winston Churchill Boulevard and to identify long term improvements for the horizon year of 2031. A right-of-way (ROW) of 50 m is identified in the Region of Peel's Official Plan. This assessment is being conducted under Schedule 'C' of the Municipal Class EA process (2000, as revised in 2007 and 2011), and in accordance with the Ministry of Tourism and Culture's 2011 document *Standards and Guidelines for Consultant Archaeologists* (*S & G*), administered by the Ministry of Tourism, Culture and Sport (MTCS).

The Stage 1 archaeological assessment determined that 14 archaeological sites have been registered within a 1 km of the Mayfield Road study area. A review of the historical and archaeological contexts of the study area also suggests that it has potential for the identification of Aboriginal and Euro-Canadian archaeological resources.

Based on the results of the property inspection it was determined that the Mayfield Road right-of-way (ROW) is heavily disturbed but there is archaeological potential beyond the ROW limits throughout the length of the study corridor. In light of these results, ASI makes the following recommendations:

1. Sections of the Mayfield Road study area including the frontage of the Alloa Home United Church retain archaeological potential and should be subjected to Stage 2 archaeological assessment;

2. A large portion of the Mayfield Road study area does not retain archaeological potential due to deep and extensive land disturbances. These lands do not require Stage 2 archaeological assessment and can be cleared of further archaeological concern;

3. Small areas of the Mayfield Road study area were documented to be low and wet. These lands do not require Stage 2 archaeological assessment and can be cleared of further archaeological concern; and,

4. Should the proposed work extend beyond the current Mayfield Road study area then further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands

Notwithstanding the results and recommendations presented in this study, ASI notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the MTCS should be immediately notified.

ARCHAEOLOGICAL SERVICES INC.
ENVIRONMENTAL ASSESSMENT DIVISION

PROJECT PERSONNEL

Senior Project Manager:	Lisa Merritt, MSc [MTCS licence P094] *Senior Archaeologist, Assistant Manager, Environmental Assessment Division*
Project Director (licensee):	Paul David Ritchie, MA [MTCS licence P392] *Staff Archaeologist*
Project Manager:	Paul David Ritchie
Project Coordinator:	Sarah Jagelewski, Hon. BA [MTCS licence R405] *Research Archaeologist*
Field Director:	Peter Carruthers, MA CAHP [MTCS licence P163] *Senior Associate*
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Report Reviewer:	Lisa Merritt

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1.0 PROJECT CONTEXT

Archaeological Services Inc. (ASI) was contracted by Hatch Mott MacDonald (HMM) (Mississauga) on behalf of the Regional Municipality of Peel, to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Mayfield Road from Chinguacousy Road to 300 m west of Winston Churchill Boulevard Class Environmental Assessment (EA) study. The study area is aligned with Mayfield Road and extends from Chinguacousy Road in the east to 300 m west of Winston Churchill Boulevard in the west, in the City of Brampton and the Town of Caledon, Regional Municipality of Peel, and in the Town of Halton Hills, Regional Municipality of Halton, Ontario (Figure 1). The purpose of the study is to evaluate improvements to Mayfield Road and to identify long term improvements for the horizon year of 2031. A right-of-way (ROW) of 50 m is identified in the Regional of Peel's Official Plan. This assessment is being conducted under Schedule 'C' of the Municipal Class EA process (2000, as revised in 2007 and 2011).

This assessment was conducted under the project direction and project management of Paul David Ritchie (PIF# P392-006-2013) and the senior project management of Lisa Merritt (P094), both of ASI.

Section 1 of the Ministry of Tourism and Culture's 2011 document *Standards and Guidelines for Consultant Archaeologists* (*S & G*), administered by the Ministry of Tourism, Culture and Sport (MTCS) discusses the objectives of a Stage 1 archaeological assessment as follows:

- To provide information about the geography, history, previous archaeological fieldwork and current land condition of the study area;
- To evaluate in detail the archaeological potential of the study area which can be used, if necessary, to support recommendations for Stage 2 archaeological assessment for all or parts of the study area; and,
- To recommend appropriate strategies for Stage 2 archaeological assessment, if necessary.

This report describes the Stage 1 archaeological assessment that was conducted for this project and is organized as follows: Section 1.0 summarizes the background study that was conducted to provide the archaeological and historical context for the project study area; Section 2.0 addresses the field methods used for the property inspection that was undertaken to document its general environment, current land use history and conditions of the study area; Section 3.0 analyses the characteristics of the project study area and evaluates its archaeological potential; Section 4.0 provides recommendations for the next assessment steps; and the remaining sections contain other report information that is required by the *S & G*, e.g., advice on compliance with legislation, works cited, mapping and photo-documentation.

1.1 Development Context

All activities carried out during this assessment were completed in accordance with the Municipal Engineers' Association document *Municipal Class Environmental Assessment* (2000, as amended in 2007 and 2011), the Ministry of the Environment document *Code of Practice: Preparing, Reviewing and Using Class Environmental Assessments in Ontario* (2009), the *Ontario Heritage Act* (2005), and the *S & G*.

Authorization to carry out the activities necessary for the completion of the Stage 1 archaeological assessment was granted to ASI by HMM (Mississauga) on April 4, 2013.

1.2 Historical Context

This section provides a brief summary of historical research for the Mayfield Road study area. A review of available primary and secondary source material was undertaken to produce a contextual overview of the study area, including a general description of Euro-Canadian settlement and land use. Historically, the study area is aligned with the road allowance between (and impacts upon) Lots 17 and 18 in Concessions 3 to 6 west of Centre Road in the Former Township of Chinguacousy, County of Peel and the road allowance between (and impacts upon) Lots 17 and 18 in Concession 11 in the Former Township of Esquesing, County of Halton.

For the Euro-Canadian period, the majority of early nineteenth century farmsteads (i.e., those which are arguably the most potentially significant resources and whose locations are rarely recorded on nineteenth century maps) are likely to be located in proximity to water. The development of the network of concession roads and railroads through the course of the nineteenth century frequently influenced the siting of farmsteads and businesses. Accordingly, undisturbed lands within 100 m of an early settlement road are also considered to have potential for the presence of Euro-Canadian archaeological sites.

The *S & G* stipulates that areas of early Euro-Canadian settlement (pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches and early cemeteries, are considered to have archaeological potential. Early historical transportation routes (trails, passes, roads, railways, portage routes), properties listed on a municipal register or designated under the *Ontario Heritage Act* or a federal, provincial, or municipal historic landmark or site are also considered to have archaeological potential.

1.2.1 Aboriginal Land Use

The north shore of Lake Ontario has been occupied by Aboriginal peoples since the glaciers began to retreat about 11,000 years B.P. Mobile hunter-gatherers have used the area for resource extraction for thousands of years, as is evidenced by the archaeological sites found in the area listed in Section 1.3.3 of this report. The nearby Credit River Valley would have certainly been a very attractive place for settlement.

The Credit River watershed was populated by since the Paleo-Indian period and extensively populated since the Archaic Period (Smith 2002). Iroquoian speaking people have inhabited the Credit River watershed from between the tenth century BC (Williamson and Pihl 2002: Scott-O'Brien site) until the mid-sixteenth century AD (Hawkins 2004: Emmerson Springs site; Crawford 2003: Wallace site). By the turn of the seventeenth century the north shore of Lake Ontario was devoid of permanent settlement and the Credit River populations are believed to have relocated to join either the Huron-Wendat Nation or the Tionontaté (Petun) Nation (Birch and Williamson 2013).

The contact period for the north shore of Lake Ontario begins in the early seventeenth century with the arrival of French explorers, traders and missionaries. The ancestral Huron-Wendat are thought to have been the main group who controlled the region and the presence of European trade goods is first evident in the mid-sixteenth century where European artifacts start to make an appearance at some ancestral

Huron-Wendat sites. The occurrence of European artifacts on Huron-Wendat sites increases towards the end of the sixteenth century as the interaction between the Huron-Wendat and French explorers, traders, and missionaries continued to increase in frequency and intensity. The Huron were eventually dispersed by the Five Nations Iroquois in 1649 at which point the Seneca mainly took over control of the region (Ramsden 1990).

The Petun were closely related to the Huron-Wendat and lived in the area west of Huronia near present day Collingwood (Ramsden 1990). They were called the Petun after their practice of growing large amounts of tobacco. It is speculated that the Huron-Wendat and the Petun may have formed a single group prior to the seventeenth century given the close similarities of their cultural traditions.

Other than their specialization in growing tobacco, the Petun do not appear to have possessed a single trait that they do not share with Huron-Wendat culture (Garrad and Heidenreich 1978: 394-397). Like the Huron-Wendat, the Petun were sedentary, cultivated the land, and raised corn and tobacco. The Petun also shared the same beliefs as the Huron in sorcery, spirits, curing feats, and other ceremonies.

In 1616 Samuel de Champlain found eight villages occupied by the Petun and mentioned that two more were under construction (Garrad and Heidenreich 1978). By 1639 the Jesuits listed nine Petun villages in addition to a number of smaller settlements. While there is historic information regarding the number of Petun settlements, no information was gathered concerning the size of the Petun nation. It is now estimated that the Petun population neared 3000 by the time of European contact.

Despite waging "cruel wars" against each other, the Petun and the Huron-Wendat were at peace at the time of Champlain's arrival. This alliance included friendship, trade, and mutual help against common enemies. Petun relations were particularly close with the Huron-Wendat Attignawantan group. In the second half of the seventeenth century some Petun, and a large part of the Attignawantan, combined to become the Wyandot tribe, whose territory is located west of Lake Huron. The Petun also maintained strong relationships with the Neutral and Ottawa groups.

The first Europeans to arrive in the area were transient merchants and traders from France and England, who followed Aboriginal pathways and set up trading posts at strategic locations along the well-traveled river routes. All of these occupations occurred at sites that afforded both natural landfalls for Great Lakes traffic and convenient access, by means of the various waterways and overland trails, into the hinterlands. Foremost among these was Fort Rouillé, a small, wooden trading post on the shore of Lake Ontario east of the Humber River, which was built for the purpose of intercepting Aboriginal traders before they could cross the lake to trade with the English on the south shore. Jean Baptiste Rousseau established another substantial trading post at the mouth of the Humber. Early transportation routes followed existing Aboriginal trails, both along the lakeshore and adjacent to various creeks and rivers with the primary North-South route being the Carrying Place Trail, which connected Lake Ontario, via the Humber River and other waterways and trails, to Georgian Bay (ASI 2006).

Beginning in the mid-18th century, the Mississauga replaced the Seneca as the controlling Aboriginal group in the region since the Iroquois confederacy had overstretched their territory between the 1650s and 1670s (Williamson 2008). The Iroquois could not hold the region and agreed to form an alliance with the Mississauga and share hunting territories with them. In the late 1690s, the Mississauga established their settlement of Teiaiagon on the Humber River, which sat astride the most important route of the Toronto Passage. This route connected Lake Ontario with waterways and trails to Georgian Bay and the north and gave the Mississauga a strategic trading position (Williamson 2008). The Mississauga traded with both

the British and the French in order to have wider access to European materials at better prices, and used their strategic position on the Humber to act as trade intermediaries between the British and tribes in the north.

The First Nations occupation in the study area undoubtedly overlapped with the influx of Euro-Canadian settlers. In 1825-26 the Credit Indian Village was established as an agricultural community and Methodist mission near present day Port Credit (Heritage Mississauga 2009a; MNCFN n.d.). By 1840 the village was under significant pressure from Euro-Canadian settlement that plans begun to relocate the settlement. In 1847 the Credit Mississauga were made a land offer by the Six Nations Council to relocate at Grand River. In 1847, 266 Mississauga settled at New Credit, approximately 23 km southwest of Brantford. In 1848 a mission of the Methodist Church was established there by Rev. William Ryerson (WICEC 1985). Although the majority of the County of Peel had been surrendered from the Mississauga by 1856 (Gould 1981), this does not exclude the likelihood that the Mississauga continued to utilise the landscape at large during travel (Ambrose 1982).

The study area falls within the Chinguacousy Township, which is said to have been named by Sir Peregrine Maitland after the Mississauga word for the Credit River, and which signified "young pine." Other scholars assert that it was named in honour of the Ottawa Chief Shinguacose, which was corrupted to the present spelling of 'Chinguacousy,' "under whose leadership Fort Michilimacinac was captured from the Americans in the War of 1812" (Mika and Mika 1977; Rayburn 1997: 68). Part of the land which encompasses Chinguacousy Township was alienated by the British from the Mississauga through a provisional treaty dated October 28, 1818 (Canada 1891: 47).

1.2.2 Township Survey and Settlement

Chinguacousy Township

The land within Chinguacousy Township was acquired by the British from the Mississauga in 1818. The first legal settlers occupied their land holdings in the same year. Chinguacousy was initially settled by United Empire Loyalists who had served during the War of 1812, and by immigrants from England, Scotland and Ireland. The township was originally included within the limits of the Home District until 1849, when the old Upper Canada Districts were abolished. It formed part of the United Counties of York, Ontario and Peel until 1851, when Peel was elevated to independent County status. A provisional council for Peel was not established until 1865, and the first official meeting of the Peel County council did not occur until January 1867. In 1974, part of the township was amalgamated with the City of Brampton, and the remainder was annexed to the Town of Caledon (Armstrong 1985: 142, 152; Mika and Mika 1977: 417-418; Pope 1877: 59; Rayburn 1997: 68; Smith 1846: 32).

Due to the small population of the newly acquired tract, Chinguacousy was initially united with the Gore of Toronto Township for political and administrative purposes. In 1821, the population of the united townships numbered just 412. By 1837, the population of the township had reached an estimated 1,921. The numbers grew from 3,721 in 1842 to 7,469 in 1851. Thereafter the population declined to 6,897 in 1861, and to 6,129 by 1871 (Pope 1877: 59).

The Chinguacousy Township was the largest township in Peel County and was described as one of the best settled townships in the district. It contained excellent, rolling land which was timbered mainly in hardwood with some pine intermixed. The township contained one grist mill and seven saw mills. By 1851, this number had increased to two grist mills and eight sawmills (Smith 1846: 32; Smith 1851: 279).

The principal crops grown in Chinguacousy included wheat, oats, peas, potatoes and turnips. It was estimated that the only township in the province which rivalled Chinguacousy in terms of wheat production at that time was Whitby. Other farm products included maple sugar, wool, cheese and butter (Smith 1851: 279).

Esquesing Township

The land within Esquesing Township was acquired by the British from the Mississauga in 1818. The first township survey was undertaken in 1819, and the first legal settlers occupied their land holdings in the same year. The township is said to have been named from the corruption of a Mississauga word, eshkwessing, signifying "the last in a row" which referred to the Sixteen Mile Creek. Esquesing was initially settled by Loyalists who served during the War of 1812, and by immigrants from England, Scotland and Ireland. By the 1840s, the township was noted for its good farms and excellent land which produced a superior quality of wheat (Armstrong 1985: 143; Rayburn 1997: 114; Smith 1846: 56).

Edmonton

The historical settlement of Edmonton developed at the intersection of Mayfield Road and Hurontario Street, on part Lots 17 and 18, Concessions 1 East and West of Centre Road. The post office was opened in July 1851, with Thomas Watson appointed as the first postmaster. This office was merged with the Snelgrove office in November 1895 (the area is now known as Snelgrove). The community contained churches, one school, two halls, a post office, stores, a carriage factory, blacksmith shops, a harness maker, boot and shoe makers, and one hotel. Edmonton also contained the township hall. The population numbered about 150 in 1873 (Crossby 1873: 109)

Alloa

There is very little information readily available on the history of Alloa. It is shown on the 1877 maps of the northern and southern parts of Chinguacosy Township (Pope 1877). It may have been founded by 1838 (Reed 1982: 1307) however it does not feature in the County of Peel 1837 Directory as a place name (Pope 1877: 74-76). The 1868 *Return of the Elections to the House of Commons* lists 437 voters for the division of Chinguacosy: Alloa (Langevin 1868: 27).

Norval (Norval Station)

This post office village was located near the Credit River and on the Grand Trunk Railway on part Lot 15, Concession 6 West of Centre Road, in Chinguacousy Township. It contained two stores, a telegraph office, woollen, grist and saw mills, and an Episcopal Church. The population in 1873 numbered about 300 (Crossby 1873: 228; Rayburn 1997: 250).

Georgetown

This incorporated village was located along the Credit River on part Lots 17 to 20, Concessions 8 to 10, in Esquesing Township. It was originally settled by George Kennedy in the 1820s. He built a saw and grist mill on Silver Creek, which was sold to the Barber brothers in 1837. The community was originally named "Hungry Hollow," but was renamed Georgetown in honour of George Kennedy in the 1830s. Registered plans of subdivision for this village date from 1854-1859. The village was officially incorporated in 1864 (McDonald 1996: 5-11). Two railways intersected at this point, the Grand Trunk

Railway and the Hamilton and North-Western Railroad (now part of the CNR). The GTR station grounds were located near the centre of Georgetown, and a cemetery lot on Maple Avenue was in existence by 1877. Industries were attracted here due to the availability of water, such as Barber's Georgetown Paper Mills, a knitting machine factory and the Georgetown Carriage Works. It contained Clark's Hotel, a telegraph office, a bank, a brewery, an armoury, fairgrounds, a market square, churches, a town hall, a tannery, an iron foundry, a grist mill, marble works, one weekly newspaper, three hotels and twenty stores. The population in 1873 numbered 1, 282 (Crossby 1873: 125; Rayburn 1997: 131-132; Scott 1997: 87; Winearls 1991: 675).

Glen Williams

This post office village was originally known as Williamsburg. It was named after the Williams family who purchased land here during the 1820s, and owned the saw, grist and woollen mills in the community. It was situated on the Credit River on part Lots 20 to 22, Concessions 9 and 10, in Esquesing Township. When the post office was established here in 1852, the name "Glen William" came into official usage. Williamsburg could not be used, since a post office near Cornwall existed which used that name. The name of this village was changed to "Glen Williams" in 1870. Registered plans of subdivision for this village date from 1864. Some industries were attracted here due to the availability of water, such as the Williams woollen mills and flour and saw mills, a woollen batting factory, a tannery, a shingle factory, and knitting mills. The village contained several hotels, stores, a school, churches, a town hall and a telegraph office. The population in 1873 numbered about 300 (Crossby 1873: 127; Fischer & Harris 2007: 190; McDonald 1996: 70; Rayburn 1997: 137; Scott 1997: 89; Winearls 1991: 677).

Credit Valley Railway

The Credit Valley Railway was constructed between 1877 and 1879. The project was backed by George Laidlaw and was intended to connect Toronto with Orangeville via Streetsville. Construction began in 1874 and over several subsequent years several branches were added to the proposed line. The first section of track from Parkdale (Toronto) to Milton was opened in 1877. The line was completed in 1881 but nearly bankrupted the company. In 1883 the line was taken over by the Canadian Pacific Railway (Heritage Mississauga 2009b).

Grand Trunk Railway

The Grand Trunk Railway Company of Canada was incorporated by the Canadian government in 1852 and was planned to connect Toronto to Montreal. It began in 1853 by purchasing five existing railways: the St. Lawrence and Atlantic Railroad Company, the Quebec and Richmond Railroad Company, the Toronto and Guelph Railroad Company, the Grand Junction Railroad Company, and the Grand Trunk Railway Company of Canada East. By 1853, the Toronto and Guelph Railroad Company had already begun construction of its line. After its merge with the Grand Trunk Railway Company, the line was redirected from its original route and extended to Sarnia to be a hub for Chicago bound traffic. By 1856 the line had been built from Montreal to Sarnia via Toronto. The company fell into great debt in 1861 and while it was saved from bankruptcy by the Canadian government, in 1919 the company was bankrupt following its expansion west in an attempt to compete with the Canadian Pacific and Canadian Northern Railways (Library and Archives Canada 2005).

1.2.3 Historic Map Review

The 1877 *Illustrated Historical Atlas of the County of Halton* and 1877 *Illustrated Historical Atlas of the Country of Peel* were reviewed to determine the potential for the presence of historical features within or abutting the study area during the nineteenth century (Figures 2-4). It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference with regard to the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases.

Historically, the study area is aligned with the road allowance between (and impacts upon) Lots 17 and 18 in Concessions 3 to 6 west of Centre Road in the Former Township of Chinguacousy, County of Peel and the road allowance between (and impacts upon) Lots 17 and 18in Concession 11 in the Former Township of Esquesing, County of Halton.. The available data regarding property owners and historical features gathered from the historic mapping is summarized in Table 1.

Table 1: Mayfield Road – Nineteenth-century property owner(s) and historical features(s)

1877 *Illustrated Historical Atlas of County Peel*			
Lot #	Con #	Property Owner(s)	Historical Feature(s)
17	3-W of Centre Road	Hy: Moody	--
		Jno Dolson	Village of Alloa
	4-W of Centre Road	Jno Dolson	Village of Alloa
		Wm D. Dolson	--
	5-W of Centre Road	Wm D. Dolson	--
		Jos: Mothersill	Orchard; farm house
	6-W of Centre Road	Thos Montgomery (N.R.)	Orchard
		Jno: S. Leslie	Farm house
		Edwd Rice	Orchard; farm house (2)
18	3 W of Centre Road	Pat. McLean	Farm house
		Steph Dolson	Farm house; enclosure; Village of Alloa
	4-W of Centre Road	Aaron Silverthorn	--
		Wm D. Dolson	--
	5-W of Centre Road	Wm D. Dolson	--
		A Dolson	Orchard
	6-W of Centre Road	Jos Leslie	--
		Jno S Leslie	Orchard; farm house
1877 *Illustrated Historical Atlas of County Halton*			
Lot #	Con #	Property Owner(s)	Historical Feature(s)
17	11	Jno. S. Leslie	--
18	11	W.J. Dixon	--

The study area is aligned with the historic thoroughfare Mayfield Road. Historic north-south thoroughfares intersecting the study area include Chinguacousy Road, Creditview Road, Mississauga Road, Heritage Road, and Winston Churchill Boulevard. Transportation and communication networks are important because they serve to integrate social and economic activities between disparate settlement centres. As these settlements grew, and traffic increased between them, toll gates, taverns, hotels and

other services for travellers were established where major transportation routes were crossed. Early overland routes followed the natural topography, avoiding swamps or rocky outcrops. The historic thoroughfares within the study area, however, were opened along the straight survey lines, creating the familiar grid system of lots and concessions.

A series of topographic maps dating from 1909 to 1960 illustrate the development of the study area during the course of the twentieth century. The 1909 map (Figure 5) indicates that Mayfield Road, Chinguacousy Road, Creditview Road, Mississauga Road, Heritage Road and Winston Churchill Boulevard are all unmetalled roads, and that Winston Churchill Boulevard was the County boundary between Peel County and Halton County. The structures of the Village of Alloa are all indicated as of wooden construction. The 'Jos: Mothersill' farm house, the two 'Edwad Rice' farm houses, the 'Pat McLean' farm house and the 'Steph Dolson' farm house are indicated as of wooden constructions. A wooden construction house is also indicated at the approximate location of the 'A Dolson' orchard and may be a newer house. The 'Jno S Leslie' farm house (Lot 18, Concession 6 West of Centre Road) is indicated as being of a stone/brick construction. The 'Jno: S. Leslie' farm house (Lot 17, Concession 6 West of Centre Road) is not indicated on the 1909 map and was probably demolished by 1909.

The 1918 map (Figure 6) indicates that the 'Jos: Mothersill' farm house has now been replaced by a stone/brick construction structure. Also the structure within the Village of Alloa at the southeast corner of the intersection of Creditview Road and Mayfield road is no longer indicated and was likely demolished.

The 1931 map (Figure 7) indicates that Winston Churchill Boulevard, Mayfield Road, Creditview Road south of Mayfield Road, and Chinguacousy Road (south of Mayfield Road) were now hydro electric power corridors.

The 1942 map (Figure 8) indicates that both Winston Churchill Boulevard and Mayfield Road are now gravel secondary (narrow) highways. One of the 'Edwd Rice' farm houses is no longer indicated on the 1942 map and was likely demolished. The structure in the Village of Alloa in the southwest corner of the intersection of Creditview Road and Mayfield Road is no longer indicated and was likely demolished. A new structure is indicated in the southeast corner of the intersection of Creditview Road and Mayfield Road in the Village of Alloa. A church is now indicated in the northeast corner of the intersection of Creditview Road and Mayfield road in the Village of Alloa.

The 1960 map (Figure 9) indicates both Winston Churchill Boulevard and Mayfield Road as loose surface, graded and drained roads not less than 14 ft wide.

1.3 Archaeological Context

This section provides background research pertaining to previous archaeological fieldwork conducted within and in the vicinity of the Mayfield Road study area, its environmental characteristics (including drainage, soils or surficial geology and topography, etc.), and current land use and field conditions. Three sources of information were consulted to provide information about previous archaeological research: the site record forms for registered sites housed at the MTCS; published and unpublished documentary sources; and the files of ASI.

1.3.1 Current Land Use and Field Conditions

A large portion of the study area consists of the existing Mayfield Road ROW however it extends beyond into the adjacent lands. The landscape is rural and the land use is primarily agricultural with some portions of the study area consisting of low density residential lots.

1.3.2 Geography

In addition to the known archaeological sites, the state of the natural environment is a helpful predictor of archaeological potential. Accordingly, a description of the physiography and soils, are briefly discussed for the study area.

The *S & G* stipulates that primary water sources (lakes, rivers, streams, creeks, etc.), secondary water sources (intermittent streams and creeks, springs, marshes, swamps, etc.), ancient water sources (glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, cobble beaches, etc.), as well as accessible or inaccessible shorelines (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.) are characteristics that indicate archaeological potential.

Water has been identified as the major determinant of site selection and the presence of potable water is the single most important resource necessary for any extended human occupation or settlement. Since water sources have remained relatively stable in Ontario since 5,000 BP (Karrow and Warner 1990), proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location.

Other geographic characteristics that can indicate archaeological potential include: elevated topography (eskers, drumlins, large knolls, and plateaux), pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground, distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings. Resource areas, including; food or medicinal plants (migratory routes, spawning areas) are also considered characteristics that indicate archaeological potential (S *&* *G* Section 1.3.1).

The study area is situated within the South Slope physiographic region of southern Ontario in drumlinized till plain. The South Slope region tilts southward from the heights of the Oak Ridges Moraine into the Lake Ontario basin and is a broad, relatively featureless till plain which spans an area of approximately 2300 km^2 (Chapman and Putnam 1984:172-174). The South Slope overlies the limestones of the Verulam and Lindsay Formations, the grey shale of the Georgian Bay Formation and the red shale of the Queenston Formation. Till soils of this physiographic region are more sandy in the east and clayey in the west (Chapman and Putnam 1984:173).

See Figure 10 for Surficial Geology and Figure 11 for Soil Drainage.

Soils within the study area consist of Chinguacousy clay loam, Jeddo clay loam and Oneida clay loam. Chinguacousy clay loam is derived from a parent material which is rather high in limestone as well as shale in effective quantity. The topography of Chinguacousy clay loam is smooth gently sloping with

slight erosion and imperfect drainage. The natural vegetation consists primarily of elm and soft maple with ash and oak. (Hoffman and Richards 1953: 42-43).

Jeddo clay loam is a poorly drained soil with a smooth very gently sloping topography. Natural vegetation includes elm, ash, and cedar. Jeddo clay loam has low phosphate and calcium content which limits fertility (Hoffman and Richards 1953: 44).

Oneida clay loam is a moderately well drained soil with a moderately sloping topography. The soil pH ranges from acidic to basic through the horizon. The soil is friable (Gillespie *et al.* 1971: 46).

Water sources for the Mayfield Road study area include tributaries of Fletcher's Creek, tributaries of Huttonville Creek, and tributaries of the Norval to Port Credit sub-watershed of the Credit River. Fletcher's Creek subwatershed is a major tributary of the Credit River system and has a drainage area of 45 km^2 (Gartner Lee Ltd. 2006: 16). Fletcher's Creek originates in the South Slope physiographic region and transits the Peel Plain towards Lake Ontario meeting its confluence with the Credit River south of the Peel Plain physiographic region.

Huttonville Creek subwatershed is a small tributary of the Credit River system and has a drainage area of 13 km^2 (Totten Sims Hubicki Associates *et al.* 2004: Table 4.6.5). Huttonville Creek originates in the South Slope Physiographic region and meets its confluence with the Credit River in the Peel Plain physiographic region.

The Credit River is approximately 90 km long and its watershed features both Carolinian and Deciduous forests (CVCA n.d.). The watershed drains approximately 1000 km^2 (CVCA 2006). The Credit River's headwaters originate at the Niagara Escarpment, northeast of Orangeville. The river transits the South Slope and Peel Plain physiographic regions until meeting its confluence with Lake Ontario at Port Credit, in the Iroquois Plain physiographic region.

Palaeontological evidence can provide some information on the past environment of the region of the study areas. Isotope studies of Oxygen-18 and Carbon-13 can provide information on past climate conditions. By comparing quantities of Oxygen-18 and Carbon-13 in marl deposits with quantities found in normal meteoric water it is possible to estimate past temperatures and relative humidity. Following the retreat of the glaciers in approximately 12,000 BP, the Brampton area began to warm up. Until approximately 7500 BP the temperature was still below that of modern day and the climate was also very dry. Between 7500 BP and 5800 BP the climate of Brampton remained dry but was approximately 2° C warmer than the modern day. Between approximately 5800 BP and 1500 BP the climate continued to be warmer than the modern day and but was now a very moist climate. After 1500 BP the temperature began to get cooler until the present day climate (Edwards and Fritz 1988).

Pollen cores inform about the vegetation of past environment. By approximately 11,000 BP the Brampton region was predominantly spruce woodland. By approximately 7,000 BP this had transformed into a Pine-Oak forest with some Hemlock and Beech. Between 7,000 BP and 2,000 BP the Brampton region began gradually transitioning into a predominantly deciduous forest of Birch, Maple, Beech and Hemlock (Bernabo and Webb 1976).

East of the Brampton area in the City of Toronto, an antler was recovered from a deposit of channel sand, overlying glacial drift and underlying redeposited glacial clay. The antler is either of extinct *Torontoceros hypogaeus* (Churcher and Peterson 1982) or of caribou *Rangifer tarandus* (Spiess *et al.* 1985). The

specimen was found in association with pollen representing mixed hardwood-conifer forest (Churcher and Peterson 1982). The specimen was burned and yielded a normalized return of 11395 ± 325 (GX-4914) (Canadian Museum of Civilization 2005). Using the program OxCal 4.2, this calibrates to a date of 10, 686 cal BC.

These proxies on the past climate and environment of the region of the Mayfield Road study area indicate that it was a hospitable place for human settlement. The warmer climate and mixed deciduous-coniferous woodland would have been attractive to Aboriginal peoples, both for subsistence and as a comfortable place to live. As a point of comparison, the region of Ancaster to the south has been demonstrated to have been intensively occupied during the Archaic Period, between approximately 10,000 BP and 2800 BP (Ellis *et al.* 1990; Jackson and Morrison 1997; Steiss *et al.* 1997).

1.3.3 Previous Archaeological Research

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (OASD) maintained by the MTCS. This database contains archaeological sites registered within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 km east to west, and approximately 18.5 km north to south. Each Borden block is referenced by a four-letter designator, and sites within a block are numbered sequentially as they are found. The study area under review is located in Borden block *AkGx.*

According to the OASD (MTCS 2013a; 2013b; 2013c) 14 archaeological sites have been previously registered within 1 km of the study area (Table 2).

Of the 14 sites located within 1 km of the study area, three are located within 50 m of the study area. These include:

The **AkGx-38** site is located to the southeast of the intersection of Mayfield Road and Mississauga Road in the north corner of the property. The property consists of an undulating landscape sectioned by two tributaries of the Credit River. The site is a findspot of an incomplete Onondaga chert projectile point reminiscent of Middle Woodland corner-notched points (ASI 2003). The AkGx-38 site was researched in 2002 by Bruce Welsh.

The **AkGx-39** site is located to the southeast of the intersection of Mayfield Road and Mississauga Road in the west corner of the property. The property consists of an undulating landscape sectioned by two tributaries of the Credit River. The site is a findspot of a snub-nosed scraper manufactured from Onondaga chert of indeterminate date (ASI 2003). The AkGx-38 site was research by Bruce Welsh in 2002.

The **Alloa H1** (AkGx-61) is located at the southeast corner of the intersection of Creditview Road and Mayfield Road and is situated within the Mayfield Road study area. The site was discovered by Archeoworks Inc. in 2007. In 2008 Archeoworks Inc. conducted a Stage 3 archaeological assessment of the site. In 2008 Archeoworks Inc. conducted a Stage 4 mitigation of the site. The site has been interpreted to be a homestead based on the domesticity of the artifact assemblage despite initial inferences that the site may have been the historic Troughton Inn (Archeoworks Inc. 2007; 2009).

Table 2: List of previously registered sites within 1 km of the study area

Borden #	Site Name	Cultural Affiliation	Site Type	Researcher
AkGx-3	Wey	Archaic	Undetermined	Spittal 1977
AkGx-8	William Graham	Euro-Canadian	Homestead	Poulton and Borland [DRP&A] 1993
AkGx-10	Bottner	Pre-contact	Findspot	Poulton and Borland [DRP&A] 1992
AkGx-38	-	Middle Woodland	Findspot	Welsh [ASI] 2002
AkGx-39	-	Aboriginal	Findspot	Welsh [ASI] 2002
AkGx-42	Alloa	Middle, Late Archaic; Brewerton Side Notched	Campsite	Cooper [ASI] 2001; Welsh [ASI] 2003
AkGx-43	Alloa	Late Archaic	Findspot	Cooper [ASI] 2002-2003
AkGx-44	The Orth Site	Euro-Canadian	Homestead	Cooper [ASI] 2002-2003
AkGx-46	Alloa General Store	--	--	--
AkGx-47	-	Late Archaic	Findspot	Henry 2005
AkGx-54	-	Euro-Canadian; 19th C. Mid	Homestead; Residential	Hossack [Archaeologix] 2007
AkGx-56	-	Aboriginal; Pre-contact; Pre-1650	Camp; Lithic scatter	Hossack [Archaeologix] 2007
AkGx-61	Alloa H1	Euro-Canadian; 19th C. Mid	Homestead	Slocki 2007; 2009
AkGx-76	-	Euro-Canadian; 1850-1880	Homestead	Power 2011

Archaeologix – Archaeologix Inc.
ASI – Archaeological Services Inc.
DRP&A – D.R. Poulton & Associates

According to the background research, eight other archaeological assessments have been conducted within 50 m of the Mayfield Road study area (AMEC 2012; Archeoworks Inc. 2007; 2009; ASI 2003; 2007; 2008; 2012; 2013). These studies are reviewed below.

ASI (2003) conducted a Stage 1and 2 archaeological assessment of Part of Lot 17, Concession 4, Former Township of Chinguacousy under the project direction of Martin Cooper (MCL CIF# 2001-020-272). The Stage 1 archaeological assessment determined that the study area possessed archaeological potential. The Stage 2 assessment was conducted on November 5-7, 2002. The Stage 2 archaeological assessment identified two isolated precontact sites, AkGx-38 and AkGx-39 as well as two isolated findspots. Consequently, on account of the isolated nature of the AkGx-38 and AkGx-39 sites as well as the two isolated findspots, the study area was considered free of further archaeological concern.

Archeoworks Inc. (2007) conducted a Stage 1 and 2 archaeological assessment of Part of the West Half of Lot 17, Concession 3 W.H.S., City of Brampton, Regional Municipality of Peel under the project

direction of Kim Slocki (PIF# P029-431-2007). The Stage 1 archaeological assessment determined that the study area possessed archaeological potential. The Stage 2 archaeological assessment was conducted on October 18, 2007. The Stage 2 archaeological assessment identified one historic site (AkGx-61). The site was recommended for Stage 3 archaeological assessment and Stage 4 mitigation.

ASI (2007) conducted a Stage 1 archaeological assessment of the Alloa Reservoir, Pumping Station and Feedermain Class EA in the City of Brampton, Region of Peel under the project direction of Robert Pihl (MCL CIF# P243-008-2007). The Stage 1 archaeological assessment determined that the Feedermain routes did not retain archaeological potential. The Alloa Reservoir and Pumping Station sites require Stage 2 archaeological assessment.

ASI (2008) conducted a Stage 1 archaeological assessment of the Creditview Road re-alignment between Bovaird Drive and Mayfield Road in the City of Brampton, Regional Municipality of Peel under the project direction of Robert Pihl (MCL PIF# P057-484-2008). The Stage 1 archaeological assessment determined that while portions of the study area do not require further assessment on account of being disturbed or previously assessed, the remainder of the study area should be subjected to a Stage 2 archaeological assessment.

Archeoworks Inc. (2009) conducted a Stage 3-4 archaeological assessment and mitigation of the Alloa site (AkGx-61) in Part of Lot 17, Concession 3 W.H.S. in the City of Brampton, Regional Municipality of Peel under the project direction of Kim Slocki (PIF# P029-536-2008). The Stage 3 archaeological assessment was conducted in June of 2008. Nine one by one metre units were excavated and 1006 artifacts were recovered. The Stage 4 mitigation was conducted in June and July of 2008. An area of 525 m^2 was mechanically stripped exposing three archaeological features from which 545 artifacts were recovered. The site has been recommended to be considered free of further archaeological concern.

AMEC (2012) conducted a Stage 1 archaeological assessment of Chinguacousy Road between Wanless Drive and Mayfield Road in the City of Brampton under the project direction of Tara Jenkins under the licence of Shaun Austin (PIF# P-141-179-2012). The Stage 1 archaeological assessment determined that the study area retained archaeological potential and recommended that it be subjected to a Stage 2 archaeological assessment.

ASI (2012) conducted a Stage 1 archaeological assessment (background research and property inspection) of the Mayfield Road Class EA between Chinguacousy Road and Heart Lake Road in the Regional Municipality of Peel under the project direction of Lisa Merritt (MTCS PIF# P094-067-2011). The Stage 1 archaeological assessment determined that the Mayfield Road ROW did not retain archaeological potential but that lands beyond the Mayfield Road ROW retained archaeological potential and should be subjected to a Stage 2 archaeological assessment.

ASI (2013) conducted a Stage 1 archaeological assessment (background research and property inspection) of the Victoria Feedermain, Mayfield Road Sub-transmission Main Class EA along Mayfield Road from East of Mississauga Road to Hurontario Street in the Regional Municipality of Peel under the project direction of Paul David Ritchie (MTCS PIF# P392-004-2013). The Stage 1 archaeological assessment determined that the Mayfield Road ROW, Creditview Road ROW, and the Alloa Public School frontage did not retain archaeological potential but that lands beyond these areas retained archaeological potential and should be subjected to a Stage 2 archaeological assessment.

1.3.4 Summary of Archaeological Context

The review of archaeological work conducted in the area demonstrated that 14 archaeological sites have been registered within 1 km of the study area. The registered sites are a mix of pre-contact and historic sites, which reflect the long-term use and settlement of the area.

As discussed in Section 1.3.3 of this report, archaeological potential is associated with the presence of certain topographic features. The study area is located in proximity to tributaries of Fletcher's Creek, Huttonville Creek and the Credit River and is both aligned with and intersected by historic transportation routes. The study area also impacts on the historic settlement of Alloa. The presence of known archaeological sites, watersources, historic transportation routes and historic settlement indicate that the study area has the potential for the recovery of pre-contact and historic archaeological resources.

2.0 FIELD METHODS

The Stage 1 archaeological assessment property inspection was conducted by Peter Carruthers, (P163) of ASI, on May 3, 2013 in order to gain first-hand knowledge of the geography, topography, and current conditions and to evaluate and map archaeological potential of the Mayfield Road study area. It was a visual inspection only and did not include excavation or collection of archaeological resources.

Weather conditions for the inspection were clear and sunny with temperatures of approximately 26^{o}C. Previously identified features of archaeological potential were examined, additional features of archaeological potential not visible on mapping were identified and documented as well as any features that will affect assessment strategies. Field observations are compiled onto maps of the study area in Section 7.0 (Figures 13-16) and associated photographic plates are presented in Section 8.0 (Plates 1-38).

3.0 ANALYSIS AND CONCLUSIONS

The historical and archaeological contexts have been analyzed to help determine the archaeological potential of the study area. This data is presented below in Section 3.1. Results of the analysis of the property inspection are then presented for the Mayfield Road study area.

3.1 Analysis of Archaeological Potential

The *S & G* list characteristics that indicate where archaeological resources are most likely to be found. The study area meets the following criteria indicating archaeological potential:

- Previously identified archaeological sites (e.g. Alloa *AkGx-61*);
- Water sources: primary, secondary, or past water source (e.g. tributaries of the Credit River);
- Areas of Euro-Canadian Settlement (e.g. Alloa);
- Early historic transportation routes (e.g. Mayfield Road)

These criteria characterize the study area as having potential for the identification of Aboriginal and Euro-Canadian archaeological resources.

3.2 Analysis of Property Inspection Results

A large part of the Mayfield Road study area is comprised of ROWs. Typically, a ROW can be divided into two areas: the disturbed ROW, and ROW lands beyond the disturbed ROW. The typically disturbed ROW extends outwards from either side of the centerline of the traveled lanes, and it includes the traveled lanes and shoulders and extends to the toe of the fill slope, the top of the cut slope, or the outside edge of the drainage ditch, whichever is furthest from the centerline. Subsurface disturbance within these lands may be considered deep and extensive, thereby negating any archaeological potential for such lands.

ROW construction disturbance may be found to extend beyond the typical disturbed ROW area, and this generally includes additional grading, cutting and filling, additional drainage ditching, watercourse alteration or channelization, servicing, removals, intensive landscaping, and heavy construction traffic. Areas beyond the typically disturbed ROW generally require archaeological assessment in order to determine archaeological potential relative to the type or scale of disturbances that may have occurred in these zones.

The Mayfield Road study area spans from Winston Churchill Boulevard in the west to beyond Chinguacousy Road in the east. It runs through the historic settlement of Alloa and is intersected by the historic transportation routes of Winston Churchill Boulevard, Heritage Road, Mississauga Road, Creditview Road, and Chinguacousy Road. The Mayfield Road ROW has been subject to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources. Commercial and residential development has also disturbed some of the adjacent landscape. Due to the extent of previous disturbance, the Mayfield Road ROW and portions of the adjacent lands do not exhibit archaeological site potential. No further archaeological assessment is required on these lands (Figures 13-16: areas marked in yellow; Plates 1, 2, 4-27, 29-33, 35-38).

Beyond the disturbed ROW, several areas have remained relatively undisturbed and exhibit archaeological potential. Most of the areas of potential are relatively undisturbed fields that have not been impacted by construction activities or residential frontages. In these areas a Stage 2 archaeological assessment should be conducted in accordance with the *S & G* (Figures 13-16: areas marked in green and purple; Plates 1-13, 18-23, 25, 27-30, 32-38).

Small areas of the Mayfield Road study area have been documented to be low and wet. As per Section 2.1 of the *S & G* such lands do not require Stage 2 archaeological assessment (Figures 13-16: areas marked in blue; Plates 18, 31, 32).

4.0 RECOMMENDATIONS

The Stage 1 archaeological assessment was conducted to assist with the Mayfield Road Class EA study. The assessment determined that 14 sites have been registered within 1 km of the study area. A review of the historical and archaeological contexts of the study area also suggested that it has potential for the identification of Aboriginal and Euro-Canadian archaeological resources. In light of these results, the following recommendations are made:

1. Sections of the Mayfield Road study area including the frontage of the Alloa Home United Church retain archaeological potential and should be subjected to Stage 2 archaeological assessment in accordance with the *S & G* (Figures 13-16: areas marked in green and purple);

2. A large portion of the Mayfield Road study area does not retain archaeological potential due to deep and extensive land disturbances (Figures 13-16: areas marked in yellow). As per Section 1.3.2 of the *S & G* these lands do not require Stage 2 archaeological assessment and can be cleared of further archaeological concern;

3. Small areas of the Mayfield Road study area were documented to be low and wet (Figures 13-16: areas marked in blue). As per Section 2.1 of the *S & G* such lands do not require Stage 2 archaeological assessment and can be cleared of further archaeological concern; and,

4. Should the proposed work extend beyond the current Mayfield Road study area then further Stage 1 archaeological assessment should be conducted to determine the archaeological potential of the surrounding lands

Notwithstanding the results and recommendations presented in this study, ASI notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the MTCS should be immediately notified.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

ASI also advises compliance with the following legislation:

- This report is submitted to the Minister of Tourism, Culture, and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, RSO 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological field work and report recommendations ensure the conservation, preservation and protection of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the MTCS, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

- It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological field work on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act.*

- Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the *Ontario Heritage Act*.

- The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002. c.33 requires that any person discovering human remains must immediately notify the police or coroner.

- The documentation related to this archaeological assessment will be curated by ASI until such a time that arrangements for their ultimate transfer to Her Majesty the Queen in right of Ontario, or other public institution, can be made to the satisfaction of the project owner(s), the Ontario MTCS, and any other legitimate interest groups.

6.0 WORKS CITED

Ambrose, M.T.

1982 *An Archaeological Survey of Highway 407 from Highway 10 to Airport Road (W.P. 87-78-00), Regional Municipality of Peel.*

AMEC

2012 *Original Report: Stage 1 Archaeological Assessment: Road Improvements to Chinguacousy Road (Wanless Drive to Mayfield Road), City of Brampton, Ontario.*

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7.0 MAPS

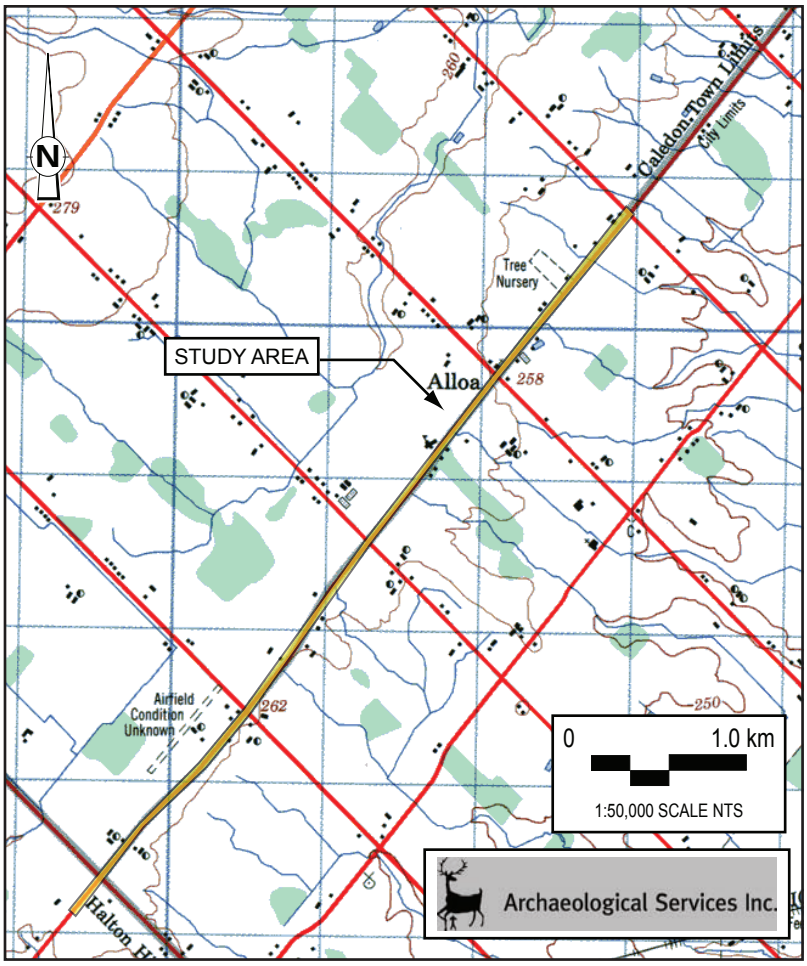


Figure 1: Mayfield Road Study Area (approximate location)

Base map: (NTS 30 M/12)

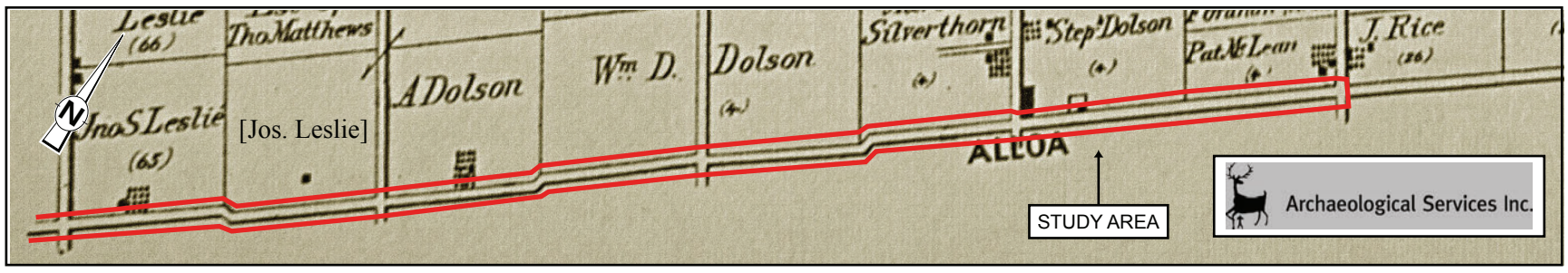


Figure 2: Mayfield Road Study Area (approximate location) overlaid on 1877 map of Northern Part of Chinguacousy Township

Base map: (Pope 1877b)

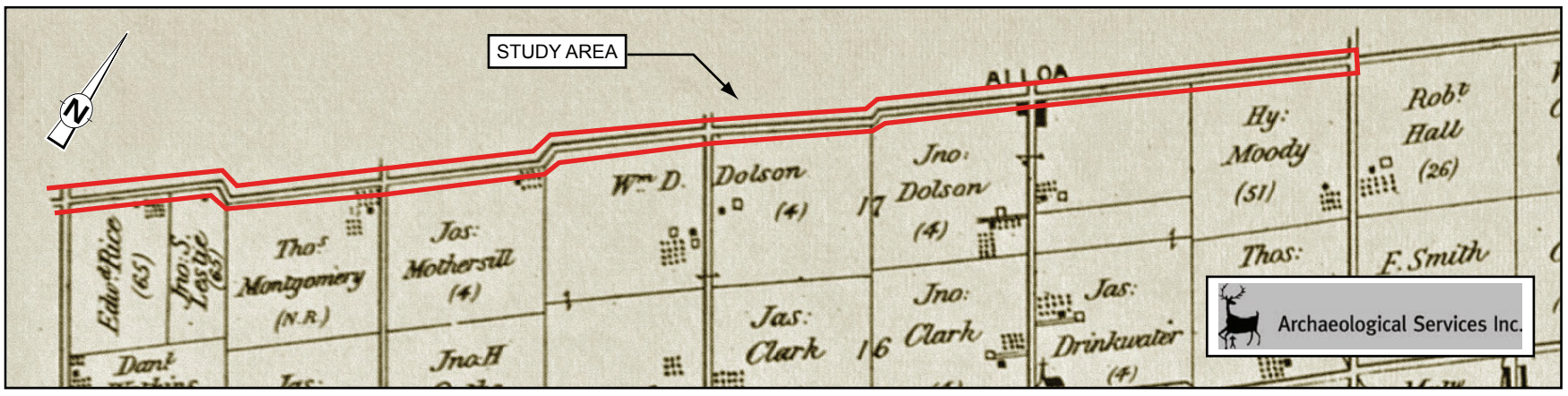


Figure 3: Mayfield Road Study Area (approximate location) overlaid on 1877 map of Southern Part of Chinguacousy Township

Base map: (Pope 1877b)

Figure 4: Mayfield Road Study Area (approximate location) overlaid on 1877 map of the Northern Part of Esquesing Township

Base map: (Pope 1877a)

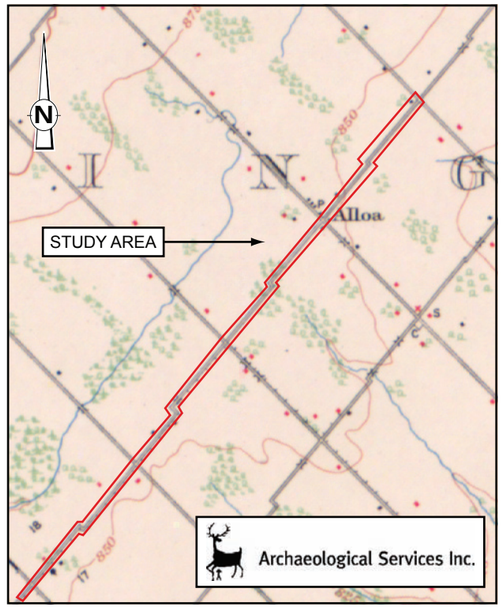


Figure 5: (left) Mayfield Road Study Area (approximate location) overlaid on 1909 map of Brampton

Base map:
(Dept. of Militia and Defence 1909)

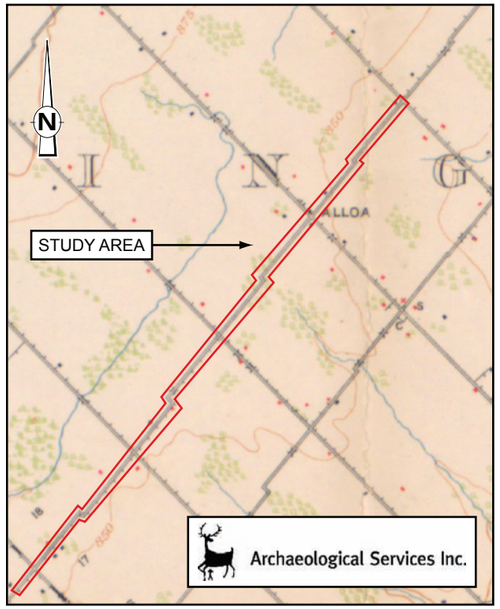


Figure 6: (left) Mayfield Road Study Area (approximate location) overlaid on 1918 map of Brampton

Base map:
(Dept. of Militia and Defence 1918)

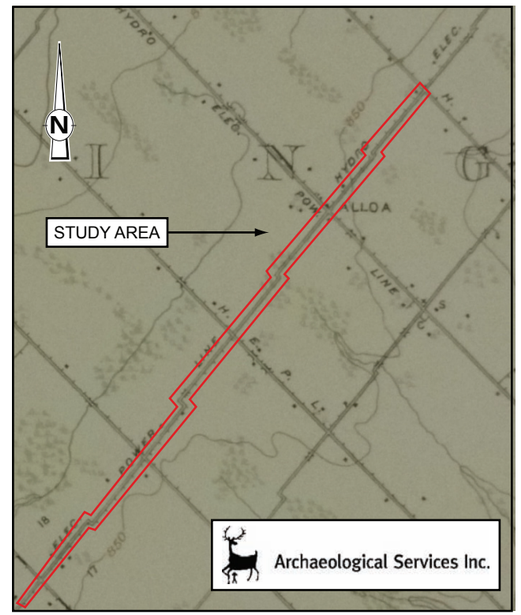


Figure 7: (right) Mayfield Road Study Area (approximate location) overlaid on 1931 map of Brampton

Base map:
(Dept. of National Defence 1931)

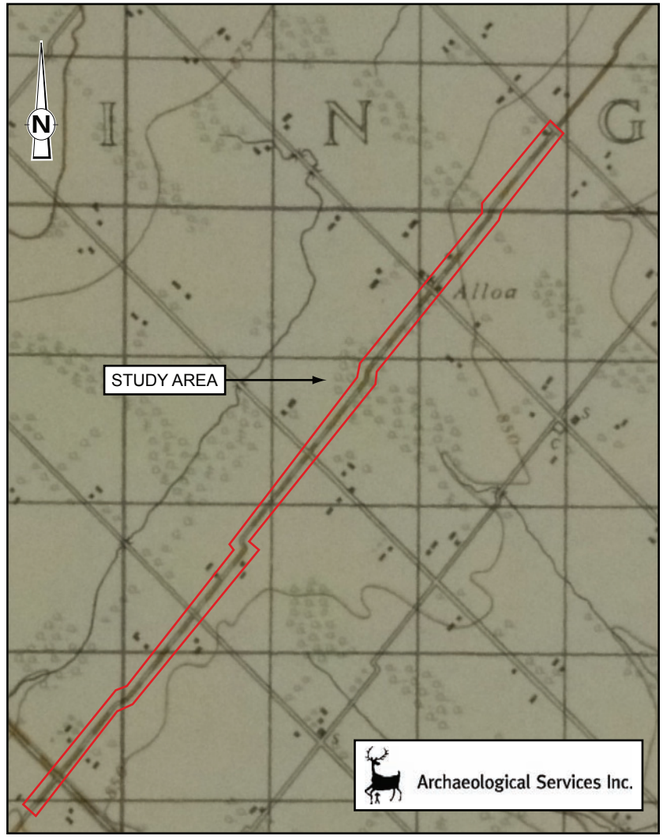


Figure 8: (left) Mayfield Road Study Area (approximate location) overlaid on 1942 map of Brampton

Base map:
(Dept. of National Defence 1942)

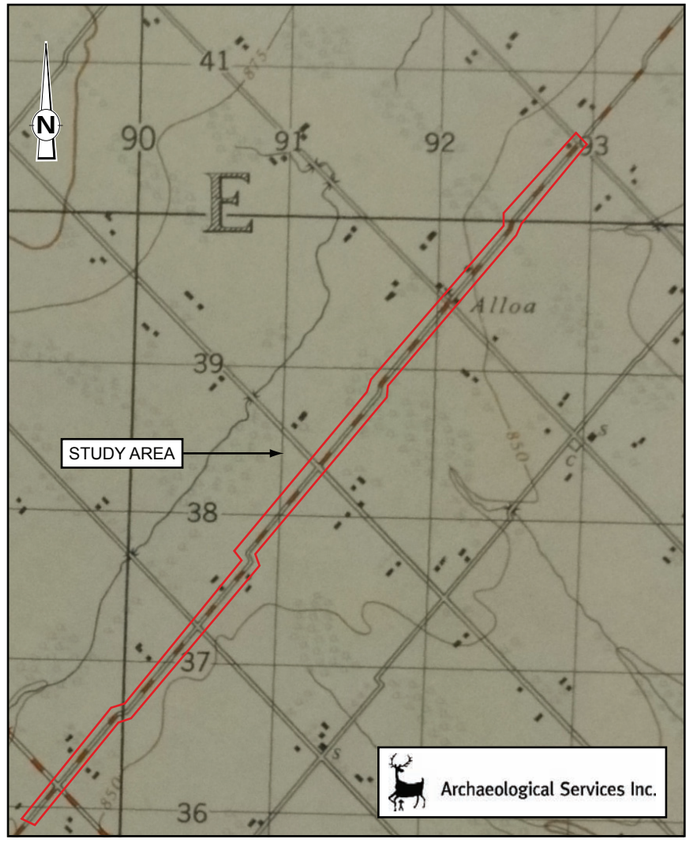


Figure 9: (right) Mayfield Road Study Area (approximate location) overlaid on 1960 map of Brampton

Base map:
(Dept. of National Defence 1960)

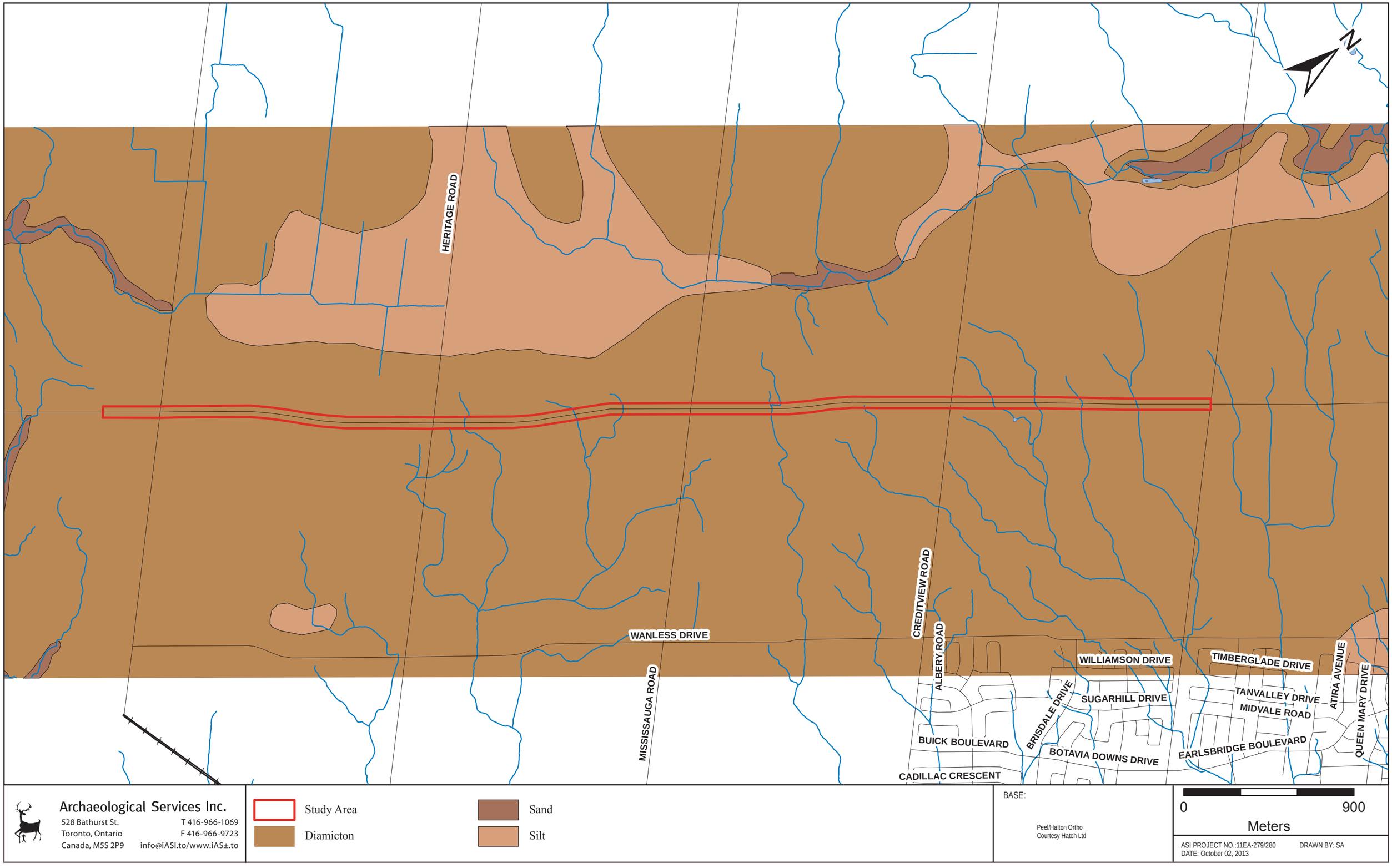
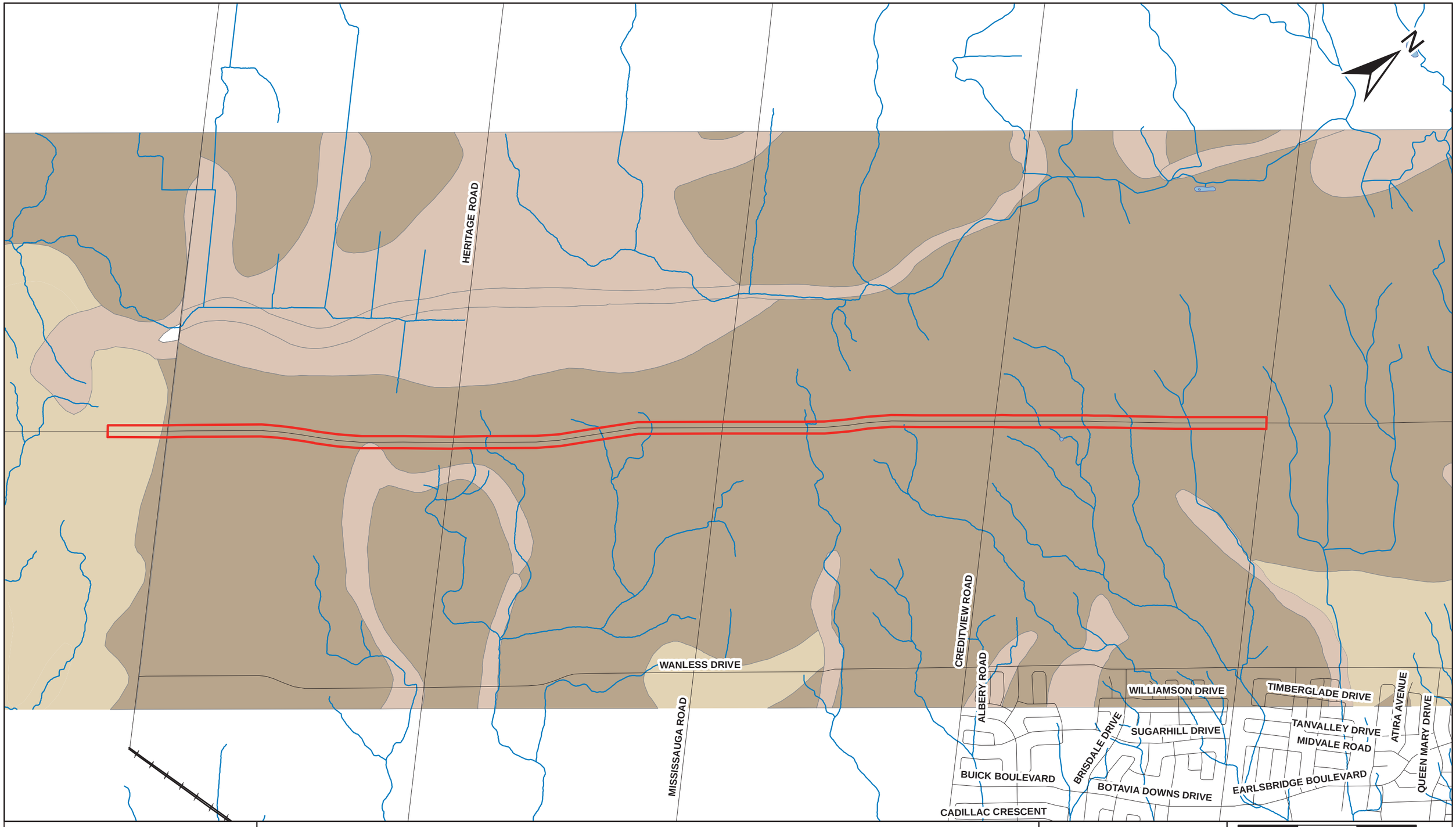


Figure 10: Mayfield Road - Surficial Geology



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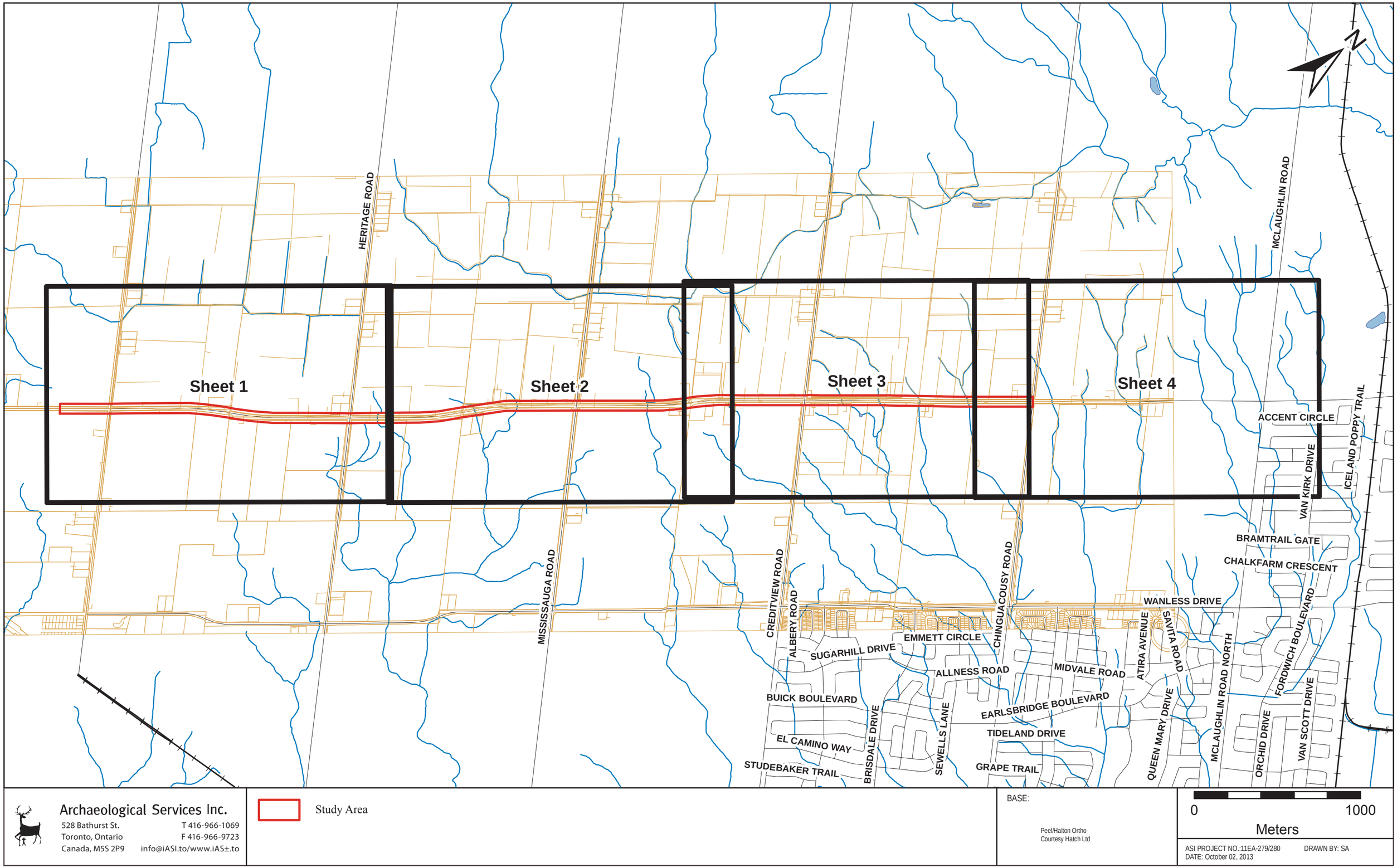
ASI PROJECT NO.:11EA-279/280 DRAWN BY: SA
DATE: October 02, 2013

Figure 11: Mayfield Road - Soil Drainage



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Study Area

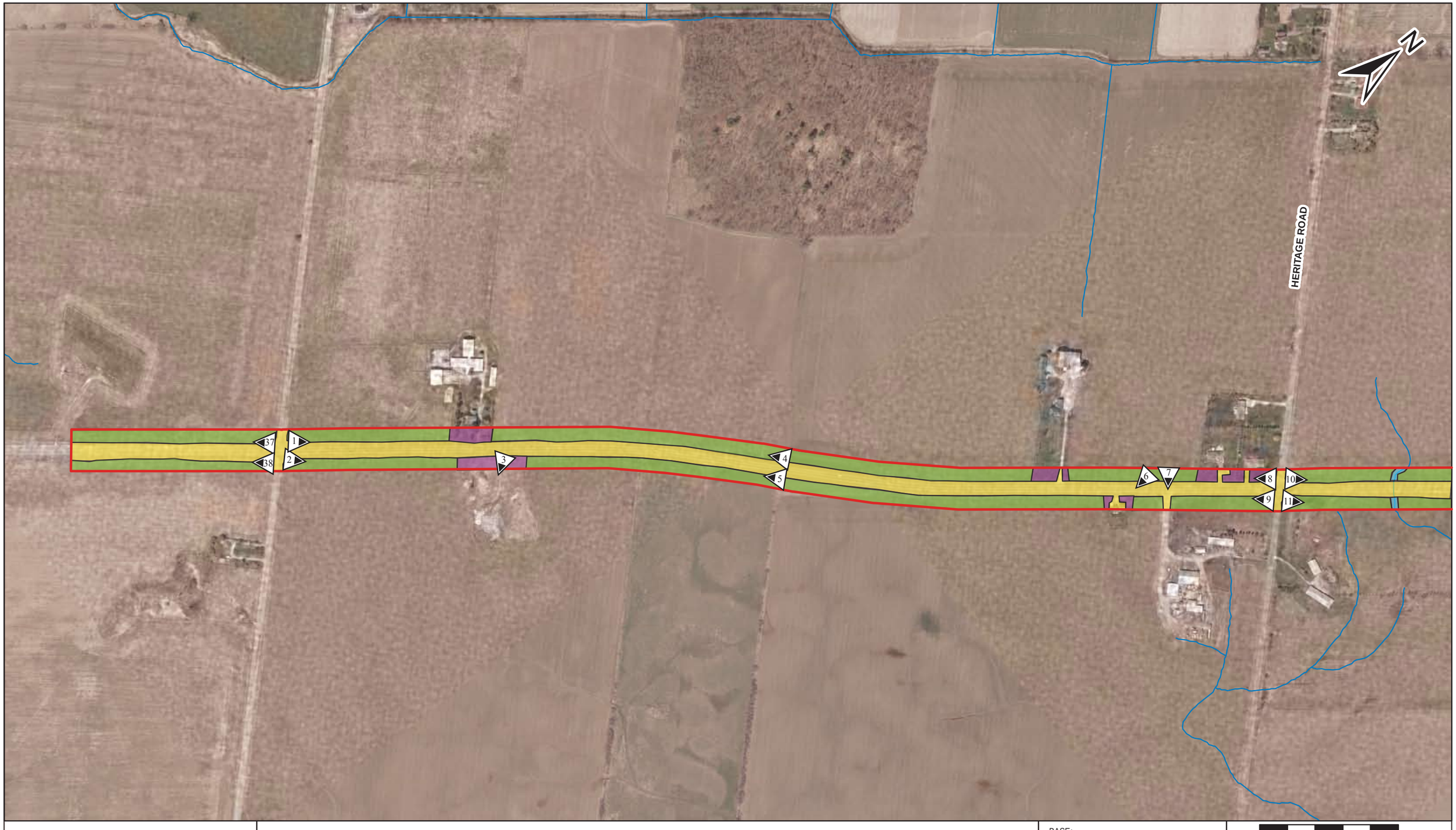
BASE:

Peel/Halton Ortho
Courtesy Hatch Ltd

0 1000
Meters

ASI PROJECT NO.:11EA-279/280 DRAWN BY: SA
DATE: October 02, 2013

Figure 12: Mayfield Road - Property Inspection Results (Key Map)



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Toronto, Ontario F 416-966-9723
Canada, M5S 2P9 info@iASI.to/www.iAS±.to

Study Area

Photographic Plate

Potential (Req. Stage 2 Ped. Survey)

Potential (Req. Stage 2 Test-pit Survey)

No Potential (Disturbed)

No Potential (Low and Wet)

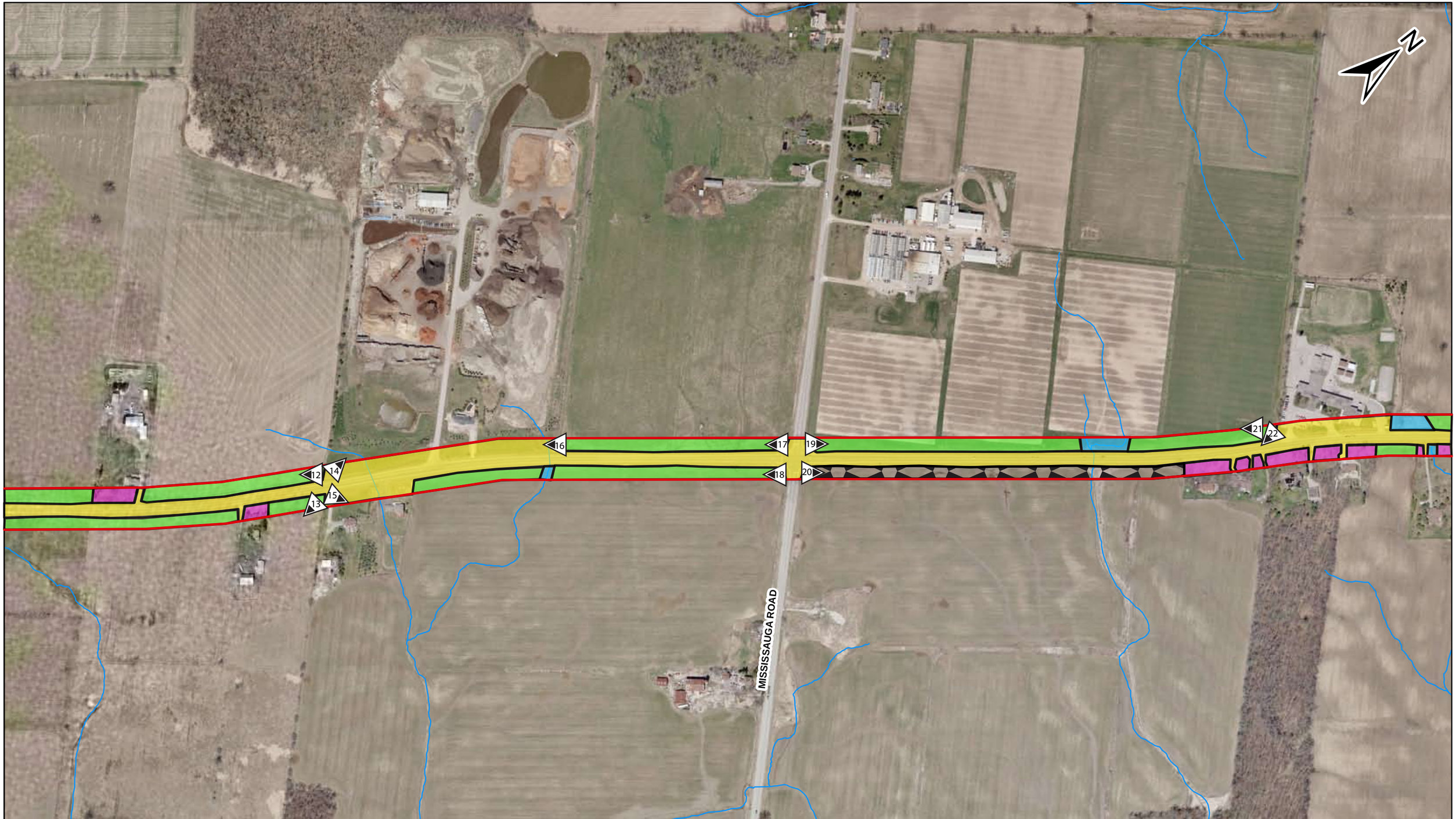
BASE:

Peel/Halton Ortho
Courtesy Hatch Ltd

0 200
Meters

ASI PROJECT NO.:11EA-279/280 DRAWN BY: SA PR
DATE: October 02, 2013

Figure 13: Mayfield Road - Property Inspection Results (Sheet 1)



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Study Area

Previously Assessed (ASI 2003)

Req. Stage 2 AA (Ped. Survey)

Req. Stage 2 AA (Test-pit Survey)

No Potential (Disturbed)

No Potential (Low and Wet)

1 Photographic Plate

BASE:

Peel/Halton Ortho
Courtesy Hatch Ltd

0 200
Meters

ASI PROJECT NO.:11EA-279/280
DATE: Apr 19, 2013

DRAWN BY: BW PR

Figure 14: Mayfield Road - Property Inspection Results (Sheet 2)

CREDITVIEW ROAD

CHINGUACOUSY ROAD

24 23 25 27 29 31 33 34
26 28 30 32

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Study Area

Previously Assessed (Archeoworks Inc. 2007)

Req. Stage 2 AA (Ped. Survey)

Req. Stage 2 AA (Test-pit Survey)

No Potential (Disturbed)

No Potential (Low and Wet)

1 Photographic Plate

BASE:

Peel/Halton Ortho
Courtesy Hatch Ltd

0 200
Meters

ASI PROJECT NO.:11EA-279/280 DRAWN BY: BW PR
DATE: Apr 19, 2013

Figure 15: Mayfield Road - Property Inspection Results (Sheet 3)

Archaeological Services Inc.
528 Bathurst St. T 416-966-1069
Toronto, Ontario F 416-966-9723
Canada, M5S 2P9 info@iASI.to/www.iAS±.to

Study Area

Req. Stage 2 AA (Ped. Survey)

Req. Stage 2 AA (Test-pit Survey)

No Potential (Disturbed)

No Potential (Low and Wet)

1 Photographic Plate

BASE:

Peel/Halton Ortho
Courtesy Hatch Ltd

0 200
Meters

ASI PROJECT NO.:11EA-279/280 DRAWN BY: BW PR
DATE: Apr 19, 2013

Figure 16: Mayfield Road - Property Inspection Results (Sheet 4)

8.0 IMAGES

Plate 1: View northeast along Mayfield Road. Potential beyond fence and disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 2: View northeast along Mayfield Road. Potential in field beyond disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 3: View south from Mayfield Road. Potential. Requires Stage 2 test-pit survey.

Plate 4: View west-southwest along Mayfield Road. Potential beyond disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 5: View west-southwest along Mayfield Road. Potential beyond disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 6: View south across Mayfield Road ROW. Potential around house. Requires Stage 2 test-pit survey.

Plate 7: View southeast across Mayfield Road ROW. Potential on either side of disturbed driveway. Requires Stage 2 test-pit survey.

Plate 8: View southwest view along Mayfield Road across Heritage Road ROW. Lawn has potential. Requires Stage 2 test-pit survey.

Plate 9: View southwest along Mayfield Road. Potential beyond disturbed ROW. Requires Stage 2 test-pit survey.

Plate 10: View northeast along Mayfield Row ROW. Potential beyond disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 11: View northeast along Mayfield Road ROW. Potential beyond disturbed ROW. Requires Stage 2 pedestrian survey and test-pit survey where appropriate.

Plate 12: View southwest along Mayfield Road ROW. Potential beyond disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 13: View south from Mayfield Road. Potential beyond disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 14: View north of Gro-Bark property. Lawn graded. No potential.

Plate 15: View east of residential property. Lawn graded. No potential.

Plate 16: View South-southwest of Gro-Bark property along Mayfield Road ROW. Lawn graded. No potential.

Plate 17: View southwest along Mayfield Road ROW. Field beyond disturbed ROW has potential. Requires Stage 2 pedestrian survey.

Plate 18: View southwest along Mayfield Road ROW. Field beyond disturbed ROW has potential (excluding wet area). Requires Stage 2 pedestrian survey.

Plate 19: View northeast along Mayfield Road. Field beyond disturbed ROW has potential. Requires Stage 2 pedestrian survey.

Plate 20: View northeast along Mayfield Road. Field beyond disturbed ROW has potential. Requires Stage 2 pedestrian survey.

Plate 21: View south-southwest along Mayfield Road. Field beyond disturbed ROW has potential. Requires Stage 2 pedestrian survey.

Plate 22: View south across Mayfield Road ROW. Residential frontages beyond disturbed ROW have potential. Require Stage 2 test-pit survey.

Plate 23: View south across Mayfield Road ROW. Potential beyond disturbed ROW. Requires Stage 2 test-pit survey and pedestrian survey.

Plate 24: View southwest along Mayfield Road ROW. Lawn beyond is graded. No potential.

Plate 25: View south-southwest along Mayfield Road. Potential beyond disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 26: View south-southwest along Mayfield Road. No potential beyond Mayfield Road ROW.

Plate 27: View north-northeast of Alloa Home Church. Avoid impact. Requires Stage 2 test-pit survey.

Plate 28: View east of location of AkGx-61. Site and surrounding area previously assessed (Archeoworks Inc. 2007; 2009).

Plate 29: View southwest along Mayfield Road. Potential beyond disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 30: View southwest along Mayfield Road. Potential beyond disturbed ROW. Requires Stage 2 pedestrian survey.

Plate 31: View west of low and wet area beyond disturbed Mayfield Road ROW. No potential.

Plate 32: View south. Potential beyond disturbed Mayfield Road ROW excluding low and wet swale. Requires Stage 2 pedestrian survey.

Plate 33: View west from Mayfield Road. Transformer station disturbed. Lawn has potential. Requires Stage 2 test-pit survey.

Plate 34: View northwest. Lawn has potential. Requires Stage 2 test-pit survey.

Plate 35: View southwest along Mayfield Road. Potential beyond disturbed ROW. Requires Stage 2 test-pit survey.

Plate 36: View southwest along Mayfield Road. Potential beyond disturbed Row. Requires Stage 2 pedestrian survey.

Plate 37: View southwest along Mayfield Road. ROW is disturbed; no potential. Land beyond ROW has potential. Requires Stage 2 archaeological assessment.

Plate 38: View southwest along Mayfield Road. ROW is disturbed; no potential. Land beyond ROW has potential. Requires Stage 2 archaeological assessment.

Stage 2 Report

STAGE 2 ARCHAEOLOGICAL ASSESSMENT
MAYFIELD ROAD WIDENING
CHINGUACOUSY ROAD TO WINSTON CHURCHILL BOULEVARD
FORMER TOWNSHIP OF CHINGUACOUSY, COUNTY OF PEEL
CITY OF BRAMPTON AND TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL

ORIGINAL REPORT

Prepared for:

Hatch Mott MacDonald
5035 South Service Road, 6th Floor
Burlington, ON L7L 6M9
T: 519.489.4109

Archaeological Licence #P128 (Hull)
Ministry of Tourism, Culture and Sport PIF# P128-0123-2015
ASI File: 15EA-063

30 March 2016

ASI Archaeological & Cultural Heritage Services
528 Bathurst Street Toronto, ONTARIO M5S 2P9
416-966-1069 F 416-966-9723 asiheritage.ca

STAGE 2 ARCHAEOLOGICAL ASSESSMENT
MAYFIELD ROAD WIDENING
CHINGUACOUSY ROAD TO WINSTON CHURCHILL BOULEVARD
(FORMER TOWNSHIP OF CHINGUACOUSY, COUNTY OF PEEL), ONTARIO
CITY OF BRAMPTON AND TOWN OF CALEDON, REGIONAL MUNICIPALITY OF PEEL

EXECUTIVE SUMMARY

Archaeological Services Inc. (ASI) was contracted by Hatch Mott Macdonald to conduct a Stage 2 Archaeological Assessment (Property Assessment) for the proposed Mayfield Road Widening from Chinguacousy Road to west of Winston Churchill Boulevard in the City of Brampton and Town of Caledon, Region of Peel.

A Stage 1 Archaeological Assessment was previously completed to assess the archaeological potential of the study corridor for this project. ASI completed this assessment in 2013 and the results were summarized in a report submitted to the Ministry of Tourism, Culture and Sport (MTCS). The Stage 1 determined that the study corridor remained relatively undisturbed and therefore possessed potential for archaeological resources and a Stage 2 Archaeological Assessment was recommended prior to any ground disturbing activities.

The Stage 2 property assessment was conducted by ASI on November 16, 17, 27, 30 and December 9, 2015 in accordance with the *Ontario Heritage Act* and the *Standards and Guidelines for Consultant Archaeologists* (S & G). The total size of the Stage 2 study corridor is approximately 16.9 ha. Test pit survey at five metre intervals and pedestrian survey at five metre intervals was completed on all lands with archaeological potential, where appropriate, in the study corridor. During the course of the pedestrian survey three historical Euro-Canadian archaeological sites were identified.

The historical Euro Canadian archaeological sites were given the field designation of H1, H2, and H3. Preliminary background research and artifact analysis suggests that the archaeological sites correspond to occupation *circa* 1840-1890; 1830-1880; and 1840-1870, respectively. According to the S & G, sites H1, H2, and H3 each have further cultural heritage value, and as such must be subject to Stage 3 comprehensive archaeological assessments.

PROJECT PERSONNEL

Project Director:	Katherine Hull, PhD (P128) *Senior Archaeologist, Manager* *Historical Archaeology – Environmental Assessment Division*
Senior Project Manager:	Lisa Merritt, MSc (P094) *Senior Archaeologist, Manager,* *Environmental Assessment Projects (East)*
Project Coordinator:	Sarah Jagelewski, Hon BA (R405) *Staff Archaeologist, Assistant Manager* *Environmental Assessment Division*
Field Director:	Katherine Hull
	Stacey Franklin, MA (R435)
Field Archaeologists	Lisa Merritt Poorya Kashani, PhD Emily Wells, MSc (R1092)
Report Preparation:	Sarah Jagelewski
	Paul David Ritchie, MA (P392) *Staff Archaeologist*
Graphics:	Jonas Fernandez, MSc, (R281) *Geomatics Specialist*
	Blake Williams, MLitt (P383) *Geomatics Specialist, Staff Archaeologist*
Artifact Processing	Danielle Bella, Hon BA *Laboratory Technician*
Artifact Analysis	Alexis Dunlop, MSc (R377) *Laboratory Manager*
Report Reviewers:	Katherine L. Hull
	Lisa Merritt

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1.0 PROJECT CONTEXT

Archaeological Services Inc. (ASI) was contracted by Hatch Mott Macdonald (HMM) to conduct a Stage 2 Archaeological Assessment (Property Assessment) for the proposed Mayfield Road Widening from Chinguacousy Road to west of Winston Churchill Boulevard in the City of Brampton and Town of Caledon, Region of Peel (Figure 1).

Following the *Standards and Guidelines for Consultant Archaeologists* (S & G), the objectives are this report are:

- To provide information about the geography, history, previous archaeological fieldwork and current land condition of the study corridor (Stage 1 background study);
- To document all archaeological resources in the study corridor;
- To determine whether the study corridor contains archaeological resources with cultural heritage value or interest (CHVI) that would require further assessment; and,
- To recommend appropriate Stage 3 archaeological assessment strategies for any archaeological sites identified.

This report addresses these objectives in terms of the Project as follows: Section 1.0 first identifies the development context for the Project, then summarizes the historical and archaeological context represented by the Stage 1 background study and property inspection that was previously conducted; Section 2.0 first outlines the field methods employed to conduct the Stage 2 fieldwork, then summarizes the survey results; Section 3.0 documents archaeological resources that were recovered; Section 4.0 provides an analysis on the background research and the fieldwork completed and establishes that the Project area contains archaeological resources with further cultural heritage value or interest; Section 5.0 presents recommendation for the next assessment steps; and the remaining sections contain other report information that is required by the S & G which is administered by the Ministry of Tourism, Culture and Sport (MTCS), such as advice on compliance with legislation, works cited, photo-documentation and mapping.

1.1 Development Context

All work has been undertaken as required by the *Environmental Assessment Act* and the *Municipal Class Environmental Assessment* (October 2000, as amended in 2007 and 2011).

The Stage 2 is being conducted to satisfy recommendations made in the Stage 1 archaeological assessment which was undertaken in 2013 by ASI under PIF P392-006-2013 under the Schedule C Municipal Class EA process.

All activities carried out during this assessment were completed in accordance with the terms of the *Ontario Heritage Act* and the S & G.

Authorization to carry out the activities necessary for the completion of the Stage 2 Archaeological Assessment, including permission to access the study corridor was granted to ASI by HMM on June 22, 2015.

1.2 Historical Context

The purpose of this section, according to the S & G, Section 7.5.7, Standard 1, is to describe the past and present land use and the settlement history and any other relevant historical information gathered through the previous Stage 1 background research and supplemented where necessary. First, a summary is presented of the current understanding of the Aboriginal land use of the study corridor. This is followed by a review of the historical Euro-Canadian settlement history.

The background research (ASI 2014) determined that the study corridor has been occupied by Aboriginal peoples for millennia. The study corridor is located within the traditional territory of the ancestral Huron-Wendat and was subsequently utilised by the Five Nations Iroquois during the mid-late seventeenth century and then by Ojibwa peoples until 1784.

The eighteenth century saw the ethnogenesis in Ontario of the Métis. Métis people are of mixed First Nations and French ancestry, but also mixed Scottish and Irish ancestry as well. The Métis played a significant role in the economy and socio-political history of the Great Lakes during this time. Living in both Euro-Canadian and Aboriginal societies, the Métis acted as agents and sub-agents in the fur trade but also as surveyors and interpreters. Though Métis populations were predominantly located north and west of Lake Superior, they also lived throughout Ontario (Métis Nation of Canada n.d.; Stone and Chaput 1978:607,608).

Historically, the study corridor is located in part of Lots 17 & 18, Concession 3-6 West of Centre Road in the Former Township of Chinguacousy, County of Peel. The background research and historical mapping (ASI 2014) demonstrates that the study corridor is situated within the historical extent of the Village of Alloa and is also in proximity of several historical features. Mayfield Road, Winston Churchill Boulevard, and Chinguacousy Road are also historical transportation routes.

1.3 Archaeological Context

1.3.1 Previous Archaeological Research

According to a 2015 review of the Ontario Archaeological Sites Database (OASD) which is maintained by the MTCS, 14 previously registered archaeological sites are located within one kilometre of the study corridor (MTCS 2015). Details of the sites are summarized in the Stage 1 Archaeological Assessment report (ASI 2014).

Two areas of the Stage 2 study corridor have been previously assessed by The Archaeologists Inc., in 2008. Both assessments were completed on behalf of Melrose Investments Inc. One Stage 2 pedestrian survey was carried out for Parcel #8 of Walness Developments Inc., Part of Lot 17, Concession 3 W.H.S. No artifacts were recovered and the property was considered free of any further archaeological concern (The Archaeologists Inc. 2008a). The second Stage 1-2 assessment was completed on 1367933 Ontario Inc., Part of Lot 17, Concession W.H.S. A pedestrian survey was completed and no artifacts were recovered. The property was considered free of any further archaeological concern (The Archaeologists Inc. 2008b).

A Stage 1 archaeological assessment was completed by ASI in 2014 for the Mayfield Road Widening as part of the Class EA Study and the results were summarized in a report submitted to the MTCS. The Stage 1 determined that the study area had potential for archaeological resources and recommended a Stage 2 assessment prior to any ground disturbing activities (ASI 2014).

1.3.2 Current Land Use and Field Conditions

The study corridor, approximately 16.9 ha in size, is situated on the border between the City of Brampton and the Town of Caledon. Although a large portion of the study corridor consists of the existing Mayfield Road ROW, it extends slightly beyond into the adjacent lands. The landscape is rural and the land use is primarily agricultural with some portions of the study corridor consisting of low density residential lots. The Stage 2 property assessment was conducted under the field direction of Dr. Katherine Hull (P128) and Stacey Franklin (R435), on November 16, 17, 27, 30 and December 9, 2015 in accordance with the *Ontario Heritage Act* and the S & G, Section 2.1.

1.3.3 Physiography

A review of geography indicates that the study corridor includes several water sources (tributaries of Fletcher's Creek, Huttonville Creek and the Credit River). The study corridor includes historic transportation routes, the historic settlement of Alloa as well as being in proximity to several historic features. These criteria are indicative of archaeological potential for the recovery of Aboriginal and Euro-Canadian archaeological resources, depending on the degree to which the natural topography and soils in the study corridor have been disturbed by historic and modern development (ASI 2014).

2.0 FIELD METHODS

As per Section 2.1 of the S & G, all actively or recently cultivated agricultural lands were subjected to pedestrian survey and all unploughable lands were subject to test pit survey at 5 m intervals, including narrow linear survey corridors with a width of 10 m or less.

Pedestrian survey was conducted according to the S & G, Section 2.1.1, Standard 1-6 which prescribes that lands requiring pedestrian survey must be recently ploughed. In heavy clay soils, the survey area must be disked after ploughing to further break the soil clods. Lands to be surveyed must be weathered by one heavy rainfall or several light rainfalls to improve visibility of archaeological resources. Ploughing must be completed deep enough to provide total topsoil exposure but not deeper than previous ploughing. At least 80% of the ploughed ground surface must be visible and survey transects must be at maximum five metres apart.

According to Section 2.1.2(2) of the S & G, any undisturbed areas requiring test pit survey within 300 m of any feature of archaeological potential must be subject to systematic assessment at 5 m intervals. All test pits in this survey were excavated following the S & G Section 2.1.2 Standards 2-9. All test pits were excavated by hand to a minimum of 30 cm in diameter. All test pits were excavated into the first 5 cm of subsoil and examined for stratigraphy, cultural features, and evidence of fill. Test pit fill was screened through 6 mm mesh to facilitate artifact recovery. Afterwards, all test pits were backfilled and their locations were recorded on field maps. If archaeological resources were uncovered, test pit intervals were intensified to a maximum of 2.5 m around the positive test pits to define site boundaries. Any factors that precluded the excavation of test pits (e.g. excessive slope, drainage, exposed bedrock, previous disturbance) were noted, and the areas were mapped and photographed.

In general, undisturbed test pits displayed profiles of dark brown clay loam underlain by light brown clay subsoil approximately 30-40 cm deep. In several areas, test pits demonstrated disturbed soil profiles. These deep and pervasive disturbances were attributed to buried utility installation, landscaping, on-going demolition of residences, and residential development construction.

Some areas were subject to judgmental test-pit survey to confirm previous disturbance according to the S & G, Section 2.1.8, Standards 1 and 2. Any disturbed areas were inspected according to the standards for Stage 1 property inspections. Stage 2 test-pits were placed throughout the disturbed areas according to professional judgement (and where physically viable) to confirm these areas had been completely disturbed.

Approximately 6 ha (36%) of the study corridor was subject to pedestrian survey following the above standards, 1.7 ha (10%) of the study corridor was subject to test-pit survey at five metre intervals following the above standards, 0.4 ha (2%) of the study corridor was subject to judgmental test-pit survey (S & G, Section 2.1.8, Standards 1 and 2), 1.6 ha (9%) were found to have no potential due to deep and pervasive disturbance (S & G Section 2.1, Standard 2b), 1.1 ha (7%) were not assessed due to previous archaeological assessment (ASI 2003, The Archaeologists Inc. 2008a, 2008b), 2.1 ha (12%) requires ploughing prior field survey, while the remaining of the 4 ha (24%) were not assessed due to lack of permission to enter (Table 1). Results of the assessment and the location and direction of each photo are presented in Figures 3-6, and Plates 1-32.

Artifacts with cultural heritage value were recovered during the course of the pedestrian survey.

Table 1: List of Properties Requiring Stage 2 Assessment

Property PIN No.	Type of Survey	
	Test Pit	Pedestrian
25059-0058		x
14361-0021	x	
25058-0122		x
14255-0128	x	
14255-0024	x	
14255-0026	x	
14255-0055		x
14255-0274	x	x
14252-0031	x	

3.0 RECORD OF FINDS

3.1 Site H1

General Site location: Southeast side of Mayfield Road, northeast of Winston Churchill Boulevard. For detailed location information including GPS coordinates and detailed mapping see separate Supplementary Documentation report.

Topography: Site located within a flat agricultural field within the South Slope physiographic region.

Soil Type: Clay loam

Features of Archaeological Potential: Euro-Canadian settlement feature (i.e. historical map feature); early transportation routes (i.e. Mayfield Road)

Site Type: Historical domestic occupation.

Field Conditions: Edge of agricultural field.

Site Size (approximate): 10 m (north-south) x 30 m (east-west).

Assessment Method: Pedestrian survey at five metre intervals.

Density & Distribution: 50 artifacts found in an area of approximately 236 m^2.

Content Summary: A total of 50 artifacts were collected (100% of artifacts were retained/collected). These include: 37 ceramic fragments, six glass fragments, four metal artifacts, one slate artifact and one white ball clay pipe fragment.

General Collection Description: The ceramic assemblage is as follows: 27 fragments of ironstone; two pieces of refined white earthenware (RWE); one fragment of yellow ware; one fragment of buff earthenware; three fragments of coarse red earthenware; one fragment of semi-porcelain; and two sherds of unidentifiable ware type. The identifiable ceramic motifs present in the collection are as follows: one Rockingham; one glazed; two hand-painted (one general and one late palette); one factory slip (cat's eye); two moulded (ribbed/panelled); five unidentified; and 23 undecorated.

One artifact is classified as personal gear and consists of a fragment of a white ball clay smoking pipe.

The remaining artifacts include six glass fragments, including two fragments of window glass and four fragments of an indeterminate container, one writing slate fragment, one indeterminate fragment of plastic, three machine-cut nails, and one ferrous metal spike.

Site Interpretation: The ceramics collected from the site are typical of an 1840-1890 southern Ontario Euro-Canadian assemblage. The artifact assemblage also has the signature of a domestic site given that the artifacts recovered were mainly household objects (i.e. ceramics, glass, nails, etc.). Initial research indicates that the southwest half of Lot 17, Concession 6 West of Centre Road was severed into two parts (45 acres and 55 acres, respectively). Site H1 is situated within the 55 acre parcel. The 100 acres of the southwest half of the lot came into the ownership of Samuel Oney in 1834. Oney retained the 55 acre parcel following its severance in 1842. This part was willed to Edward Rice (Sr.) in 1856. In 1861 the property is listed as owned by the widow Rebecca Oney. In 1871 the property is listed as occupied by Edward Rice (Jr.), Rebecca Oney, and a tenant, James McNaby. Edward Rice (Jr.) owned the property until 1882 when it was sold to Robert Groat (*Abstract Index to Deed Titles*; 1851 *Census Rolls*; 1861 *Census Rolls*; 1871 *Census Rolls; Peel County Land Registry Office Records*). The H1 site is believed to correspond to the northeastern most features indicated on the 1877 historical mapping (Pope 1877).

Has the cultural heritage value or interest been sufficiently assessed and documented in Stage 2: No

Recommendations: Stage 3 assessment is necessary for the H1 site, located on Mayfield Road.

Justification: Meets the requirements of the S & G, Section 2.2, Standard 1 (c).

3.2 Site H2

General Site location: Southeast side of Mayfield Road, northeast of Winston Churchill Boulevard. For detailed location information including GPS coordinates and detailed mapping see separate Supplementary Documentation report.

Topography: Site located within a flat agricultural field within the South Slope physiographic region. .

Soil Type: Clay loam

Features of Archaeological Potential: Euro-Canadian settlement feature (i.e. historical map feature); early transportation routes (i.e. Mayfield Road)

Site Type: Historical domestic occupation.

Field Conditions: Edge of agricultural field.

Site Size (approximate): 10 m (north-south) x 20 m (east-west).

Assessment Method: Pedestrian survey at five metre intervals.

Density & Distribution: Approximately 144 artifacts found in an area of approximately 157 m^2.

Content Summary: A total of 48 artifacts were collected (33.3% of artifacts were retained/collected). These include: 34 ceramic fragments, three glass fragments, nine metal artifacts, and two clay tile fragments.

General Collection Description: The ceramic assemblage is as follows: 10 fragments of ironstone; 14 pieces of refined white earthenware (RWE); one fragment of stoneware; and eight fragments of red earthenware (three refined and five coarse). The identifiable ceramic motifs present in the collection are as follows: three hand painted (two general and one late palette); four transfer print (two general, one Chinese motif, and one flow); one fragment of edgeware (chicken claw); five fragment of spongeware; one fragment of factory slip (banded); two fragments of stamped; three fragments of jetware; five fragments of glazed; seven undecorated fragments; and one unidentifiable fragment.

One artifact is classified as a household furnishing and consists of a porcellaneous fragment of a figurine.

The remaining artifacts include two fragments of clay drainage tile, two fragments of dark green bottle glass, one fragment of unidentifiable container glass, seven machine cut nails, and two wire nails.

Site Interpretation: The ceramics collected from the site are typical of an 1830-1880s southern Ontario Euro-Canadian assemblage. The artifact assemblage also has the signature of a domestic site given that the artifacts recovered were mainly household objects (i.e. ceramics, glass, nails, etc.). Initial research indicates that the southwest half of Lot 17, Concession 6 West of Centre Road was severed into two parts (45 acres and 55 acres, respectively). Site H2 is situated within the 45 acre parcel. The 100-acre southwest half of the lot came into the ownership of Samuel Oney in 1834. Oney severed and sold the 45 acres part to Richard Everson in 1842 (*Abstract Index to Deed Titles)*. The 1859 *Tremaine's Map of County of Peel, Canada West* indicates that the property was owned by Uriah Everson. The 1877 *Illustrated Historical Atlas of County of Peel* map of the southern part of Chinguacousy Township indicates that the property was at that time owned by Jonathan. S. Leslie. The H2 site is believed to correspond to the historical feature indicated on the 1877 historical mapping at the northern corner of the southwest half of Lot 17, Concession 6 West of Centre Road (Pope 1877).

Has the cultural heritage value or interest been sufficiently assessed and documented in Stage 2: No

Recommendations: Stage 3 assessment is necessary for the H2 site, located on Mayfield Road.

Justification: Meets the requirements of the S & G, Section 2.2, Standard 1 (c).

3.3 Site H3

General Site location: Northwest side of Mayfield Road and southwest of Chinguacousy Road. For detailed location information including GPS coordinates and detailed mapping see separate Supplementary Documentation report.

Topography: Site located within a flat agricultural field within the South Slope physiographic region.

Soil Type: Clay loam.

Features of Archaeological Potential: Proximity to Euro-Canadian settlement feature (i.e. historical map feature); early transportation routes (i.e. Mayfield Road and Chinguacousy Road).

Site Type: Historical domestic occupation.

Field Conditions: Edge of agricultural field.

Site Size (approximate): 10 m (north-south) x 30 m (east-west).

Assessment Method: Pedestrian survey at five metre intervals.

Density & Distribution: 160 artifacts found in an area of approximately 157 m^2.

Content Summary: A total of 80 artifacts were collected (50% of artifacts were retained/collected). These include: 67 ceramic fragments, one bone fragment, two glass fragments, and ten white ball clay pipe fragments.

General Collection Description: The ceramic assemblage is as follows: 14 fragments of ironstone; 40 fragments of refined white earthenware (RWE); and 13 fragments of coarse red earthenware. The identifiable ceramic motifs present in the collection are as follows: nine general transfer-print; three edgeware (two general and one straight and unmoulded); two general factory slip; 14 hand painted late palette; one stamped; two moulded (one repeating image and one ribbed or panelled); six spongeware; 11 glazed; and 19 undecorated fragments.

Ten artifacts—fragments of white ball clay smoking pipes with fragmented manufacturer stamps—are classified as personal gear.

The remaining artifacts include one weathered faunal fragment, one window glass fragment, and one unidentifiable aqua container glass fragment.

Site Interpretation: The ceramics collected from the site are typical of an 1840-1870s southern Ontario Euro-Canadian assemblage. The artifact assemblage also has the signature of a domestic site given that the artifacts recovered were mainly household objects (i.e. ceramics, glass, nails, etc.). Initial research indicates that the east half of Lot 18, Concession 3 West of Centre Road was severed into four parts (two 15.2 acre parts, one 20.2 acre part and one 50.4 acre part, respectively). Site H3 is situated within the 50.4 acre parcel. The 100-acre eastern half of the lot came into the ownership of Mary McLean in 1831. In

1859 Patrick McLean severed the property into four parts, retaining 50.4 acres himself. Patrick McLean continued to occupy the property until sometime after 1871 when Nancy McLean sold the property to Stafford Broughton in 1888 (*Abstract Index to Deed Titles;* 1861 *Census Roll*). The H3 site does not correlate with any features on historical mapping (Pope 1877; Tremaine 1859).

Has the cultural heritage value or interest been sufficiently assessed and documented in Stage 2: No

Recommendations: Stage 3 assessment is necessary for the H3 site, located on Mayfield Road.

Justification: Meets the requirements of the S & G, Section 2.2, Standard 1 (c).

3.4 Documentary and Material Record

The documentation related to this archaeological assessment will be curated by ASI until such a time that arrangements for their ultimate transfer to Her Majesty the Queen in right of Ontario, or other public institution, can be made to the satisfaction of the project owner(s), the MTCS, and any other legitimate interest groups.

Table 3 provides an inventory and location of the documentary and material record for the project in accordance with the S & G, Sections 6.7 and 7.8.2.3.

Table 2: Inventory of Documentary and Material Record

Document/Material	Location	Comments
Written Field Notes, Annotated Field Maps, GPS Logs, etc.	Archaeological Services Inc., 528 Bathurst Street, Toronto, ON M5S 2P9	Field notes hard copy, GPS data (digital) [38pages; 16 files]
Field Photography (Digital)	Archaeological Services Inc., 528 Bathurst Street, Toronto, ON M5S 2P9	Stored on ASI network servers and/or CD-ROM [68 files]
Research/Analysis/Reporting Materials (Various Formats)	Archaeological Services Inc., 528 Bathurst Street, Toronto, ON M5S 2P9	Hard copy and/or digital files stored on ASI network servers and/or CD-ROM [three files]
Artifacts	Archaeological Services Inc., 528 Bathurst Street, Toronto, ON M5S 2P9	All stored in a single sealed plastic bag measuring 1 23cm x 30cm

4.0 ANALYSIS AND CONCLUSIONS

4.1 Analysis

At the H1 site, a total of 50 artifacts were recovered during the pedestrian survey. The site measures approximately 10 m x 30 m, and is located adjacent to the Mayfield Road ROW northeast of Winston Churchill Boulevard (Supplementary Documentation Figure 1). The analysis of the artifacts recovered from Site H1 indicates that the site likely represents a *circa* 1840-1890 domestic occupation. The majority of the artifacts recovered are the remains of household objects that feature ceramics with patterns and styles that date to the mid-to-late nineteenth century. No evidence of earlier ware types (such as pearlware or creamware) are present and one fragment of semi-porcelain was identified. When the artifact analysis is combined with the land use history, it seems most probable that this site represents either the household of Edward Rice Jr. or tenant James McNaby. The site's location most likely correlates to the historical feature indicated within/adjacent to the property's orchard (Pope 1877). The nineteenth-century character

of the site requires that it be subject to a Stage 3 assessment according to S & G: Section 2.2, Standard 1(c).

At the H2 site, a total of 48 artifacts were recovered during pedestrian survey. The site measures approximately 10 m x 20 m, and is located adjacent to the Mayfield Road ROW northeast of Winston Churchill Boulevard (Supplementary Documentation Figure 1). The analysis of the artifacts recovered from Site H2 indicates that the site likely represents a *circa* 1830-1880 domestic occupation. The majority of the artifacts recovered are the remains of household objects that feature ceramics with patterns and styles that date to the mid-to-late nineteenth century. When the artifact analysis is combined with the land use history, it seems probable that this site represents the household of landowner Jonathan S. Leslie, who is shown on the 1877 *Atlas*. The home sites of early settlers are considered to be culturally significant and as such must be subject to a Stage 3 assessment according to S & G: Section 2.2, Standard 1(c).

At the H3 site, a total of 160 artifacts were recovered during the pedestrian survey. The site measures approximately 10 m x 30 m, and is located adjacent to the Mayfield Road ROW southwest of Chinguacousy Road (Supplementary Documentation Figure 1). The analysis of the artifacts recovered from Site H3 indicates that the site represents a *circa* 1840-1870s domestic occupation. The majority of the artifacts recovered are the remains of household objects that feature ceramics with patterns and styles that date to the mid-to-late nineteenth century. No evidence of earlier ware types (such as pearlware or creamware) or later ware types (such as semi-porcelain or vitrified white earthenware) are present. When the artifact analysis is combined with the land use history, it seems probable that this site represents a domestic structure associated with Patrick McLean, who is shown on the 1859 map. The home sites of early settlers are considered to be culturally significant and as such must be subject to a Stage 3 assessment according to S & G: Section 2.2, Standard 1(c).

4.2 Conclusions

A Stage 2 Archaeological Assessment was conducted in the study corridor along Mayfield Road from Chinguacousy Road to west of Winston Churchill Boulevard. This assessment consisted of both pedestrian and test pit survey of 8.1 ha of the study corridor. Approximately 1.6 ha were found to have no potential due to deep and pervasive disturbance, the remainder of the project study corridor (4 ha) was not assessed due to lack of permission-to-enter private properties (see Figures 3-6, areas marked in fuchsia).

During the course of the pedestrian survey, three archaeological sites with further cultural heritage value were found. The historical Euro-Canadian archaeological sites were given the field designations of H1, H2, and H3. The sites correspond to occupation circa 1840-1890, 1830-1880 and 1840-1870, respectively. All three sites will require Stage 3 assessment in order to clarify the nature and extent of the cultural deposits.

5.0 RECOMMENDATIONS

In light of the above results, ASI makes the following recommendations:

1. Euro-Canadian Site H1, H2 and H3, identified within the Mayfield Road Widening study corridor, have further cultural heritage value and Stage 3 archaeological assessments are recommended in accordance with the S & G in order to clarify the nature and extent of the cultural deposits, and to aid in the determination of a Stage 4 mitigation strategy, if one is required.

- The Stage 3 archaeological assessments should commence with the creation of a recording grid on a fixed datum, the position of which has been recorded using a GPS. Then, a controlled surface collection must be conducted to precisely define the nature and extent of the sites. This work will require that the site area be re-ploughed and allowed to weather for a least one heavy rainfall prior to commencing this work. The location of each artifact should be mapped with the aid of a tape measure and transit, and a surface map produced for the sites.

- The sites must be then be excavated by hand, placing 1 m square units in a 10 m grid across the sites with an additional units amounting to 40% of the grid total. These will be placed in areas of interest around units of high artifact counts or other significant areas of the site. The test units should be excavated five cm into the sterile subsoil and soil fills screened through six mm wire mesh to facilitate artifact recovery. The sterile subsoil should be trowelled and all soil profiles examined for undisturbed cultural deposits.

2. Sections of the Mayfield Road Widening study corridor were not assessed as part of this Stage 2 Archaeological Assessment because of lack of permission-to-enter (see Table 2). These areas will require Stage 2 archaeological assessment prior to any ground disturbing activities and once PTE is acquired;

3. Should changes to the project design or temporary workspace requirements result in the inclusion of previously un-surveyed lands, these lands should be subject to a Stage 2 archaeological assessment.

Notwithstanding the results and recommendations presented in this study, ASI notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the MTCS should be immediately notified.

6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

In addition, the following advice on compliance is provided:

- This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, RSO 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological field work and report recommendations ensure the conservation, preservation and protection of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the MTCS, a letter will be issued by the Ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development;

- It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such

time as a licensed archaeologist has completed archaeological field work on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*;

- Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the *Ontario Heritage Act*;

- The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33, requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the Registrar of Cemeteries at the Ministry of Consumer Services is also immediately notified; and,

- Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the Ontario Heritage Act and may not be altered, nor may artifacts be removed from them, except by a person holding an archaeological license.

7.0 REFERENCES CITED

Archaeological Services Inc. (ASI)

2003 Stage 1 and 2 Archaeological Assessment of Part of Northwest Brampton Lands Part of Lot 17, Concession 4, W.H.S., (Geographic Township of Chinguacousy), City of Brampton, Regional Municipality of Peel, Ontario. Report on file with MTCS, Toronto.

2014 Stage 1 Archaeological Assessment (Background Research and Property Inspection) Mayfield Road Class Environmental Assessment Chinguacousy Road to West of Winston Churchill Boulevard Regional Municipality of Peel and Regional Municipality of Halton, Ontario. Report on file with MTCS, Toronto.

2016 Stage 2 Archaeological Assessment Mayfield Road Widening, Chinguacousy Road to Winston Churchill Boulevard, Former Township of Chinguacousy, County of Peel, City of Brampton, Town of Caledon, Regional Municipality of Peel – SUPPLEMENTARY DOCUMENTATION

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n.d. *The Métis Nation*. <http://www.metisnation.ca/index.php/who-are-the-metis>

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1978 History of the Upper Great Lakes. In *Handbook of North American Indians*, Volume 15:602-690. Edited by B.G. Trigger. Smithsonian Institute, Washington.

The Archaeologists Inc.
2008a Stage 1&2 Archaeological Assessment of Walness Development Inc., Part of Lot 17, Concession 3 W.H.S., City of Brampton, Regional Municipality of Peel, Ontario [P052-136-2006]. Report on file with MTCS, Toronto.

2008b Stage 1&2 Archaeological Assessment of 1367933 Ontario Inc., Part of Lot 17, Concession 3 W.H.S., City of Brampton, Regional Municipality of Peel, Ontario [P052-132-2006]. Report on file with MTCS , Toronto.

Tremaine, George
1859 *Tremaine's Map of the County of Peel.* George C. Tremaine, Toronto.

Archival and Census Records

Abstract Index to Deed Titles, Chinguacousy Township

1851 *Census Rolls*; Chinguacousy Township

1861 *Census Rolls*; Chinguacousy Township

1871 *Census Rolls;* Chinguacousy Township

1901 *Census Rolls;* Chinguacousy Township

Peel County Land Registry Office Records

8.0 MAPPING

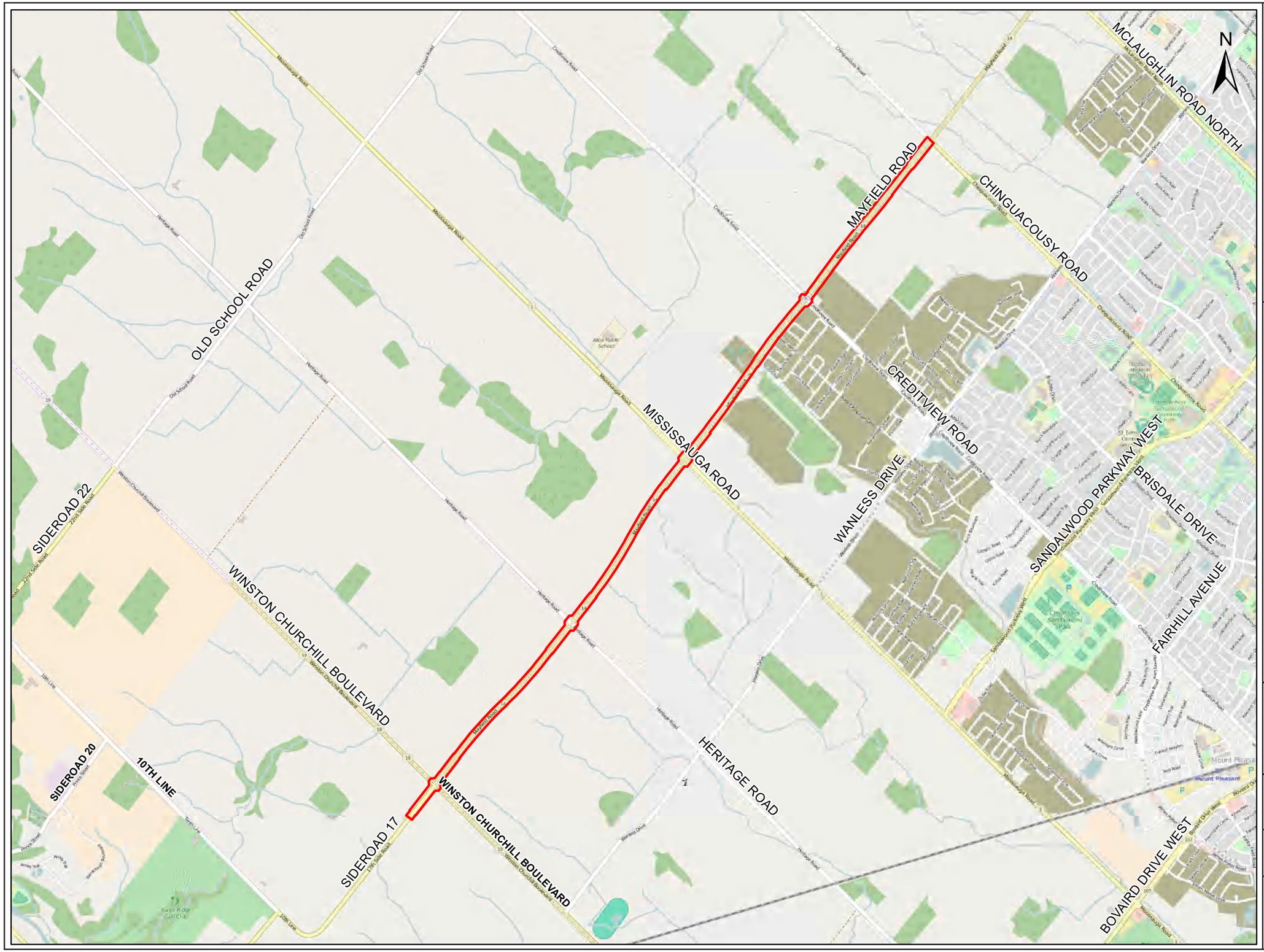
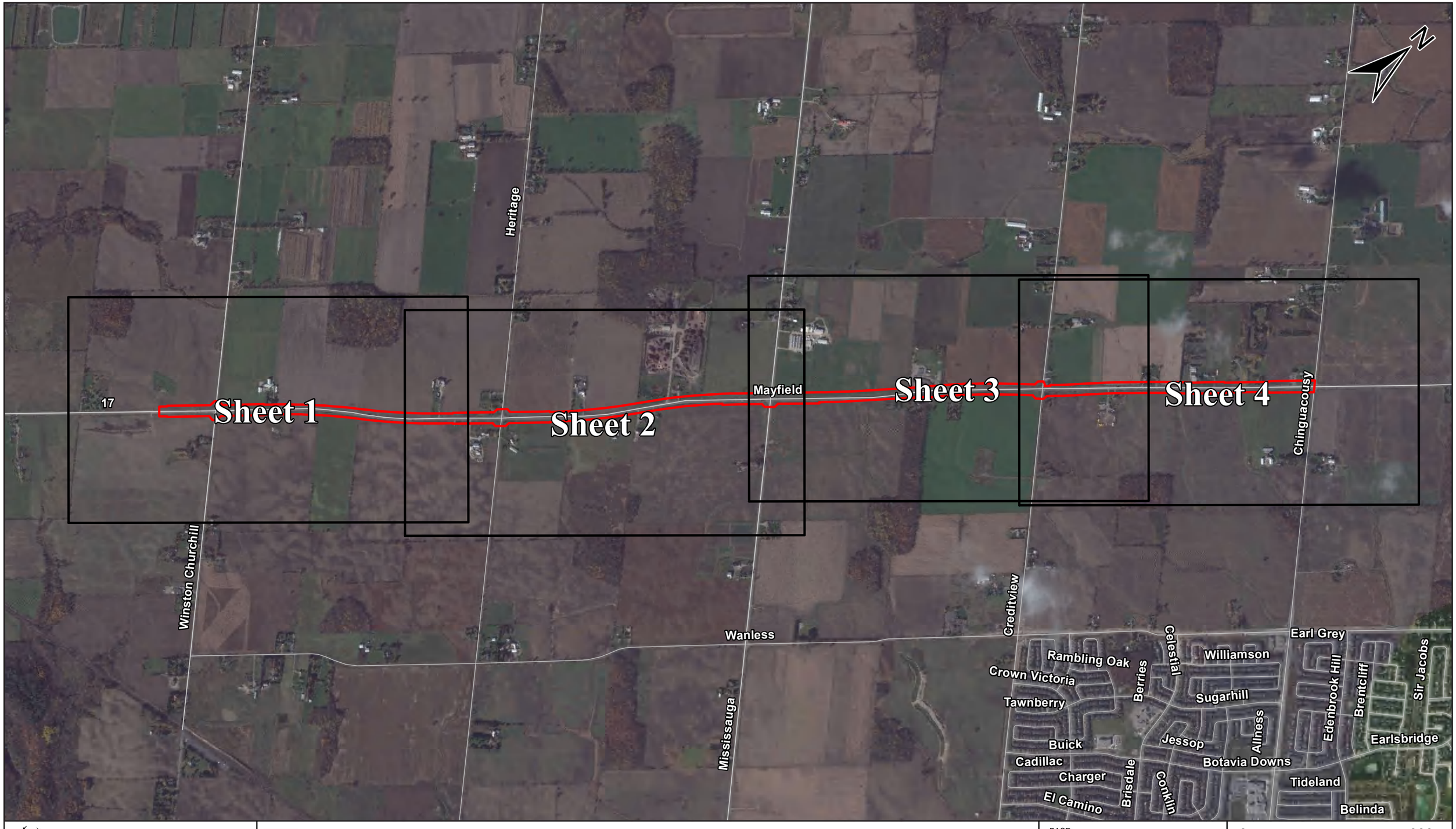


Figure 1: Mayfield Road Widening Study Area Location



Study Area

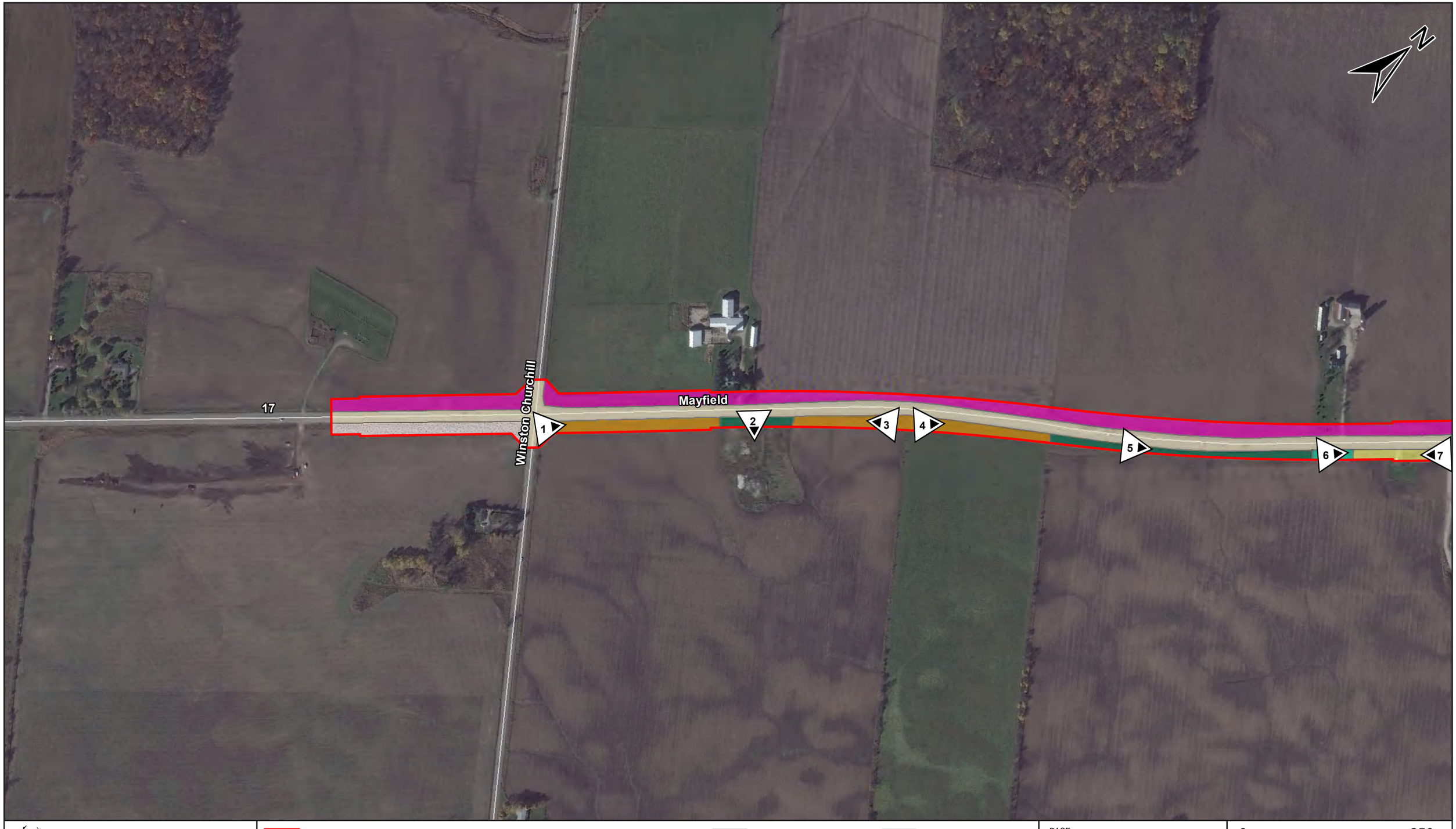
Archaeological & Cultural Heritage Services
528 Bathurst Street Toronto, ONTARIO M5S 2P9
416-966-1069 | F416-966-9723 | asiheritage.ca

BASE:
Ortho
Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 900
Metres

ASI PROJECT NO.: 15EA-063
DATE: 08 Mar 2016
DRAWN BY: BW
FILE: 15EA063_Fig2_KP

Figure 2: Mayfield Road Widening Study Area (Property Assessment Results (Key Map)



Archaeological & Cultural Heritage Services
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416-966-1069 | F416-966-9723 | asiheritage.ca

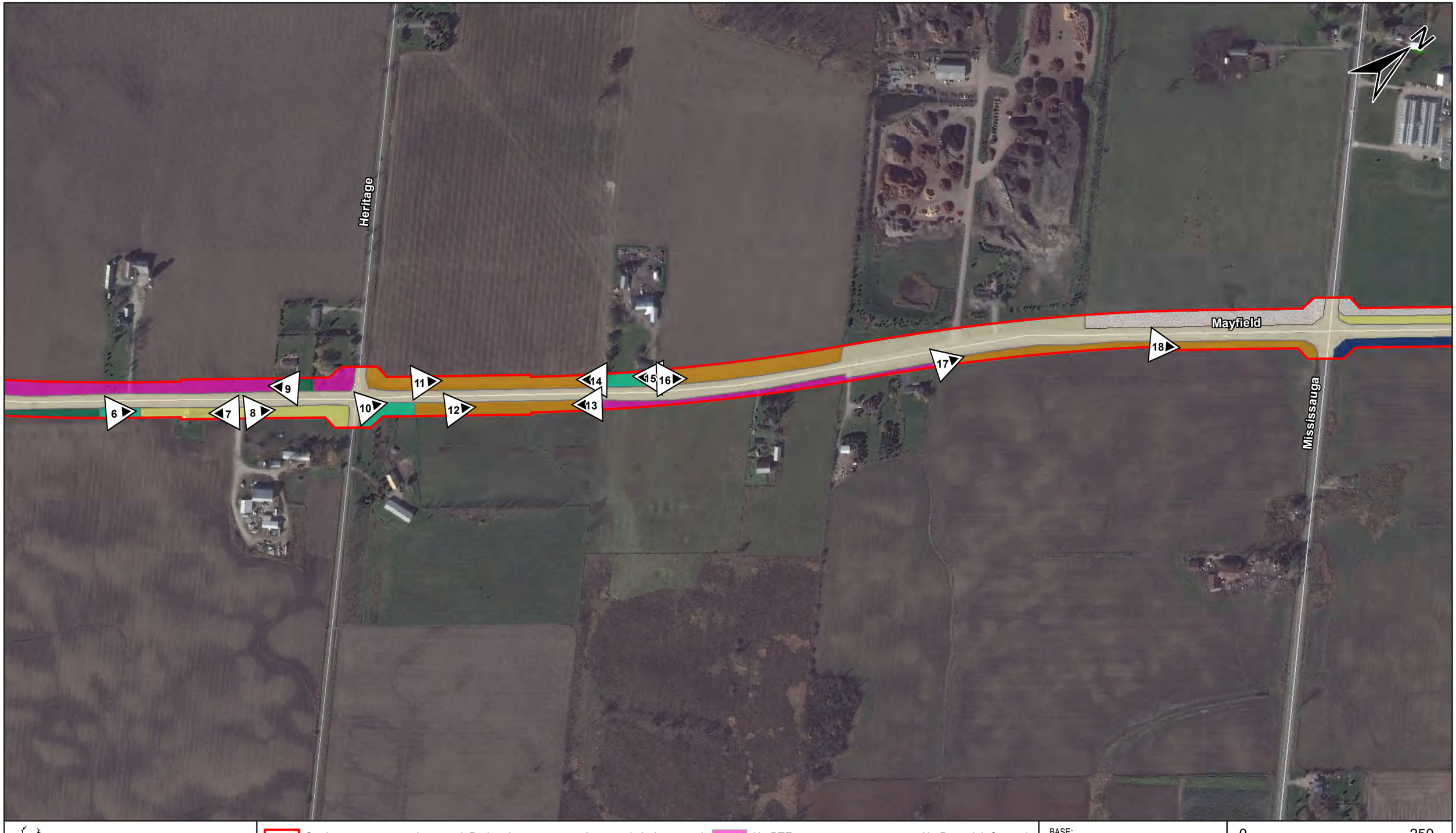
Study
Photo Plate
Assessed: Pedestrian Survey
Assessed: Test Pit Survey
Assessed: Judgemental Test Pit Survey
Disturbed
No PTE
No Potential: Stage 1 (ASI 2014)
Requires ploughing

BASE:
Ortho
Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 250
Metres

ASI PROJECT NO.: 15EA-063
DATE: 24 Mar 2016
DRAWN BY: BW
FILE: 15EA063_Fig3_S1

Figure 3: Mayfield Road Widening Study Area (Property Assessment Results (Sheet 1)



Archaeological & Cultural Heritage Services
528 Bathurst Street Toronto, ONTARIO M5S 2P9
416-966-1069 | F416-966-9723 | asiheritage.ca

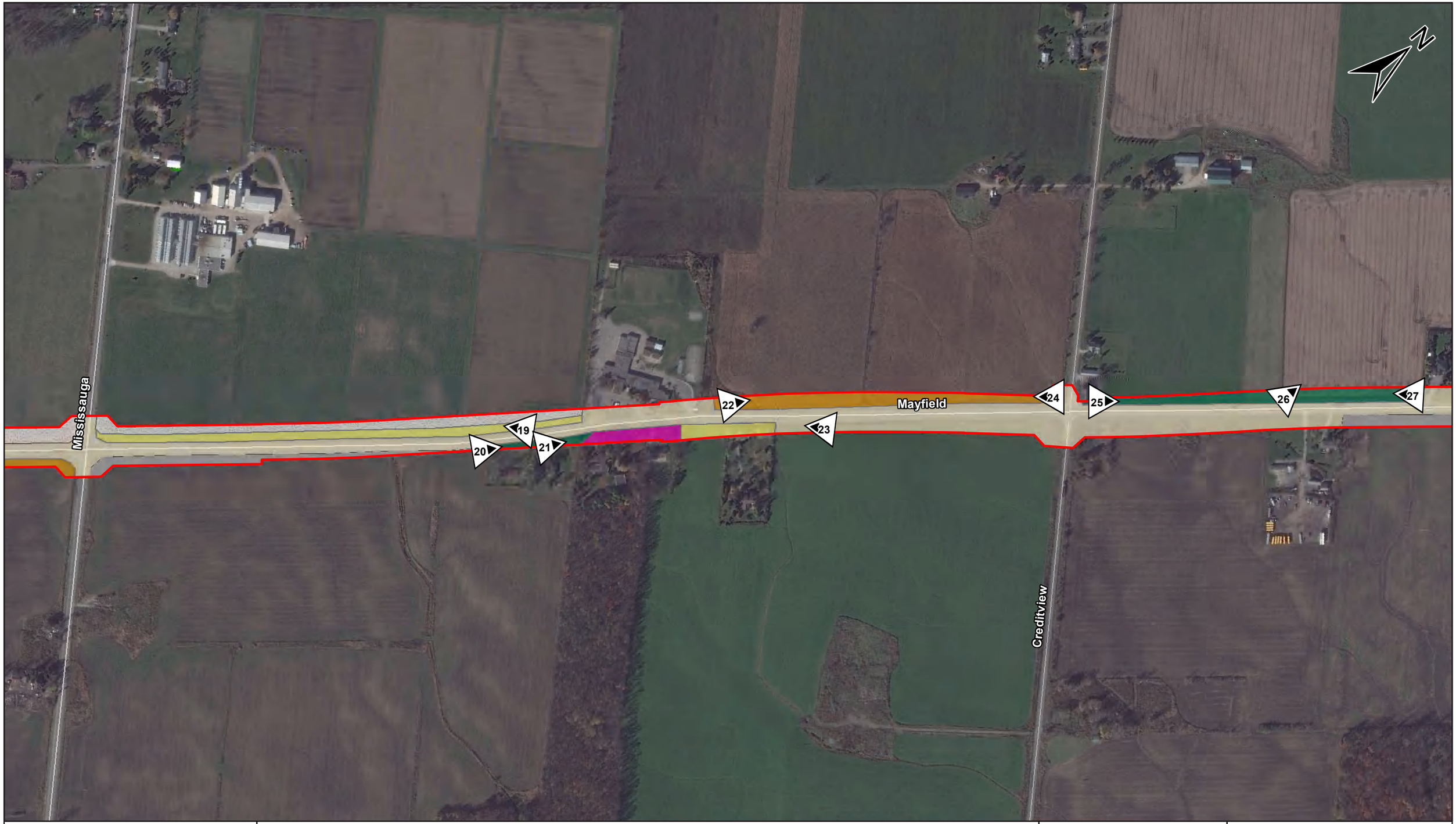
Study
Photo Plate
Assessed: Pedestrian Survey
Assessed: Test Pit Survey
Assessed: Judgemental Test Pit Survey
Disturbed
No PTE
Previously Assessed (ASI 2003)
No Potential: Stage 1 (ASI 2014)
Requires ploughing

BASE:
Ortho
Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 250
Metres

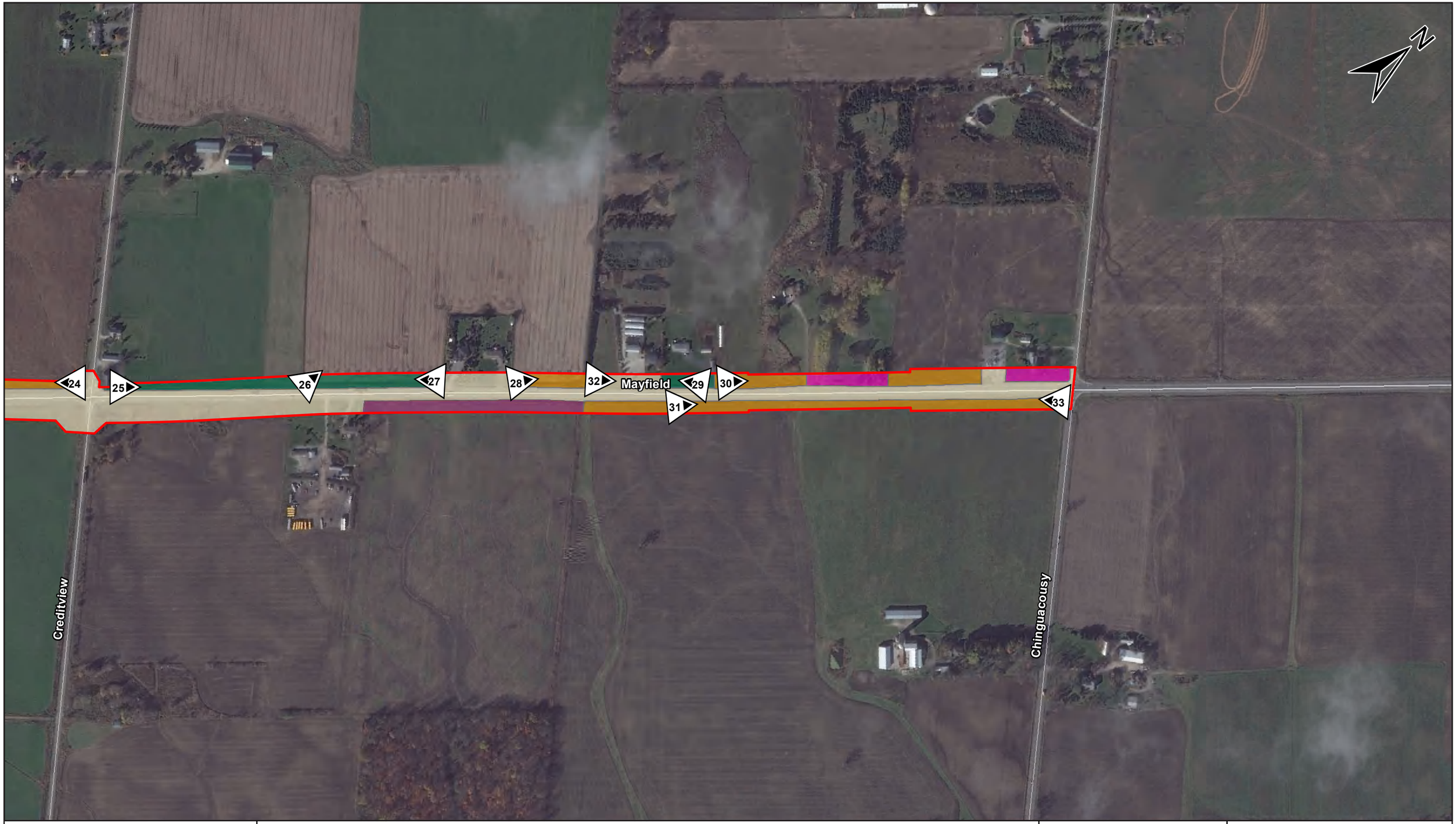
ASI PROJECT NO.: 15EA-063
DATE: 24 Mar 2016
DRAWN BY: BW
FILE: 15EA063_Fig4_S2

Figure 4: Mayfield Road Widening Study Area (Property Assessment Results (Sheet 2)



Archaeological & Cultural Heritage Services
528 Bathurst Street Toronto, ONTARIO M5S 2P9
416-966-1069 | F416-966-9723 | asiheritage.ca

Figure 5: Mayfield Road Widening Study Area (Property Assessment Results (Sheet 3)



Archaeological & Cultural Heritage Services
528 Bathurst Street Toronto, ONTARIO M5S 2P9
416-966-1069 | F416-966-9723 | asiheritage.ca

Study
Photo Plate
Assessed: Pedestrian Survey
Assessed: Test Pit Survey
No PTE
Previously Assessed (The Archaeologists 2008 A+B)
No Potential: Stage 1 (ASI 2014)

BASE:
Ortho
Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 250
Metres

ASI PROJECT NO.: 15EA-063
DATE: 24 Mar 2016
DRAWN BY: BW
FILE: 15EA063_Fig6_S4

Figure 6: Mayfield Road Widening Study Area (Property Assessment Results (Sheet 4)

9.0 IMAGES

Fieldwork Plates:

Plate 1: View NE of study corridor. Lands subject to pedestrian survey at five metre intervals

Plate 2: View SE of study corridor. Lands disturbed with no archaeological potential

Plate 3: View SW of study corridor. Lands subject to pedestrian survey

Plate 4: View NE of study corridor. Lands subject to pedestrian survey

Plate 5: View NE of study corridor. Lands subject to test-pit survey

Plate 6: View NE of study corridor. Lands subject to judgmental test-pit survey to confirm disturbance.

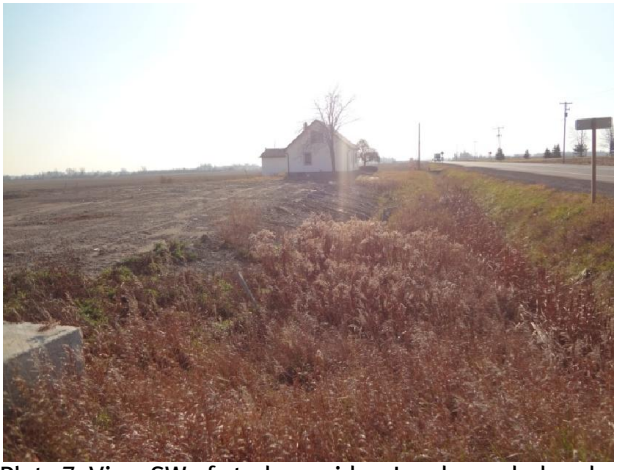


Plate 7: View SW of study corridor. Lands graded and disturbed with no archaeological potential.

Plate 8: View NE of study corridor Lands graded and disturbed with no archaeological potential.

Plate 9: View SW of study corridor. Lands assessed by test-pit survey

Plate 10: View NE of study corridor. Lands assessed by judgmental test-pit survey to confirm disturbance.

Plate 11: View NE of study corridor. Lands assessed by pedestrian survey

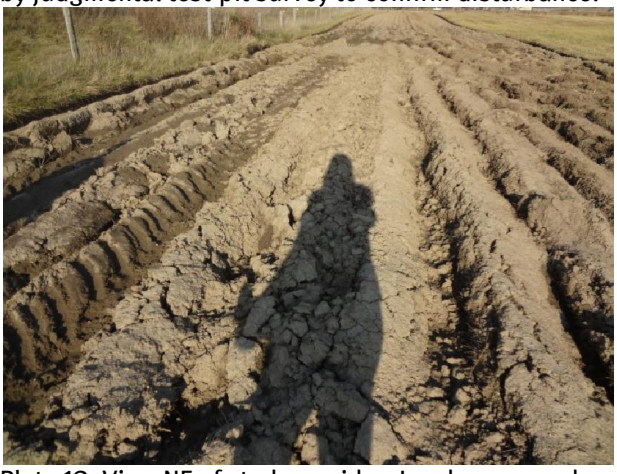


Plate 12: View NE of study corridor. Lands assessed by pedestrian survey

Plate 13: View SW of study corridor. Lands assessed by pedestrian survey

Plate 14: View SW of study corridor. Lands assessed by pedestrian survey

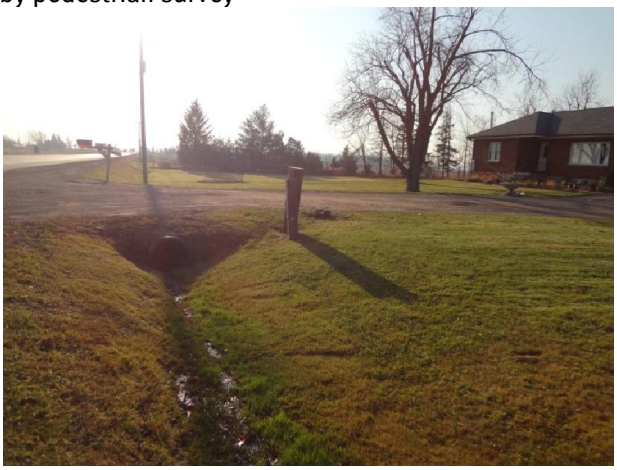


Plate 15: View SW of study corridor. Lands assessed by judgmental test-pit survey

Plate 16: View NE of study corridor. Lands assessed by pedestrian survey

Plate 17: View north of study corridor. Lands assessed by pedestrian survey

Plate 18: View NE of study corridor. Lands assessed by pedestrian survey

Plate 19: View SW. Lands in foreground and middle ground are graded and disturbed by installation of utilities – no potential. Lands beyond possess archaeological potential – Stage 2 pedestrian survey required

Plate 20: View NE of study corridor. Lands assessed by test-pit survey

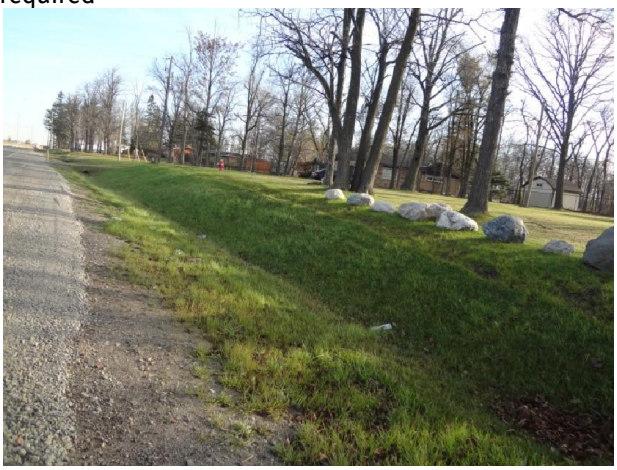


Plate 21: View NE of study corridor. Lands are graded and disturbed and possess no potential

Plate 22: View NE of study corridor. Lands assessed by pedestrian survey

Plate 23: View SW of study corridor. Lands are graded and disturbed with no archaeological potential

Plate 24: View SW of study corridor. Lands assessed by pedestrian survey

Plate 25: View NE of study corridor. Lands assessed by test-pit survey and complimented by pedestrian survey

Plate 26: View of culvert. Lands adjacent to culvert assessed by test-pit survey at five metre intervals

Plate 27: View SW of study corridor. Lands assessed by test-pit survey complimented by pedestrian survey

Plate 28: View NE of study corridor. Lands assessed by pedestrian survey

Plate 29: View SW of study corridor. Lands assessed by test-pit survey

Plate 30: View NE of study corridor. Lands assessed by pedestrian survey

Plate 31: View NE of study corridor. Lands assessed by pedestrian survey

Plate 32: View NE of study corridor. Lands assessed by pedestrian survey

Plate 33: View SW of study corridor. Lands assessed by pedestrian survey

Artifact Plates:

Plate 34: Assorted mid nineteenth-century ceramic wares and smoking pipe stem from H1.
Top (left to right): coarse red earthenware, hand painted ironstone; white ball clay smoking pipe stem. Middle (left to right): late palette RWE; hand painted ironstone. Bottom (left to right): one sherd of plain yellowware; four fragments of ironstone.

Plate 35: Tools, Equipment and Architectural items from H1.
From left: slate tablet fragment; two machine-cut nails.

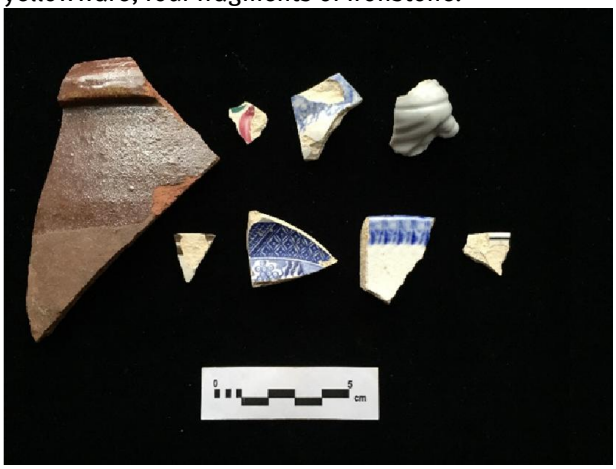


Plate 36: Assorted mid nineteenth-century ceramic wares from H2.
Top left to right: coarse red earthenware; late palette RWE; sponge-decorated RWE; porcellaneous figurine fragment. Bottom left to right: hand painted RWE; Willow pattern printed ironstone; straight edge-decorated ironstone; and hand painted RWE saucer rim sherd.

Plate 37: Machine-cut nails from H2.

Plate 38: Assorted mid nineteenth-century ceramic wares from H3.
Top left to right: coarse red earthenware pot rim; late palette RWE; moulded ironstone; sponge-decorated RWE. Bottom left to right: purple printed RWE rim; red printed RWE rim; transfer-printed ironstone; edge-decorated RWE.

Plate 39: Assorted mid nineteenth-century smoking pipe stems from H3.
Top: impressed mark “[M[URRA_[Y]” “[G]LASGOW.” Middle: impressed mark “BANN[ERMAN]” “[M]ONTREAL.” Bottom: undecorated stem/bowl junction.

Appendix A: Artifact Catalogues

Artifact Catalogue for H1 Site

Cat. #	Context	Qty	Class	Subclass	Type	Material	Ceramic Ware	Ceramic Form	Ceramic Motif	Portion	Colour	Comments
1	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Buff Earthenware	Hollowware	Rockingham	Body	Brown	
2	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Yellow Ware	Hollowware	Undecorated	Body		
3	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Body	Light Brown	
4	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Hand Painted - General	Body	Pink	Hotel-ware -like motif.
5	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Unidentified	Rim	Blue	Blue along rim edge. Possibly edgeware.
6	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Hand Painted - Late Palette	Rim	Pink	
7	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Hollowware	Factory Slip - Cat's Eye	Body	Blue and Black	Impressed line horizontally. Blue oval shaped partial blob with black interior.
8	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	Unidentifiable	Flatware	Unidentified	Body		Completely exfoliated.
9	Surface	2	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Unidentified	Body		Completely exfoliated.
10	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Hollowware	Undecorated	Footring		Base and foorting - likely for a serving bowl.
11	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Hollowware	Moulded - Ribbed or Panelled	Rim		Panelled motif.
12	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Undecorated	Rim		
13	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Undecorated	Base		
14	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Hollowware	Undecorated	Body		Spot for handle attachment. Likely a teapot or pitcher.
15	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Undecorated	Brink		
16	Surface	16	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Undecorated	Body		
17	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Semi-porcelain	Hollowware	Undecorated	Body		
18	Surface	1	Indeterminate	Indeterminate	Container - Unidentifiable	Glass				Body	Dark Olive Green	
19	Surface	1	Indeterminate	Indeterminate	Container - Unidentifiable	Glass				Body	Blue	
20	Surface	2	Architectural	Building Component	Window Glass	Glass				Incomplete	Colourless	
21	Surface	2	Indeterminate	Indeterminate	Container - Unidentifiable	Glass				Body	Light Aqua	Embossed with "_ O _ / _ E N"
22	Surface	1	Personal Artifacts	Personal Gear	Smoking Pipe	White Ball Clay				Stem		
23	Surface	1	Indeterminate	Indeterminate	Unidentified	Plastic				Indeterminate	White	Thin flat white fragment. Likely tag from milk tag.
24	Surface	1	Tools/Equipment	Writing	Slate Tablet	Slate				Incomplete		
25	Surface	3	Architectural	Building Component	Nail - Machine Cut	Metal - Ferrous				Incomplete		
26	Surface	1	Tools/Equipment	Hardware	Spike	Metal - Ferrous				Incomplete		Long spike with rectangular shaft. Missing head.

Artifact Catalogue for H2 Site

Cat. #	Context	Qty	Class	Subclass	Type	Material	Ceramic Ware	Ceramic Form	Ceramic Motif	Portion	Colour	Comments
1	Surface	1	Kitchen/Food	Indeterminate	Teaware	Ceramic	RWE	Flatware	Hand Painted - Late Palette	Body	Pink and Green	
2	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Hollowware	Transfer Print - General	Rim	Blue	Delicate stylized floral motif.
3	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Edgeware - Chicken Claw	Rim	Blue	
4	Surface	1	Kitchen/Food	Indeterminate	Teaware	Ceramic	RWE	Hollowware	Spongeware	Body	Blue and Pink	
5	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Transfer Print - General	Body	Blue	Thin lines.
6	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Hand Painted - General	Rim	Black	Thin line along rim edge.
7	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Transfer Print - Chinese Motif	Base	Blue	Double folded footring. Likely Blue Willow motif.
8	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Hollowware	Transfer Print - Flow	Body	Mulberry (Flow Black)	
9	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Hollowware	Factory Slip - Banded	Rim	Dark Brown	
10	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Hollowware	Hand Painted - General	Body	Brown	Two medium lines on exterior.
11	Surface	2	Kitchen/Food	Beverage Consumption	Teaware	Ceramic	RWE	Hollowware	Spongeware	Body	Blue	Waist portion. Bell-shaped teacup.
12	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Unidentified	Rim	Blue	Unidentifiable blue along rim edge.
13	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Stamped	Body	Blue	
14	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Spongeware	Body	Blue	Dark blue dense sponging.
15	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Undecorated	Base		
16	Surface	5	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Undecorated	Body		
17	Surface	1	Indeterminate	Indeterminate	Container - Unidentifiable	Stoneware				Rim	Dark Brown	Incomplete lip for stoneware bottle - likely for a beverage.
18	Surface	2	Kitchen/Food	Indeterminate	Teaware	Ceramic	Red Earthenware - Refined	Hollowware	Jackfield	Body	Black	
19	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Rim	Brown	Single flat rim. Rounded body - likely for storage. Glazed on interior and exterior.
20	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Rim	Brown	Single string rim.
21	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Rim	Brown	Single rounded extending lip.
22	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Body	Brown	
23	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Rim	Brown	Single flat rim. Glazed on interior and along rim.
24	Surface	1	Kitchen/Food	Beverage Service	Teaware	Ceramic	Red Earthenware - Refined	Teapot	Jackfield	Lid	Black	

Cat. #	Context	Qty	Class	Subclass	Type	Material	Ceramic Ware	Ceramic Form	Ceramic Motif	Portion	Colour	Comments
25	Surface	2	Architectural	Building Component	Sewer Pipe	Clay				Incomplete	Brown	Glazed drainage tile.
26	Surface	1	Furnishings	Household Accessory	Figurine	Porcellaneous Ware				Body		Appearance of draped fabric.
27	Surface	2	Kitchen/Food	Beverage Storage	Container - Liquor	Glass				Base	Dark Olive Green	Pushup with large mammalon.
28	Surface	1	Indeterminate	Indeterminate	Container - Unidentifiable	Glass				Base	Aqua	Rectangular base with chamfered corners. Pontil mark.
29	Surface	7	Architectural	Building Component	Nail - Machine Cut	Metal - Ferrous				Incomplete		
30	Surface	2	Architectural	Building Component	Nail - Wire	Metal - Ferrous				Incomplete		

Artifact Catalogue for H3 Site

Cat. #	Context	Qty	Class	Subclass	Type	Material	Ceramic Ware	Ceramic Form	Ceramic Motif	Portion	Colour	Comments
1	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Transfer Print - General	Rim	Red	Stippled motif.
2	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Edgeware - General	Rim	Blue	Very fragmentary - possibly embossed.
3	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Hollowware	Transfer Print - General	Rim	Purple	Stippled motif on interior. Unidentifiable motif on exterior.
4	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Hollowware	Factory Slip - General	Body	Blue	
5	Surface	1	Kitchen/Food	Beverage Consumption	Teaware	Ceramic	RWE	Hollowware	Transfer Print - General	Rim	Blue	Geometric motif on interior and exterior.
6	Surface	10	Kitchen/Food	Indeterminate	Teaware	Ceramic	RWE	Hollowware	Hand Painted - Late Palette	Body	Green, Blakc and Blue	Floral motif.
7	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Hand Painted - Late Palette	Rim	Pink	Pink line along rim edge.
8	Surface	1	Kitchen/Food	Indeterminate	Teaware	Ceramic	RWE	Flatware	Hand Painted - Late Palette	Rim	Green	Line along rim edge.
9	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Edgeware - Straight and Unmoulded	Rim	Blue	
10	Surface	1	Kitchen/Food	Beverage Consumption	Teaware	Ceramic	RWE	Teacup	Hand Painted - Late Palette	Rim	Green and Blue	Floral motif. Partial handle element.
11	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Hollowware	Stamped	Body	Pink	
12	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Transfer Print - General	Body	Grey	X geometric motif.
13	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Moulded - Repeating Image	Body		Likely a wheatware pattern derivative.
14	Surface	4	Kitchen/Food	Indeterminate	Teaware	Ceramic	RWE	Flatware	Spongeware	Body	Blue	
15	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Hollowware	Spongeware	Body	Blue	
16	Surface	3	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Transfer Print - General	Body	Blue	Unidentifiable motif.
17	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Transfer Print - General	Body	Blue	Geometric motif.
18	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Hollowware	Undecorated	Handle		Likely for a teacup or creamer.
19	Surface	10	Kitchen/Food	Indeterminate	Tableware	Ceramic	Ironstone	Flatware	Undecorated	Body		
20	Surface	2	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Undecorated	Body		
21	Surface	3	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Flatware	Undecorated	Base		Base with partial footring.
22	Surface	1	Kitchen/Food	Indeterminate	Tableware	Ceramic	RWE	Hollowware	Undecorated	Base		Round base with straight sides - likely a mug.
23	Surface	1	Kitchen/Food	Food Service	Tableware	Ceramic	Ironstone	Hollowware	Moulded - Ribbed or Panelled	Base		Base of large vessel - likely a tureen.
24	Surface	8	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Body	Dark Brown	
25	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Body	Light Brown	
26	Surface	2	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Undecorated	Body		

Cat. #	Context	Qty	Class	Subclass	Type	Material	Ceramic Ware	Ceramic Form	Ceramic Motif	Portion	Colour	Comments
27	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Rim	Brown	Flattened rim lip.
28	Surface	1	Kitchen/Food	Indeterminate	Kitchenware	Ceramic	Red Earthenware - Coarse	Hollowware	Glazed	Rim	Brown	Single rounded lip.
29	Surface	1	Architectural	Building Component	Window Glass	Glass				Incomplete		
30	Surface	1	Indeterminate	Indeterminate	Container - Unidentifiable	Glass				Base	Aqua	Side meets base portion.
31	Surface	3	Personal Artifacts	Personal Gear	Smoking Pipe	White Ball Clay				Bowl		
32	Surface	2	Personal Artifacts	Personal Gear	Smoking Pipe	White Ball Clay				Stem		
33	Surface	1	Personal Artifacts	Personal Gear	Smoking Pipe	White Ball Clay				Stem		Left side - GL. Right side is chipped off. Whittled down bit end.
34	Surface	1	Personal Artifacts	Personal Gear	Smoking Pipe	White Ball Clay				Stem		Stem and spur.
35	Surface	1	Personal Artifacts	Personal Gear	Smoking Pipe	White Ball Clay				Stem		Left side - HEND. Right side - EAL. Very faint.
36	Surface	1	Personal Artifacts	Personal Gear	Smoking Pipe	White Ball Clay				Stem		Left side - L. BANN. Right side - ONTREAL.
37	Surface	1	Personal Artifacts	Personal Gear	Smoking Pipe	White Ball Clay				Stem		Left side - _URRA_. Right side - LASGOW.
38	Surface	1	Organic	Faunal	Faunal - Mammal	Bone				Incomplete		Weathered.

K CULTURAL HERITAGE

Cultural Heritage Assessment Report:
Built Heritage Resources and Cultural Heritage Landscapes

Existing Conditions – Impact Assessment

Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard
Environmental Assessment Study

Former Townships Chinguacousy North and South, Peel County
Town of Caledon and City of Brampton, Regional Municipality of Peel, Ontario

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ASI File 11EA-280

October 2013 (Revised January 2015, May 2015, October 2015)

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Cultural Heritage Assessment Report:
Built Heritage Resources and Cultural Heritage Landscapes

Existing Conditions – Impact Assessment

Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard
Environmental Assessment Study

Former Townships Chinguacousy North and South, Peel County
Town of Caledon and City of Brampton, Regional Municipality of Peel, Ontario

EXECUTIVE SUMMARY

Archaeological Services Inc (ASI) was contracted by Hatch Mott MacDonald to conduct a Cultural Heritage Assessment Report (CHAR) as part of the Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard, Environmental Assessment (EA) Study. The project involves the evaluation of improvements to Mayfield Road from approximately 300 m southwest of Winston Churchill Boulevard to Chinguacousy Road.

The results of background historic research and a review of secondary source material, including historic mapping, revealed a study area with a rural land use history dating back to the early nineteenth century. The field review confirmed that the study area contains a number of nineteenth and early twentieth century cultural heritage resources within and/or adjacent to the study area. A total of fifteen (15) cultural heritage landscapes and two (2) built heritage resources were identified in the Mayfield Road study area.

Based on the results of background data collection and field review of the Mayfield Road study area, the following recommendations have been developed:

1. Staging and construction activities should be suitably planned to avoid impacts to identified cultural heritage resources;

2. BHR 1 and CHL 4 are expected to be significantly impacted through the potential demolition of buildings, alteration to the landscape setting, and the introduction of elements that are not in keeping with the historic setting of these properties (i.e. construction of new sidewalks and reduced setbacks). A resource-specific heritage impact statement should be carried out for each resource prior to construction to evaluate the cultural heritage value of these resources, identify cultural heritage attributes, and develop appropriate mitigation measures

3. The feasibility of implementing tree protection zones should be investigated for all identified cultural heritage resources where tree removals are planned. If possible, tree protection zones should be implemented for CHL 2, 4, 6, 7, and 13;

4. CHL 2, 4, 6, 7, and 13 are expected to be impacted through alteration to the setting by the removal of replaceable landscape features (i.e. shrubs and young trees) and the introduction of elements that are not in keeping with the historic setting of these properties (i.e. construction of new sidewalks). A cultural heritage landscape documentation report should be prepared for these properties by a qualified heritage consultant in advance of construction activities;

5. Post-construction landscaping and rehabilitation plans should be undertaken in a manner that is sympathetic to the overall setting. Wherever possible, landscaping with appropriate/sympathetic historic plant materials is recommended, and fence rows should be preserved where extant. Post-construction landscaping is recommended for CHL 2, 4, 6, 7, and 13, and for all properties that will be subject to the removal of vegetation (i.e. trees, shrubs, and flower beds) during construction; and,

6. Should future work require an expansion of the Mayfield Road study area then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential cultural heritage resources.

ARCHAEOLOGICAL SERVICES INC.
BUILT HERITAGE AND CULTURAL HERITAGE LANDSCAPE PLANNING DIVISION

PROJECT PERSONNEL

Corporate Responsibility:	Robert Pihl, MA, CAHP *Partner and Senior Archaeologist* *Manager, Environmental Assessment Division*
Project Director:	Rebecca Sciarra, MA, CAHP *Cultural Heritage Specialist and Manager,* *Built Heritage and Cultural Heritage Landscape Planning Division*
Project Manager:	Heidy Schopf, MES *Cultural Heritage Specialist*
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Project Administrator:	Carol Bella, Hon. BA *Research Archaeologist*
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1.0 INTRODUCTION

Archaeological Services Inc (ASI) was contracted by Hatch Mott MacDonald to conduct a Cultural Heritage Assessment Report (CHAR) as part of the Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard, Environmental Assessment (EA) Study. The project involves the widening of Mayfield Road from approximately 300 m southwest of Winston Churchill Boulevard to Chinguacousy Road (Figure 1)

The purpose of this report is to present a built heritage and cultural heritage landscape inventory of resources in the Mayfield Road study area and identify any potential impacts to cultural heritage resources.

This assessment was conducted under the project direction of Rebecca A. Sciarra and Project Management of Heidy Schopf, both Cultural Heritage Specialists at ASI.

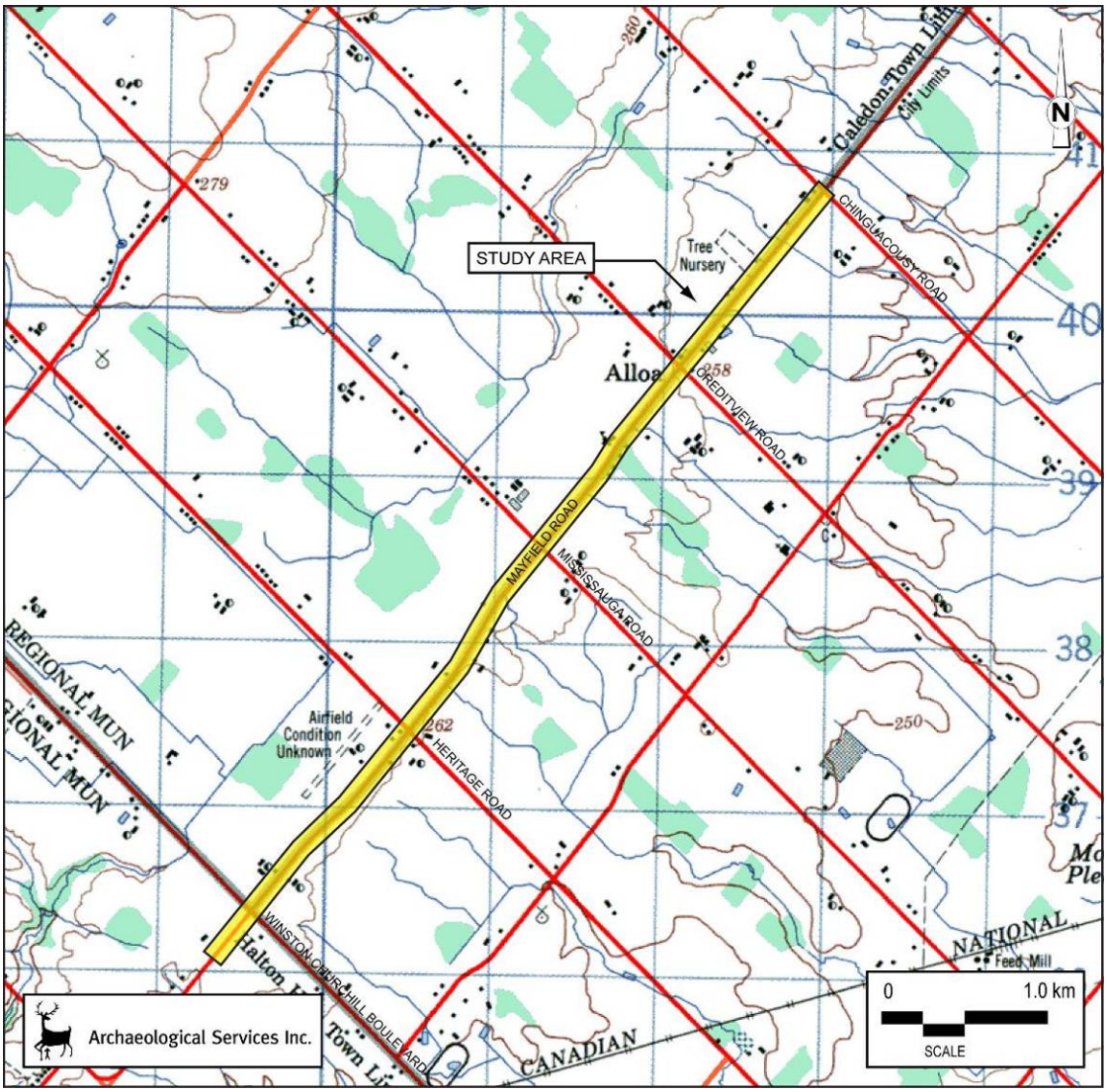


Figure 1: Location of the study area

Base Map: NTS 30 M/12 (Brampton)

2.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT CONTEXT

2.1 Approach and Methodology

This cultural heritage assessment considers cultural heritage resources in the context of improvements to specified areas, pursuant to the *Canadian Environmental Assessment Act* (CEAA) and the Ontario *Environmental Assessment Act* (Ontario EAA). This assessment addresses above ground cultural heritage resources over 40 years old. Use of a 40 year old threshold is a guiding principle when conducting a preliminary identification of cultural heritage resources (Ministry of Transportation 2006; Ministry of Transportation 2007; Ontario Realty Corporation 2007). While identification of a resource that is 40 years old or older does not confer outright heritage significance, this threshold provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly younger than 40 years old, this does not preclude the resource from retaining heritage value.

For the purposes of this assessment, the term cultural heritage resources is used to describe both cultural heritage landscapes and built heritage features. A cultural landscape is perceived as a collection of individual built heritage resources and other related features that together form farm complexes, roadscapes and nucleated settlements. Built heritage features are typically individual buildings or structures that may be associated with a variety of human activities, such as historical settlement and patterns of architectural development.

The analysis throughout the study process addresses cultural heritage resources under various pieces of legislation and their supporting guidelines. The CEAA requires that consideration must be given to cultural heritage resources in federal environmental assessments. The relationship between cultural heritage resources and environmental effects are described in Section 2(1) as:

> Any change that the project may cause in the environment, including any effects of such change... on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

The CEAA Reference Guide of Physical and Cultural Heritage Resources defines a cultural heritage resource as:

> A human work or place that gives evidence of human activity or has spiritual or cultural meaning, and that has historic value... This interpretation of cultural resources can be applied to a wide range of resources, including, cultural landscapes and landscape features, archaeological sites, structures, engineering works, artefacts, and associated records.

Under the Ontario EAA environment is defined in Subsection 1(c) to include:

- cultural conditions that influence the life of man or a community; and
- any building, structure, machine, or other device or thing made by man.

The Ministry of Tourism, Culture and Sport is charged under Section 2 of the *Ontario Heritage Act* with the responsibility to determine policies, priorities and programs for the conservation, protection and preservation of the heritage of Ontario and has published two guidelines to assist in assessing cultural heritage resources as part of an environmental assessment: *Guideline for Preparing the Cultural Heritage*

Resource Component of Environmental Assessments (1992), and *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (1981). Accordingly, both guidelines have been utilized in this assessment process.

The *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (Section 1.0) states the following:

> When speaking of man-made heritage we are concerned with the works of man and the effects of his activities in the environment rather than with movable human artifacts or those environments that are natural and completely undisturbed by man.

In addition, environment may be interpreted to include the combination and interrelationships of human artifacts with all other aspects of the physical environment, as well as with the social, economic and cultural conditions that influence the life of the people and communities in Ontario. The *Guidelines on the Man-Made Heritage Component of Environmental Assessments* distinguish between two basic ways of visually experiencing this heritage in the environment, namely as cultural heritage landscapes and as cultural features.

Within this document, cultural heritage landscapes are defined as the following (Section 1.0):

> The use and physical appearance of the land as we see it now is a result of man's activities over time in modifying pristine landscapes for his own purposes. A cultural landscape is perceived as a collection of individual man-made features into a whole. Urban cultural landscapes are sometimes given special names such as townscapes or streetscapes that describe various scales of perception from the general scene to the particular view. Cultural landscapes in the countryside are viewed in or adjacent to natural undisturbed landscapes, or waterscapes, and include such land uses as agriculture, mining, forestry, recreation, and transportation. Like urban cultural landscapes, they too may be perceived at various scales: as a large area of homogeneous character; or as an intermediate sized area of homogeneous character or a collection of settings such as a group of farms; or as a discrete example of specific landscape character such as a single farm, or an individual village or hamlet.

A cultural feature is defined as the following (Section 1.0):

> …an individual part of a cultural landscape that may be focused upon as part of a broader scene, or viewed independently. The term refers to any man-made or modified object in or on the land or underwater, such as buildings of various types, street furniture, engineering works, plantings and landscaping, archaeological sites, or a collection of such objects seen as a group because of close physical or social relationships.

The Minister of Tourism, Culture, and Sport has also published *Standards and Guidelines for Conservation of Provincial Heritage Properties* (April 2010; Standards and Guidelines hereafter). These Standards and Guidelines apply to properties the Government of Ontario owns or controls that have cultural heritage value or interest. They are mandatory for ministries and prescribed public bodies and have the authority of a Management Board or Cabinet directive. Prescribed public bodies include:

- Agricultural Research Institute of Ontario

- Hydro One Inc.
- Liquor Control Board of Ontario
- McMichael Canadian Art Collection
- Metrolinx
- The Niagara Parks Commission
- Ontario Heritage Trust
- Ontario Infrastructure Projects Corporation
- Ontario Lottery and Gaming Corporation
- Ontario Power Generation Inc.
- Ontario Realty Corporation
- Royal Botanical Gardens
- Toronto Area Transit Operating Authority
- St. Lawrence Parks Commission

The Standards and Guidelines provide a series of definitions considered during the course of the assessment:

A provincial heritage property is defined as the following (14):

> Provincial heritage property means real property, including buildings and structures on the property, that has cultural heritage value or interest and that is owned by the Crown in right of Ontario or by a prescribed public body; or that is occupied by a ministry or a prescribed public body if the terms of the occupancy agreement are such that the ministry or public body is entitled to make the alterations to the property that may be required under these heritage standards and guidelines.

A provincial heritage property of provincial significance is defined as the following (14):

> Provincial heritage property that has been evaluated using the criteria found in Ontario Heritage Act O.Reg. 10/06 and has been found to have cultural heritage value or interest of provincial significance.

A built heritage resource is defined as the following (13):

> …one or more significant buildings (including fixtures or equipment located in or forming part of a building), structures, earthworks, monuments, installations, or remains associated with architectural, cultural, social, political, economic, or military history and identified as being important to a community. For the purposes of these Standards and Guidelines, "structures" does not include roadways in the provincial highway network and in-use electrical or telecommunications transmission towers.

A cultural heritage landscape is defined as the following (13):

> … a defined geographical area that human activity has modified and that has cultural heritage value. Such an area involves one or more groupings of individual heritage features, such as structures, spaces, archaeological sites, and natural elements, which together form a significant type of heritage form distinct from that of its constituent elements or parts. Heritage conservation districts designated under the Ontario Heritage

> Act, villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trails, and industrial complexes of cultural heritage value are some examples.

Additionally, the *Planning Act* (1990) and related *Provincial Policy Statement* (*PPS*), which was updated in 2014, make a number of provisions relating to heritage conservation. One of the general purposes of the *Planning Act* is to integrate matters of provincial interest in provincial and municipal planning decisions. In order to inform all those involved in planning activities of the scope of these matters of provincial interest, Section 2 of the *Planning Act* provides an extensive listing. These matters of provincial interest shall be regarded when certain authorities, including the council of a municipality, carry out their responsibilities under the *Act*. One of these provincial interests is directly concerned with:

> 2.(d) the conservation of features of significant architectural, cultural, historical, archaeological or scientific interest

Part 4.7 of the *PPS* states that:

> The official plan is the most important vehicle for implementation of this Provincial Policy Statement. Comprehensive, integrated and long-term planning is best achieved through official plans.
>
> Official plans shall identify provincial interests and set out appropriate land use designations and policies. To determine the significance of some natural heritage features and other resources, evaluation may be required.
>
> Official plans should also coordinate cross-boundary matters to complement the actions of other planning authorities and promote mutually beneficial solutions. Official plans shall provide clear, reasonable and attainable policies to protect provincial interests and direct development to suitable areas.
>
> In order to protect provincial interests, planning authorities shall keep their official plans up-to-date with this Provincial Policy Statement. The policies of this Provincial Policy Statement continue to apply after adoption and approval of an official plan.

Those policies of particular relevance for the conservation of heritage features are contained in Section 2-Wise Use and Management of Resources, wherein Subsection 2.6 - Cultural Heritage and Archaeological Resources, makes the following provisions:

> 2.6.1 Significant built heritage resources and cultural heritage landscapes shall be conserved.

A number of definitions that have specific meanings for use in a policy context accompany the policy statement. These definitions include built heritage resources and cultural heritage landscapes.

A *built heritage resource* is defined as: "a building, structure, monument, installation or any manufactured remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Aboriginal community" (PPS 2014).

A *cultural heritage landscape* is defined as "a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Aboriginal community. The area may involve features such as structures, spaces, archaeological sites or

natural elements that are valued together for their interrelationship, meaning or association" (PPS 2014). Examples may include, but are not limited to farmscapes, historic settlements, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways, and industrial complexes of cultural heritage value.

In addition, significance is also more generally defined. It is assigned a specific meaning according to the subject matter or policy context, such as wetlands or ecologically important areas. With regard to cultural heritage and archaeology resources, resources of significance are those that are valued for the important contribution they make to our understanding of the history of a place, an event, or a people (*PPS* 2014).

Criteria for determining significance for the resources are recommended by the Province, but municipal approaches that achieve or exceed the same objective may also be used. While some significant resources may already be identified and inventoried by official sources, the significance of others can only be determined after evaluation (*PPS* 2014).

Accordingly, the foregoing guidelines and relevant policy statement were used to guide the scope and methodology of the cultural heritage assessment.

2.2 Municipal Policies

The Mayfield Road study area falls within the City of Brampton, the Town of Caledon, and the Town of Halton Hills. The municipal policies for these municipalities were reviewed to gather direction regarding cultural heritage resources.

City of Brampton

In the City of Brampton's *Official Plan* (2006), Section 4.9 (Cultural Heritage) provides policy direction regarding built heritage and cultural heritage landscapes. The City of Brampton sets out the following objectives in relation to cultural heritage resources:

a) Conserve the cultural heritage resources of the City for the enjoyment of existing and future generations;
b) Preserve, restore and rehabilitate structures, buildings or sites deemed to have significant historic, archaeological, architectural or cultural significance; and, preserve cultural heritage landscapes; including significant public views; and,
c) Promote public awareness of Brampton's heritage and involve the public in heritage resources decisions affecting the municipality.

Numerous policies related to built heritage, cultural heritage landscapes, heritage conservation districts, areas with cultural heritage character, and heritage cemeteries are provided in Sections 4.9.1 to 4.9.5 of the City of Brampton's *Official Plan*.

Town of Caledon

In the Town of Caledon's *Official Plan* (2008), Section 3.2 (Cultural Heritage Conservation) provides policy direction regarding archaeological, built heritage, and cultural heritage landscapes. The Town of Caledon sets out the following objectives related to cultural heritage resources:

3.2.2.1 To identify and conserve the Town's cultural heritage resources, in balance with the other objectives of this Plan, through the implementation of appropriate designations, policies and programs including public and private stewardship and partnering with other heritage organizations in the community.

3.2.2.2 To promote the continuing public and private awareness, appreciation and enjoyment of Caledon's cultural heritage through educational activities and by providing guidance on sound conservation practices.

3.2.2.3 To develop partnerships between various agencies and organizations to conserve and promote cultural heritage resources.

3.2.2.4 To use as appropriate all relevant Provincial legislation that reference the conservation of cultural heritage resources, particularly the provisions of the Ontario Heritage Act, the Planning Act, the Environmental Assessment Act, the Municipal Act, the Cemeteries Act, and the Niagara Escarpment Planning and Development Act in order to conserve Caledon's cultural heritage.

Numerous policies related to built heritage resources, cultural heritage landscapes, and areas with cultural heritage character are provided in Sections 3.2.3.3 to 3.2.3.5 of the Town of Caledon's *Official Plan*.

Town of Halton Hills

In the Town of Halton Hills' *Official Plan* (2008), Section A2.6 provides goals and strategic objectives regarding cultural heritage resources. The goal of the Town of Halton Hills' heritage policy is to identify, conserve and enhance the Town's cultural heritage resources and promote their value and benefit to the community. Strategic objectives related to the present Mayfield Road EA are provided below:

a) To enhance the character of the Town by protecting and maintaining the Town's cultural heritage resources.
f) To ensure that the nature and location of cultural heritage and archaeological resources are known and considered before land use decisions are made.
g) To pursue the designation, or other means of protection, under the *Ontario Heritage Act*, of significant cultural heritage resources.
h) To prevent the demolition, destruction, inappropriate alteration or use of designated cultural heritage resources.
i) To promote the conservation of significant cultural heritage resources on lands that are adjacent to proposed development and to encourage the adjacent development to be of an appropriate scale and character.
k) To consult with Heritage Halton Hills and other established heritage organizations when making decisions regarding the conservation of cultural heritage resources in the Town.

2.3 Data Collection

In the course of the cultural heritage assessment, all potentially affected cultural heritage resources are subject to inventory. Short form names are usually applied to each resource type, (e.g. barn, residence). Generally, when conducting a preliminary identification of cultural heritage resources, three stages of research and data collection are undertaken to appropriately establish the potential for and existence of cultural heritage resources in a particular geographic area.

Background historic research, which includes consultation of primary and secondary source research and historic mapping, is undertaken to identify early settlement patterns and broad agents or themes of change in a study area. This stage in the data collection process enables the researcher to determine the presence of sensitive heritage areas that correspond to nineteenth and twentieth-century settlement and development patterns. To augment data collected during this stage of the research process, federal, provincial, and municipal databases and/or agencies are consulted to obtain information about specific properties that have been previously identified and/or designated as retaining cultural heritage value. Typically, resources identified during these stages of the research process are reflective of particular architectural styles, associated with an important person, place, or event, and contribute to the contextual facets of a particular place, neighbourhood, or intersection.

A field review is then undertaken to confirm the location and condition of previously identified cultural heritage resources. The field review is also utilized to identify cultural heritage resources that have not been previously identified on federal, provincial, or municipal databases.

Several investigative criteria are utilized during the field review to appropriately identify new cultural heritage resources. These investigative criteria are derived from provincial guidelines, definitions, and past experience. During the course of the environmental assessment, a built structure or landscape is identified as a cultural heritage resource if it is considered to be 40 years or older[1], and if the resource satisfies at least one of the following criteria, which form part of Ontario Heritage Act O.Reg. 9/06 and 10/06:

Design/Physical Value:

- It is a rare, unique, representative or early example of a style, type, expression, material or construction method.
- It displays a high degree of craftsmanship or artistic merit.
- It demonstrates a high degree of technical or scientific achievement.
- The site and/or structure retains original stylistic features and has not been irreversibly altered so as to destroy its integrity.
- It demonstrates a high degree of excellence or creative, technical or scientific achievement at a provincial level in a given period.

Historical/Associative Value:

[1] Use of a 40 year old threshold is a guiding principle when conducting a preliminary identification of cultural heritage resources (Ministry of Transportation 2006; Ministry of Transportation 2007; Ontario Realty Corporation 2007). While identification of a resource that is 40 years old or older does not confer outright heritage significance, this threshold provides a means to collect information about resources that may retain heritage value. Similarly, if a resource is slightly younger than 40 years old, this does not preclude the resource from retaining heritage value.

- It has a direct association with a theme, event, belief, person, activity, organization, or institution that is significant to: the City of Brampton, Town of Caledon and Town of Halton Hills; the Province of Ontario; or Canada.
- It yields, or has the potential to yield, information that contributes to an understanding of the history of the: the City of Brampton, Town of Caledon, and Town of Halton Hills; the Province of Ontario, or Canada.
- It demonstrates or reflects the work or ideas of an architect, artist builder, designer, or theorist who is significant to: the City of Brampton, Town of Caledon or Town of Halton Hills; the Province of Ontario; or Canada.
- It represents or demonstrates a theme or pattern in Ontario's history.
- It demonstrates an uncommon, rare or unique aspect of Ontario's cultural heritage.
- It has a strong or special association with the entire province or with a community that is found in more than one part of the province. The association exists for historic, social, or cultural reasons or because of traditional use.
- It has a strong or special association with the life or work of a person, group or organization of importance to the province or with an event of importance to the province.

Contextual Value:

- It is important in defining, maintaining, or supporting the character of an area.
- It is physically, functionally, visually, or historically linked to its surroundings.
- It is a landmark.
- It illustrates a significant phase in the development of the community or a major change or turning point in the community's history.
- The landscape contains a structure other than a building (fencing, culvert, public art, statue, etc.) that is associated with the history or daily life of that area or region.
- There is evidence of previous historic and/or existing agricultural practices (e.g. terracing, deforestation, complex water canalization, apple orchards, vineyards, etc.).
- It is of aesthetic, visual or contextual importance to the province.

If a resource meets one of these criteria it will be identified as a cultural heritage resource and is subject to further research where appropriate and when feasible. Typically, detailed archival research, permission to enter lands containing heritage resources, and consultation is required to determine the specific heritage significance of the identified cultural heritage resource.

When identifying cultural heritage landscapes, the following categories are typically utilized for the purposes of the classification during the field review:

Farm complexes:	comprise two or more buildings, one of which must be a farmhouse or barn, and may include a tree-lined drive, tree windbreaks, fences, domestic gardens and small orchards.
Roadscapes:	generally two-lanes in width with absence of shoulders or narrow shoulders only, ditches, tree lines, bridges, culverts and other associated features.
Waterscapes:	waterway features that contribute to the overall character of the cultural heritage landscape, usually in relation to their influence on historic development and settlement patterns.

Railscapes:	active or inactive railway lines or railway rights of way and associated features.
Historical settlements:	groupings of two or more structures with a commonly applied name.
Streetscapes:	generally consists of a paved road found in a more urban setting, and may include a series of houses that would have been built in the same time period.
Historical agricultural landscapes:	generally comprises a historically rooted settlement and farming pattern that reflects a recognizable arrangement of fields within a lot and may have associated agricultural outbuildings, structures, and vegetative elements such as tree rows.
Cemeteries:	land used for the burial of human remains.

Results of the desktop data collection are contained in Sections 3.0 and 4.0, while Section 5.0 contains conclusions and a description of further work to be conducted.

3.0 BUILT HERITAGE RESOURCE AND CULTURAL HERITAGE LANDSCAPE ASSESSMENT

3.1 Introduction

This section provides a brief summary of historic research for the study area. A review of available primary and secondary source material was undertaken to produce a contextual overview, including a general description of settlement and historic land use. Historically, the study area is located in the former Township of Chinguacousy, County of Peel, between Concessions VI west and II west, Lots 17 to 18 and the Township of Esquesing, County of Halton, Concession XI, Lots 17 and 18.

3.2 Nineteenth-Century Township Survey and Settlement

Township of Chinguacousy

The Township of Chinguacousy was first named after a Mississauga word meaning "young pine," which may have been used to denote the Credit River. Other scholars assert that it was named in honour of the Ottawa Chief Shinguacose, which was corrupted to the present spelling of 'Chinguacousy,' "under whose leadership Fort Michilimacinac was captured from the Americans in the War of 1812" (Mika 1977:416; Rayburn 1997: 68). Part of the land which encompasses the Township of Chinguacousy was alienated by the British from the native Mississaugas through a provisional treaty dated October 28, 1818 (*Indian Treaties* 1891: #19 p. 47), which was an extension of the Crawford Purchase (an acquisition of land from the Missassaugas by the British Government in 1783) (Miller 2009: 82-3).

Chinguacousy was initially settled by immigrants from New Brunswick, as well as by United Empire Loyalists, soldiers who had served during the War of 1812, and by immigrants from England, Scotland and Ireland (Pope 1877: 65; Mika 1977 :417; Armstrong 1985:142). Indeed William Dunn Dolson, son-

in-law to Peter Plummerfeldt, a United Empire Loyalist, was one of the earliest settlers in the region, being granted 200 acres of land in Lot 17 in 1822.

The township was originally included within the limits of the Home District until 1849, when the old Upper Canadian Districts were abolished. It formed part of the United Counties of York, Ontario and Peel until 1851, when Peel was elevated to independent County status. A provisional council for Peel was not established until 1865, and the first official meeting of the Peel County council did not occur until January 1867.

Due to the small population of the newly acquired tract, Chinguacousy was initially united with the Gore of Toronto Township for political and administrative purposes. In 1821, the population of the united townships numbered just 412. By 1837, the population of the township had reached an estimated 1,921. The numbers grew from 3,721 in 1842 to 7,469 in 1851. Thereafter the figures declined to 6,897 in 1861, and to 6,129 by 1871 (Walton 1837: 71; Pope 1877: 59).

In 1877, it was described as a "first class agricultural township" and was known for the success of its agricultural industry (Pope 1877: 65). The principal crops grown in Chinguacousy included wheat, oats, peas, potatoes and turnips. It was estimated that the only township in the province which rivalled Chinguacousy in terms of wheat production at that time was Whitby. Other farm products included maple sugar, wool, cheese and butter (Smith 1851: 279). By 1851, the Township of Chinguacousy contained two grist mills and eight saw mills (Smith 1846: 32; Smith 1851: 279).

In 1974, part of the Township was amalgamated with the City of Brampton, and the remainder was annexed to the Town of Caledon (Pope 1877: 59; Mika 1977: 417-418; Armstrong 1985: 152; Rayburn 1997: 68).

Township of Esquesing

The land within Esquesing Township was acquired by the British from the Mississauga in 1818. The first township survey was undertaken in 1819, and the first legal settlers occupied their land holdings in the same year. The township is said to have been named from the corruption of a Mississauga word, eshkwessing, signifying "the last in a row" which referred to the Sixteen Mile Creek. Esquesing was initially settled by Loyalists who served during the War of 1812, and by immigrants from England, Scotland and Ireland. By the 1840s, the township was noted for its good farms and excellent land which produced a superior quality of wheat (Armstrong 1985: 143; Rayburn 1997: 114; Smith 1846: 56).

Alloa

The post office village of Alloa was located on part Lots 17 and 18, Concession 3 West, in Chinguacousy Township. The population numbered 50 in 1873 (Crossby 1873:18). Alloa was likely named after the Scottish town of Alloa: birth place of the Canadian politician and journalist George Brown (Wallace 1948: 313-4).

3.3 Review of Historic Mapping

The 1859 *Tremaine Map of the County of Peel* and the 1877 *Illustrated Historical Atlas of the Country of Peel* were reviewed to determine the potential for the presence of cultural heritage resources within the study corridor during the nineteenth century (Figures 2 and 3). It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference with regard to the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases.

Historically, the study area is located in the former Township of Chinguacousy, County of Peel, between Concessions VI west and II west, Lots 17 to 18 and the Township of Esquesing, County of Halton, Concession XI, Lots 17 and 18. The available data regarding property owners and historical features gathered from the historic mapping is summarized in Table 1.

Table 1: Nineteenth-century property owner(s) and historical feature(s)

Con. #	Lot #	Property Owner(s) (1859)	Property Owners (1877)	Historical Feature(s) (1859)	Historical Feature(s) (1877)
Township of Chingacousy, Peel County					
VI West	18	Adam Raven (H-?). Watson	Jonathon S. Leslie Joseph Leslie	Farmstead	Farmsteads (2),Orchard
	17	Rebecca Oney Friah Everson	Edward Rice Jonathon S. Leslie Thomas Montgomery	-	Farmsteads (3), Orchards (3)
V West	18	(?). Dolson William D. Dolson (Esq)	A. Dolson William D. Dolson	-	Orchard
	17	John Clarridge William D. Dolson	Joseph Mothersill William D. Dolson	Farmstead	Farmsteads (2), Barns (2), Orchards (2)
IV West	18	William D. Dolson (Esq) Mahlon Silverthorn	William D. Dolson Aaron Silverthorn	Farmstead	Road, Farmsteads (2), Orchard
	17	William D. Dolson John Dolson	William D. Dolson Jonathon Dolson	Alloa Farmstead	Alloa Road, Farmsteads (2), Barns (2), Orchards (2)
III West	18	William Sharp J. McLean (Estate) Patrick Mclean	Stephen Dolson A. Clarridge F. Graham Patrick McLean	Alloa Farmstead “Cat. Sh.”	Alloa Farmsteads (6), Orchards (3)
	17	Jason Drinkwater John Moody	Jonathon Dolson Jason Drinkwater Henry Moody	Alloa	Alloa Farmsteads (2), Barn, Orchards (2)
II West	18	John Craig William Craig	Jonathon Craig J. Rice Jonathon May	-	Farmsteads (2), Orchards (2)

Con. #	Lot #	Property Owner(s) (1859)	Property Owners (1877)	Historical Feature(s) (1859)	Historical Feature(s) (1877)
	17	Jason Nicholl Walter Cation & Bros.	Robert Hall Walter Cation	Farmstead	Road, Farmsteads (2), Barns (2), Orchards (3)
Township of Esquesing, Halton County					
11	17	Josh. Dixon	W.J. Dixon	-	Farmstead
	18	Mrs. Graham	Jno. S. Leslie	-	Farmstead

Transportation and communication networks are important because they serve to integrate social and economic activities between disparate settlement centres. As these settlements grew, and traffic increased between them, toll gates, taverns, hotels and other services for travellers were established where major transportation routes were crossed. Early overland routes followed the natural topography, avoiding swamps or rocky outcrops. The historic thoroughfares within the study area, however, were opened along the straight survey lines, creating the familiar grid system of lots and concessions. Historic north-south thoroughfares located along the study corridor include Winston Churchill Boulevard, Heritage Road, Mississauga Road, Credit View Road and Chinguacousy Road. The only historic east-west thoroughfare within the study corridor is Mayfield Road.

A series of topographic maps dating from 1909 to 1951 illustrate the development of the study area in the course of the twentieth century (Figures 4-7). Between 1909 and 1951 the number of structures along the study corridor seems to have remained fairly constant. The exceptions being the apparent disappearance of the Alloa Post-office between 1909 and 1918, and the later addition of a cemetery to Alloa in 1951. Mayfield Road was improved at some point between 1922 and 1951. The other thoroughfares intersecting the study corridor remained unimproved dirt roads until after 1951.

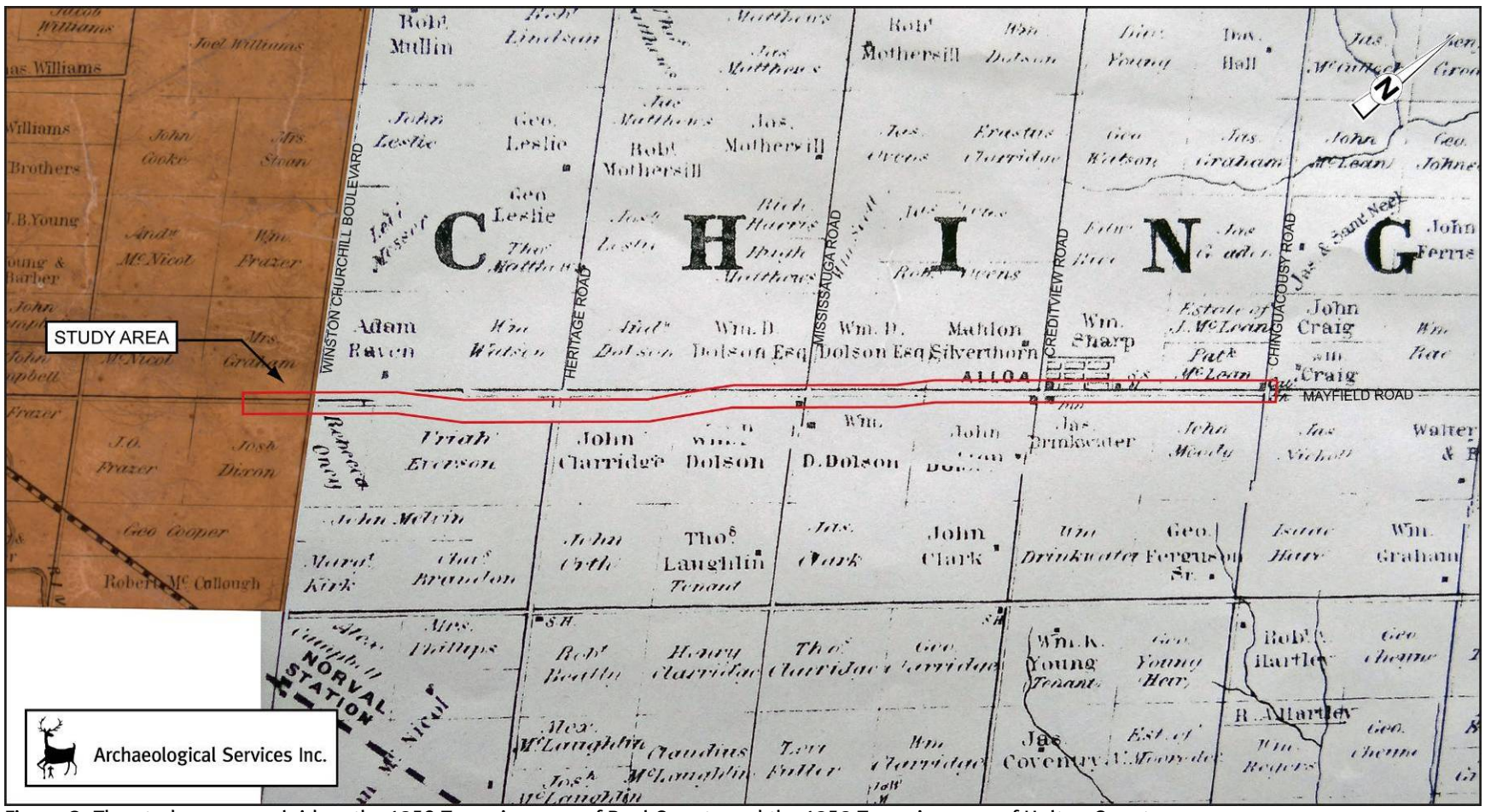


Figure 2: The study area overlaid on the 1859 Tremaine map of Peel County and the 1858 Tremaine map of Halton County

Base Map: Tremaine's Map of Peel County (Tremaine 1859) and Tremaine's Map of Halton County (Tremaine 1858)

Figure 3: The study area overlaid on the 1877 map of the Townships of Chinguacousy North and South and the 1877 map of the Township of Esquesing

Base Map: Illustrated Historical Atlas of the County of Peel (Walker & Miles 1877) and the Illustrated Historical Atlas of the County of Halton (Walker & Miles 1877)

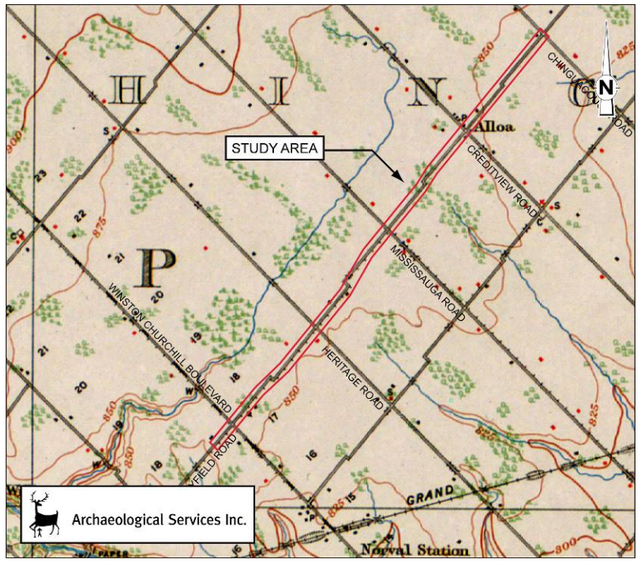


Figure 4: The study area overlaid on the 1909 topographic map of Brampton

Base Map: Brampton Sheet No. 35

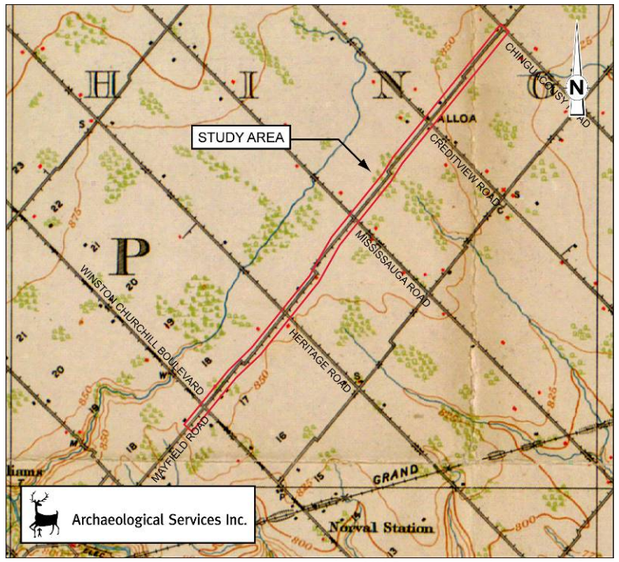


Figure 5: The study area overlaid on the 1918 topographic map of Brampton

Base Map: Brampton Sheet No. 35

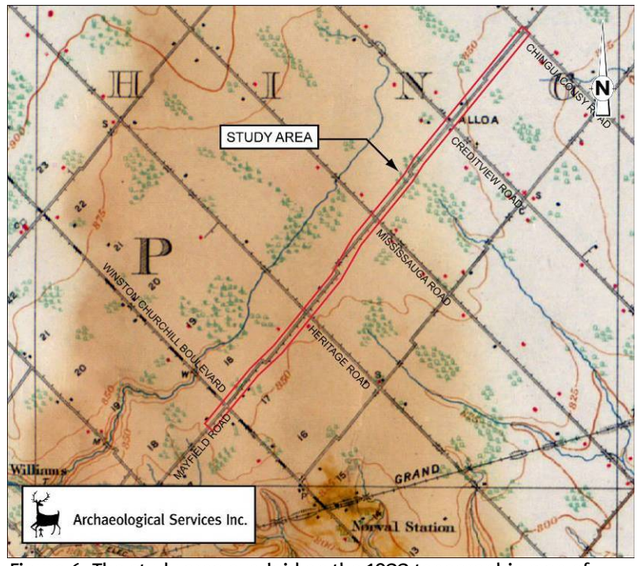


Figure 6: The study area overlaid on the 1922 topographic map of Brampton

Base Map: Brampton Sheet No. 35

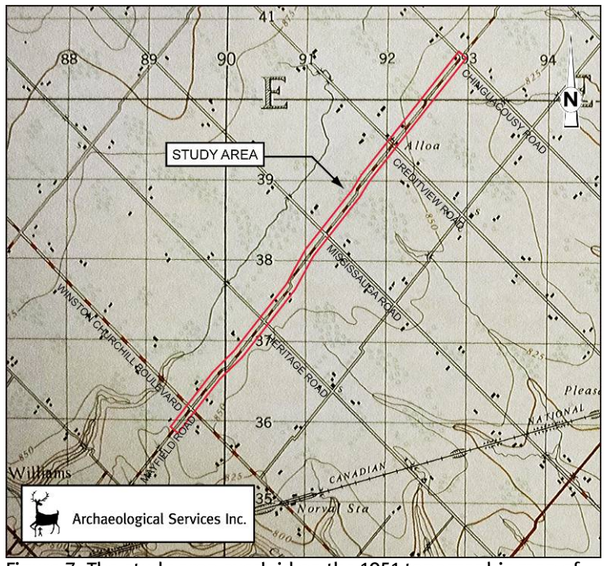


Figure 7: The study area overlaid on the 1951 topographic map of Brampton

Base Map: Brampton Sheet No. 35

3.4 Existing Conditions

A number of resources were consulted for the preliminary identification of built heritage resources and cultural heritage landscapes within the Mayfield Road study area, including: the Canadian Register of Historic Places[2]; the City of Brampton's Heritage Inventory, the Town of Caledon's Heritage Register, and the Town of Halton Hills' Heritage Register. In addition, the City of Brampton, Town of Caledon, and Town of Halton Hills were contacted directly to gather any available information on cultural heritage resources within and adjacent to the study area (Email and phone communication May 2013).

A field review was undertaken by Mary-Cate Garden and Heidy Schopf on May 16, 2013 to document the existing conditions of the study area. The field survey was preceded by a review of available, current and historic, aerial photographs and maps (including online sources such as Bing and Google maps). These large-scale maps were reviewed for any potential cultural heritage resources which may be extant in the study area. As discussed in Section 3.4 of this report, the study area includes numerous nineteenth century farmsteads, a settlement centre (Alloa) and an early twentieth century church. Information gathered from communication with the City of Brampton, the Town of Caledon, and the Town of Halton Hills indicated that many of these nineteenth century resources are still intact.

The field review demonstrated that the lands adjacent to Mayfield Road southwest of Winston Churchill Boulevard consist of remnant agricultural fields on the northwest side of the road (Plate 1) and actively cultivated agricultural fields on the southeast side of the road (Plate 2). The field review also revealed that Mayfield Road between Winston Churchill Boulevard and Chinguacousy Road is a two-lane road that is at grade with the surrounding landscape (Plate 3). The Mayfield Road right-of-way (ROW) includes a gravel shoulder and ditching on both sides of the road (Plates 4 and 9). The historic map review indicates that the road may have been re-aligned or "smoothed" out during the mid-twentieth century, when it was made into a metalled road.

The landscape bordering Mayfield Road on the east and west is predominantly agricultural with some relatively recent residential, commercial, and institutional properties. Agricultural landscapes include fields associated with both nineteenth-century farmsteads and recent agricultural operations. The nineteenth century farmsteads typically include a farm house, barn, silo, related outbuildings, mature trees, and agricultural fields (Plate 5). These farmsteads are visible from Mayfield Road and offer vistas of historic agricultural landscapes to those travelling along the road.

The field review also revealed that there is a mix of land-use designations along the study area, including institutional and residential land-uses and some areas that are currently under development (Plates 6, 7). The northern portion of the study area is bordered by agricultural fields and historic farmsteads (Plates 8 to 10).

[2] The Canadian Register contains information about recognized places of local, provincial, territorial and national significance. To be included in the Register, a place must be formally recognized under the *Ontario Heritage Act* through municipal designation by-law, ownership by the Ontario Heritage Trust, or a heritage conservation easement. It must also meet eligibility criteria and documentation standards. The searchable database is available online: http://www.historicplaces.ca/en/pages/register-repertoire.aspx (accessed May 2013).

Plate 1: East-northeast view of Mayfield Road. Note actively cultivated agricultural fields on right.

Plate 2: Southwest view along Mayfield Road. Note remnant agricultural fields on right.

Plate 3: South view across the intersection of Mayfield Road and Winston Churchill Boulevard. Road is at grade and is bounded by agricultural fields.

Plate 4: Northeast view along Mayfield Road. Road is at grade and is bounded by agricultural fields.

Plate 5: East-southeast view across Mayfield Road towards Mississauga Road. Typical farmstead/agricultural landscape in distance.

Plate 6: West-northwest view of Alloa Public School. Example of institutional land use along Mayfield Road.

Plate 7: South view across Mayfield Road towards construction. Property is under development.


Plate 8: North-northeast view along Mayfield Road. Road is at grade and is bounded by agricultural fields.


Plate 9: North-west view of mid- to late-twentieth century residential property located along Mayfield Road. House appears to be relatively recent.


Plate 10: South-southwest view of the intersection of Mayfield Road and Chinguacousy Road. Road is at grade and bordered by agricultural fields and historic farmsteads.

3.5 Identified Cultural Heritage Resources

Based on the results of the background research and field review, two built heritage resources (BHR) and fifteen cultural heritage landscapes (CHL) were identified within the Mayfield Road study area. Table 2 below lists the cultural heritage resources identified in the study area while Section 6.0 provides feature mapping of these resources

Table 2: Identified Built Heritage Resources (BHR) and Cultural Heritage Landscapes (CHL) in the Mayfield Road Study Area

Feature	Inventory Description	Photograph(s)
BHR 1	DESCRIPTION: This property features the Home United Church. Built in 1926, the church is constructed out of red brick and is of Gothic style. The church has an associated building in the rear, which may have been used as a drive shed, carriage house, or garage. The property is of high significance and is associated with historic settlement of Alloa. Landscape features include mature trees, shrubs, and circulation routes around the building. The church is depicted on topographic maps from the early twentieth century. LOCATION: 1500 Mayfield Road FEATURE TYPE: Church RECOGNITION: Listed – Town of Caledon	
BHR 2	DESCRIPTION: This property contains a Late Victorian Gothic House that was constructed between 1900 and 1924. The house is two storeys and features a gable roof and small veranda at the front. The structure is currently clad in synthetic siding. Landscape features include mature trees and recent plantings along property lines and shrubs, and a gravel driveway. LOCATION: 12017 Creditview Road FEATURE TYPE: House/Residence RECOGNITION: Listed – Town of Caledon	

Feature	Inventory Description	Photograph(s)
CHL 1	DESCRIPTION: Winston Churchill Boulevard borders the study area on the south. Winston Churchill Boulevard is a historically surveyed road and forms the boundary between the City of Brampton, Town of Halton Hills, and the Town of Caledon. This road is also the former boundary between the Townships of Esquesing and Chinguacousy. This roadscape retains many of its historic features. It is a two lane road with narrow shoulders, and ditches. Vistas of agricultural lands with historic farmsteads are visible on both sides of the road. Winston Churchill Boulevard is depicted on 1859 mapping in its current alignment. The review of historic mapping from the nineteenth and early-twentieth centuries demonstrates that this roadscape has not been greatly altered. Location: Winston Churchill Boulevard Feature Type: Roadscape Recognition: Identified during field review	 West view along Winston Churchill Boulevard  East view along Winston Churchill Boulevard

Feature	Inventory Description	Photograph(s)
CHL 2	DESCRIPTION: This property contains a red and buff brick High Victorian Gothic house. Building features include vergeboard, dichromatic details around windows and a sun porch from the early twentieth-century. The structure dates between 1857 and 1899. Other structures on the property include a barn, silo, and three outbuildings. These structures were not visible from the public ROW. Landscape features include mature trees and a tree line in the vicinity of the house, post and wire fencing on property lines and along internal boundaries, and original circulation routes. The farmstead is first depicted on 1859 map of the Township of Chinguacousy.	 South elevation of 84 Mayfield Road  West view of 84 Mayfield Road showing road, fence, and established trees.
	LOCATION: 84 Mayfield Road	
	FEATURE TYPE: Farmstead	
	RECOGNITION: Listed – Town of Caledon	

Feature	Inventory Description	Photograph(s)
CHL 3	DESCRIPTION: This farmscape includes a red and buff brick High Victorian Gothic farmhouse and a vertical board Central Ontario gable roof barn. The farm house was built between 1875 and 1899. Built features on the farmhouse include hipped roof with front gables, dichromatic brick detailing, and a bay window on the south elevation. Other structures on the property include a Central Ontario gable roof barn, silo, and other associated out buildings. Landscape features include a gravel tree-lined driveway, historic circulation routes, and agricultural fields. The farmscape at 400 Mayfield Road is depicted on 1877 mapping. LOCATION: 400 Mayfield Road FEATURE TYPE: Farmstead RECOGNITION: Listed – Town of Caledon	 South elevation of 400 Mayfield Road  North-northwest view of 400 Mayfield Road. Note circulation route, trees, outbuilding, and fields.

Feature	Inventory Description	Photograph(s)
CHL 4	DESCRIPTION: This farmscape consists of a house, barn, and associated out buildings. The one-and-a-half storey house is located off Mayfield Road. The house is of simple construction and features a gable roof and simple fenestration. The house appears to be relatively recent and is not depicted on historic mapping. Despite this, the barn and associated outbuildings located off of Heritage Road are depicted on 1877 historic mapping. Other structures on the property include a Central Ontario gable roof barn, two cement silos, and four additional outbuildings. Landscape features include numerous mature trees, an established tree line, fencing of internal use areas, and associated agricultural fields. LOCATION: 419 Mayfield Road (corner of Heritage Road and Mayfield Road) FEATURE TYPE: Farmstead RECOGNITION: Identified during field review	 Southwest view of 419 Mayfield Road showing historic barn, silo, and outbuildings.  South-southwest view of farm complex at the corner of Heritage Road and Mayfield Road.

Feature	Inventory Description	Photograph(s)
CHL 5	DESCRIPTION: Heritage Road is a historically surveyed road. This roadscape retains many of its historic features. It is a two lane road with narrow shoulders, and ditches. Vistas of agricultural lands with historic farmsteads are visible on both sides of the road. While there are relatively recent residential properties located at the corner of Mayfield Road and Heritage Road, the majority of Heritage Road is intact and has not been greatly altered since the nineteenth century. Heritage Road is depicted on 1859 mapping in its current alignment. The review of historic mapping from the nineteenth and early-twentieth centuries demonstrates that this roadscape has not been greatly altered. LOCATION: Heritage Road FEATURE TYPE: Roadscape RECOGNITION: Identified during field review	 Looking north along Heritage Road from Mayfield Road.  Looking south towards Heritage Road from Mayfield Road.

Feature	Inventory Description	Photograph(s)
CHL 6	DESCRIPTION: This farm complex includes a barn, concrete silo, house, and three associated outbuildings. The barn is a vertical board Central Ontario barn with a gambrel roof and concrete silo. The barn dates between 1900 and 1924. Landscape features include mature trees along the property lines and surrounding the house as well as internal circulation routes. While the barn and house do not date to the nineteenth century, this property is depicted on 1877 mapping as an orchard. A. Dolson is shown as the property owner. LOCATION: 624 Mayfield Road FEATURE TYPE: Farmstead RECOGNITION: Listed – Town of Caledon	 Barn and silo located at 624 Mayfield Road.  West view of 624 Mayfield Road. Note barn, silo, outbuilding, fields, and house.

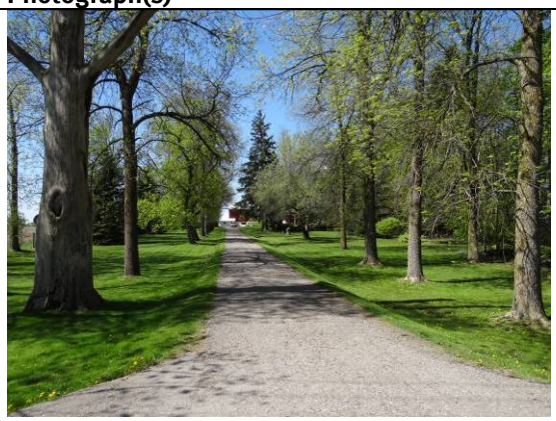
Feature	Inventory Description	Photograph(s)
CHL 7	DESCRIPTION: This property features a house and related outbuildings. The house appears to be altered or replaced but the surrounding landscape is relatively intact. The house is accessed from a tree lined gravel driveway off of Mayfield Road. Additional structures on the property include a barn with a gable roof and two outbuildings. Landscape features include post and wire fencing along property lines and internal use areas, mature tree line that acts as a screen at the front and rear of the property and mature fruit trees that are remnants of the nineteenth-century orchard. The farmstead is depicted on the 1877 map and includes a farmhouse and an orchard. Jas. Mothersill is shown as the property owner on the 1877 map. LOCATION: 709 Mayfield Road FEATURE TYPE: Farmstead RECOGNITION: Identified during field review.	 Barn and outbuilding located at 709 Mayfield Road.  Barn, house, fields, and tree line located at 709 Mayfield Road.

Feature	Inventory Description	Photograph(s)
CHL 8	DESCRIPTION: This farmscape features a two-and-a-half storey, red brick house in Queen Anne style with an irregular plan. House features include a hip roof with several projections and gable ends, and decorative vergeboard and paired windows. The fenestration is varied with some one-over-one and paired windows with brick labels, radiating voussoirs, and rusticated stone sills. The window and door openings are all segmentally arched. The facade of farmhouse features a wraparound porch with turned posts and decorative woodwork. The house dates to circa 1890. The property also includes associated structures such as a barn, silo, drive shed, and outbuildings. Landscape features include numerous mature trees surrounding the residence. The farmstead is depicted on 1877 mapping, which shows a house, two outbuildings ad an orchard. William D. Dolson is depicted as the property owner on the 1877 map. LOCATION: 11722 Mississauga Road FEATURE TYPE: Farmstead RECOGNITION: Designation in progress under *Ontario Heritage Act*, O. Reg. 9/06	 East elevation of 11722 Mississauga Road.  West view 11722 Mississauga Road. Note farm house, barn, silo, outbuildings, trees, and fields.

Feature	Inventory Description	Photograph(s)
CHL 9	DESCRIPTION: This property features a house and related outbuildings. The house appears to be altered but the surrounding landscape is relatively intact. The house is accessed from a long, tree lined gravel driveway off of Creditview Road. Identification of all built structures on the property was not possible from the public ROW since the residence and associated outbuildings are set back more than 125 m from the Creditview Road ROW and approximately 300 m from the Mayfield Road ROW. The landscape is intact and reflects the nineteenth-century agricultural roots of the area. Landscape features include mature trees along the driveway, property lines, field boundaries, and historic circulation routes. This farmscape is depicted on 1877 mapping. Aaron Silverthorn is depicted as the owner. The driveway, two structures, and an orchard are also shown on the mapping. LOCATION 12100 Creditview Road FEATURE TYPE: Farmstead RECOGNITION: Identified during field review	 South view of 12100 Creditview Road  View up tree lined driveway at 12100 Creditview Road

Feature	Inventory Description	Photograph(s)
CHL 10	DESCRIPTION: Creditview Road is a historically surveyed road. This roadscape retains many of its historic features. It is a two lane road with narrow shoulders, and ditches. Vistas of agricultural lands with historic farmsteads are visible on both sides of the road. Creditview Road is depicted on 1859 mapping in its current alignment and the historic settlement of Alloa is shown along Creditview Road near Mayfield Road. The review of historic mapping from the nineteenth and early-twentieth centuries demonstrates that this roadscape has not been greatly altered	 Looking south on Creditview Road towards Mayfield Road  Looking south along Creditview Road from Mayfield Road
	Location: Creditview Road	
	Feature Type: Roadscape	
	Recognition: Identified during field review	

Feature	Inventory Description	Photograph(s)
CHL 11	DESCRIPTION: This farmscape features a nineteenth-century red brick house, a gambrel roof barn, concrete silo, and a number of relatively recent agricultural outbuildings. The residence is accessible by a gravel driveway from Creditview Road. The house is primarily red brick with dichromatic details on window surrounds. The house appears to Victorian in style and includes a bay on the west elevation, veranda on the south, and cupola on the roof at the rear. Landscape features include numerous mature trees along the driveway and surrounding the residence. The fields are historic and have been used for agricultural purposes since the mid-nineteenth century. This farmscape is depicted on 1877 mapping and has been with the Dolson family since 1861. The Dolson family still owns and operates the farm. LOCATION: 12101 Creditview Road FEATURE TYPE: Farmstead RECOGNITION: Identified during field review	 West elevation of 12101 Creditview Road.  West view of 12101 Creditview Road from Mayfield Road. Note barn silo, house, outbuildings, trees, and fields.

Feature	Inventory Description	Photograph(s)
CHL 12	DESCRIPTION: The farmscape, better known as Beechwood Farm, features a two-storey brick residence with a hipped roof and a number of agricultural outbuildings. The structures are located over 300 metres south of Mayfield Road. The residence, which faces Chinguacousy Road, is characterized by a gable dormer on its front façade, a one-storey rear accretion, an external brick chimney, brackets underneath overhanging eaves, and buff-brick flat arches over the windows. Agricultural buildings include one silo, at least two nineteenth-century barns, as well as a number of more modern outbuildings. A farmhouse with orchard associated with Hy. Moody is illustrated at this location on the 1877 atlas map. LOCATION: 11690 Chinguacousy Road FEATURE TYPE: Farmstead RECOGNITION: Listed – City of Brampton	 View of gravel tree lined driveway. Note established trees and deep set back.  East-southeast view of 11690 Chinguacousy Road. Note tree line, barn, silo, outbuildings, and agricultural fields.

Feature	Inventory Description	Photograph(s)
CHL 13	DESCRIPTION: This farmscape features a one-and-a-half storey residence with a gable roof, internal brick chimney, and synthetic siding. Agricultural structures include a gambrel barn that sits on a red brick foundation as well as a smaller gable roof outbuilding. Mature vegetation surrounds the residence, which is accessed via Chinguacousy Road. Part of the property along Mayfield Road has been severed by a Hydro One easement. A farmhouse with orchard associated with Pat. McLean is illustrated at this location on the 1877 atlas map.	 East elevation of 12016 Chinguacousy Road.  South view of 12016 Chinguacousy Road. Note barn, outbuildings, house, established trees, and agricultural fields.
	LOCATION: 12016 Chinguacousy Road	
	FEATURE TYPE: farmstead	
	RECOGNITION: Listed – Town of Caledon	

Feature	Inventory Description	Photograph(s)
CHL 14	DESCRIPTION: Historically, Chinguacousy Road formed the road allowance between Concession II West and Concession III West in the Township of Chinguacousy. The roadscape is characterized by a narrow, two-lane paved road with little to no shoulders. It is framed by active farms both north and south of Mayfield Road. Creditview Road is depicted on 1859 mapping in its current alignment. The review of historic mapping from the nineteenth and early-twentieth centuries demonstrates that this roadscape has not been greatly altered	 West view along Chinguacousy Road. Road is two lanes and is at grade.  East view of the intersection of Mayfield Road and Chinguacousy Road. Historic farmsteads are located on both sides of road.
	Location: Chinguacousy Road	
	Feature Type: Roadscape	
	Recognition: Identified during field review	
CHL 15	DESCRIPTION: This farmscape features a nineteenth-century farmhouse that dates back to the 1870s. The farmhouse features a field stone wall and a salt box roofline. The house has recent additions but the original part of the structure was built in Georgian style. There are several outbuildings located on the property. Landscape features include mature pine trees, a tree-lined gravel driveway, and historic agricultural fields. The property is depicted on 1877 mapping	 View of gravel, tree-lined driveway. Note house and outbuildings in distance.

Feature	Inventory Description	Photograph(s)
	with Robert Hall shown as the property owner.	 North view of 11687 Chinguacousy Road. Note tree line, house, and out building.
	LOCATION: 11687 Chinguacousy Road	
	FEATURE TYPE: Farmstead	
	RECOGNITION: Listed – City of Brampton	

3.5 Screening for Potential Impacts

To assess the potential impacts of the undertaking, identified cultural heritage resources are considered against a range of possible impacts as outlined in the document entitled *Screening for Impacts to Built Heritage and Cultural Heritage Landscapes* (MTC September 2010) which include:

- Destruction of any, or part of any, significant heritage attribute or feature (III.1).
- Alteration which means a change in any manner and includes restoration, renovation, repair or disturbance (III.2).
- Shadows created that alter the appearance of a heritage attribute or change the visibility of a natural feature of plantings, such as a garden (III.3).
- Isolation of a heritage attribute from its surrounding environment, context, or a significant relationship (III.4).
- Direct or indirect obstruction of significant views or vistas from, within, or to a built and natural feature (III.5).
- A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces (III.6).
- Soil disturbance such as a change in grade, or an alteration of the drainage pattern or excavation (III.7)

A number of additional factors are also considered when evaluating potential impacts on identified cultural heritage resources. These are outlined in a document set out by the Ministry of Culture and Communications (now Ministry of Tourism, Culture and Sport) and the Ministry of the Environment entitled *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (October 1992) and include:

- Magnitude: the amount of physical alteration or destruction which can be expected;
- Severity: the irreversibility or reversibility of an impact;

- Duration: the length of time an adverse impact persists;
- Frequency: the number of times an impact can be expected;
- Range: the spatial distribution, widespread or site specific, of an adverse impact; and
- Diversity: the number of different kinds of activities to affect a heritage resource.

Where any identified, above ground, cultural heritage resources which may be affected by direct or indirect impacts, appropriate mitigation measures should be developed. This may include completing a heritage impact assessment or documentation report, or employing suitable measures such as landscaping, buffering or other forms of mitigation, where appropriate. In this regard, provincial guidelines should be consulted for advice and further heritage assessment work should be undertaken as necessary.

In particular, should any indirect or direct impacts to identified cultural heritage resources result from the proposed undertaking, Section 4.9 of the City of Brampton's *Official Plan* and Section 2.1 of the Town of Caledon's *Official Plan* should be reviewed. These sections provide policies on how to proceed in situations where cultural heritage resources may be impacted by proposed development.

3.5.1 Potential Impacts of the Proposed Undertaking

The proposed undertaking for the Mayfield Road study area consists road widening activities that will require the acquisition of property along the north and south sides of Mayfield Road. Figures 13-16 show the proposed work in relation to identified cultural heritage resources. Table 3 lists potential impacts to identified cultural heritage resources and proposes mitigation measures.

Table 3: Potential Impacts and Proposed Mitigation Measures

Resource	Potential Impact(s)	Proposed Mitigation Measure(s)
BHR 1	• Potential destruction (III.1) of church due to road widening; • Alteration (III.2) due to property acquisition along frontage; and, • Soil disturbance (III.7) due to expanded grading limits	• A heritage impact statement (HIS) should be carried out prior to construction to document the existing conditions of the resource, identify any heritage attributes that may be impacted by the proposed work, and develop appropriate mitigation measures
BHR 2	• No negative impacts anticipated	• None
CHL 1	• No negative impacts anticipated	• None
CHL 2	• Alteration (III.2) due to property acquisition along frontage; and, • Soil disturbance (III.7) due to expanded grading limits	• Investigate the feasibility of implementing tree protection zones to retain existing trees on the property; and, • Landscape documentation should be carried out prior to construction; and, • Post-construction landscaping to re-establish pre-construction

Resource	Potential Impact(s)	Proposed Mitigation Measure(s)
		conditions.
CHL 3	• No negative impacts anticipated since all heritage features are located outside the affected area.	• None
CHL 4	• Potential destruction (III.1) of residence due to road widening; • Alteration (III.2) due to property acquisition along frontage; and, • Soil disturbance (III.7) due to expanded grading limits	• A heritage impact statement (HIS) should be carried out prior to construction to document the existing conditions of the resource, identify any heritage attributes that may be impacted by the proposed work, and develop appropriate mitigation measures
CHL 5	• No negative impacts anticipated	• None
CHL 6	• Alteration (III.2) due to property acquisition along frontage; and, • Soil disturbance (III.7) due to expanded grading limits	• Investigate the feasibility of implementing tree protection zones to retain existing trees on the property; and, • Landscape documentation should be carried out prior to construction; and, • Post-construction landscaping to re-establish pre-construction conditions.
CHL 7	• Alteration (III.2) due to property acquisition along frontage; and, • Soil disturbance (III.7) due to expanded grading limits	• Investigate the feasibility of implementing tree protection zones to retain existing trees on the property; and, • Landscape documentation should be carried out prior to construction; and, • Post-construction landscaping to re-establish pre-construction conditions.
CHL 8	• No negative impacts anticipated since all heritage features are located outside the affected area.	• None
CHL 9	• No negative impacts anticipated since all heritage features are located outside the affected area.	• None
CHL 10	• No negative impacts anticipated	• None

Resource	Potential Impact(s)	Proposed Mitigation Measure(s)
CHL 11	• No negative impacts anticipated since all heritage features are located outside the affected area.	• None
CHL 12	• No negative impacts anticipated since all heritage features are located outside the affected area.	• None
CHL 13	• Alteration (III.2) due to property acquisition along frontage; and, • Soil disturbance (III.7) due to expanded grading limits	• Investigate the feasibility of implementing tree protection zones to retain existing trees on the property; • Landscape documentation should be carried out prior to construction; and, • Post-construction landscaping to re-establish pre-construction conditions.
CHL 14	• No negative impacts anticipated	• None
CHL 15	• No negative impacts anticipated since all heritage features are located outside the affected area.	• None

4.0 CONCLUSIONS

The results of background historic research and a review of secondary source material, including historic mapping, revealed a study area with a rural land use history dating back to the early nineteenth century. The field review confirmed that this area retains a number of nineteenth and twentieth-century cultural heritage resources. The following provides a summary of field review and data collection findings:

Key Findings

- Two (2) built heritage resources and fifteen (15) cultural heritage landscapes were identified in the Mayfield Road study area: One is in the process of being designated under Part IV of the *Ontario Heritage Act*, O/Reg. 9/06 (CHL 8); two were identified as heritage resources by the City of Brampton (CHL 12 and CHL 15); six were identified as heritage resources by the Town of Caledon (BHR 1, BHR 2, CHL 2, CHL 3, CHL 6, CHL 13); and eight were identified during field review (CHL 1, CHL 4, CHL 5, CHL 7, CHL 9-11, CHL 14);

- Of the 17 identified cultural heritage resources: four are roadscapes (CHL 1, CHL 5, CHL 10, CHL 14); and eleven are farm complexes (CHL 2-4, CHL 6-9, CHL 11-13, CHL 15); one is a church (BHR 1) and one is a house/residence (BHR 2); and,

- Identified cultural heritage resources are historically, architecturally, and contextually associated with nineteenth century land use patterns, agricultural processes, and historic settlement in the City of Brampton and Town of Caledon.

Impact Assessment

- Of the 17 identified cultural heritage resources, six are expected to negatively impacted by the proposed work (BHR 1, CHL 2, 4, 6, 7, and 13);

- No negative impacts are anticipated for 11 identified cultural heritage resources (BHR 2, CHL 1, 3, 5, 8-12, and 14-15);

- Property-specific heritage impact statements are recommended for two identified cultural heritage resources that are expected to experience significant impacts resulting from the proposed undertaking (BHR 1 and CHL 4);

- Establishing tree protection zones to retain existing trees is recommended for all properties where tree removals are planned. In particular, it is recommended that the feasibility of implementing tree protection zones is investigated for CHL 2, 4, 6, 7, and 13;

- Landscape documentation prior to construction is recommended for five resources that are expected to experience landscape alteration as a result of construction activities (CHL 2, 4, 6, 7, and 13); and,

- Post-construction landscaping to re-establish pre-construction conditions is recommended for five cultural heritage resources that will be subject landscape alteration resulting from the proposed undertaking (CHL 2, 4, 6, 7, and 13).

5.0 RECOMMENDATIONS

The background research, data collection, and field review conducted for the study area determined that 17 cultural heritage resources are located along Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard. Based on the results of the assessment, the following recommendations have been developed:

1. Staging and construction activities should be suitably planned to avoid impacts to identified cultural heritage resources;

2. BHR 1 and CHL 4 are expected to be significantly impacted through the potential demolition of buildings, alteration to the landscape setting, and the introduction of elements that are not in keeping with the historic setting of these properties (i.e. construction of new sidewalks and reduced setbacks). A resource-specific heritage impact statement should be carried out for each resource prior to construction to evaluate the cultural heritage value of these resources, identify cultural heritage attributes, and develop appropriate mitigation measures.

3. The feasibility of implementing tree protection zones should be investigated for all identified cultural heritage resources where tree removals are planned. If possible, tree protection zones should be implemented for CHL 2, 4, 6, 7, and 13;

4. CHL 2, 4, 6, 7, and 13 are expected to be impacted through alteration to the setting by the removal of replaceable landscape features (i.e. shrubs and young trees) and the introduction of elements that are not in keeping with the historic setting of these properties (i.e. construction of new sidewalks). A cultural heritage landscape documentation report should be prepared for these properties by a qualified heritage consultant in advance of construction activities;

5. Post-construction landscaping and rehabilitation plans should be undertaken in a manner that is sympathetic to the overall setting. Wherever possible, landscaping with appropriate/sympathetic historic plant materials is recommended, and fence rows should be preserved where extant. Post-construction landscaping is recommended for CHL 2, 4, 6, 7, and 13, and for all properties that will be subject to the removal of vegetation (i.e. trees, shrubs, and flower beds) during construction; and,

6. Should future work require an expansion of the Mayfield Road study area then a qualified heritage consultant should be contacted in order to confirm the impacts of the proposed work on potential cultural heritage resources.

6.0 CULTURAL HERITAGE RESOURCE LOCATION MAPPING

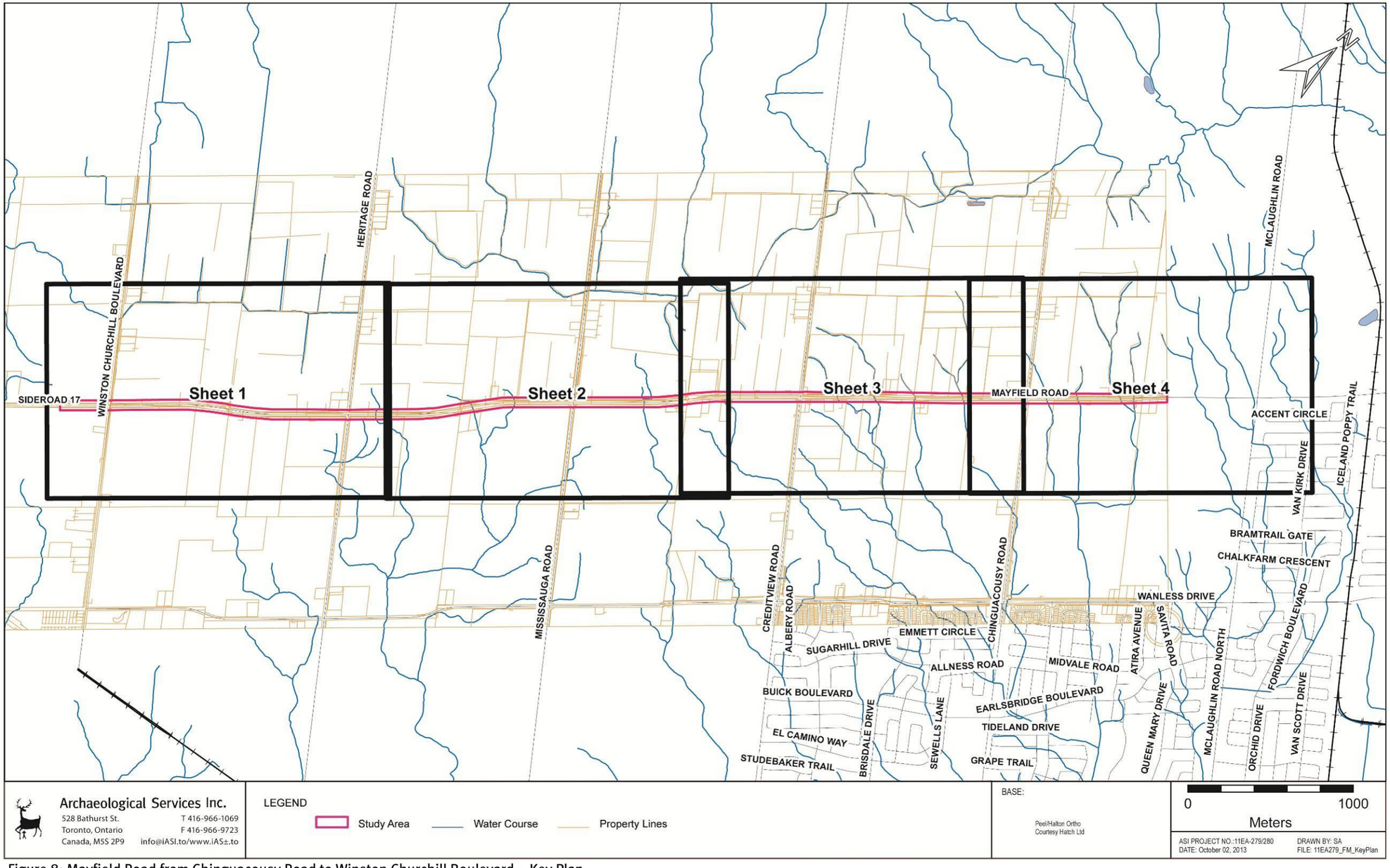


Figure 8: Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard – Key Plan

Figure 9: Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard – Location of Identified Cultural Heritage Resources (Sheet 1)

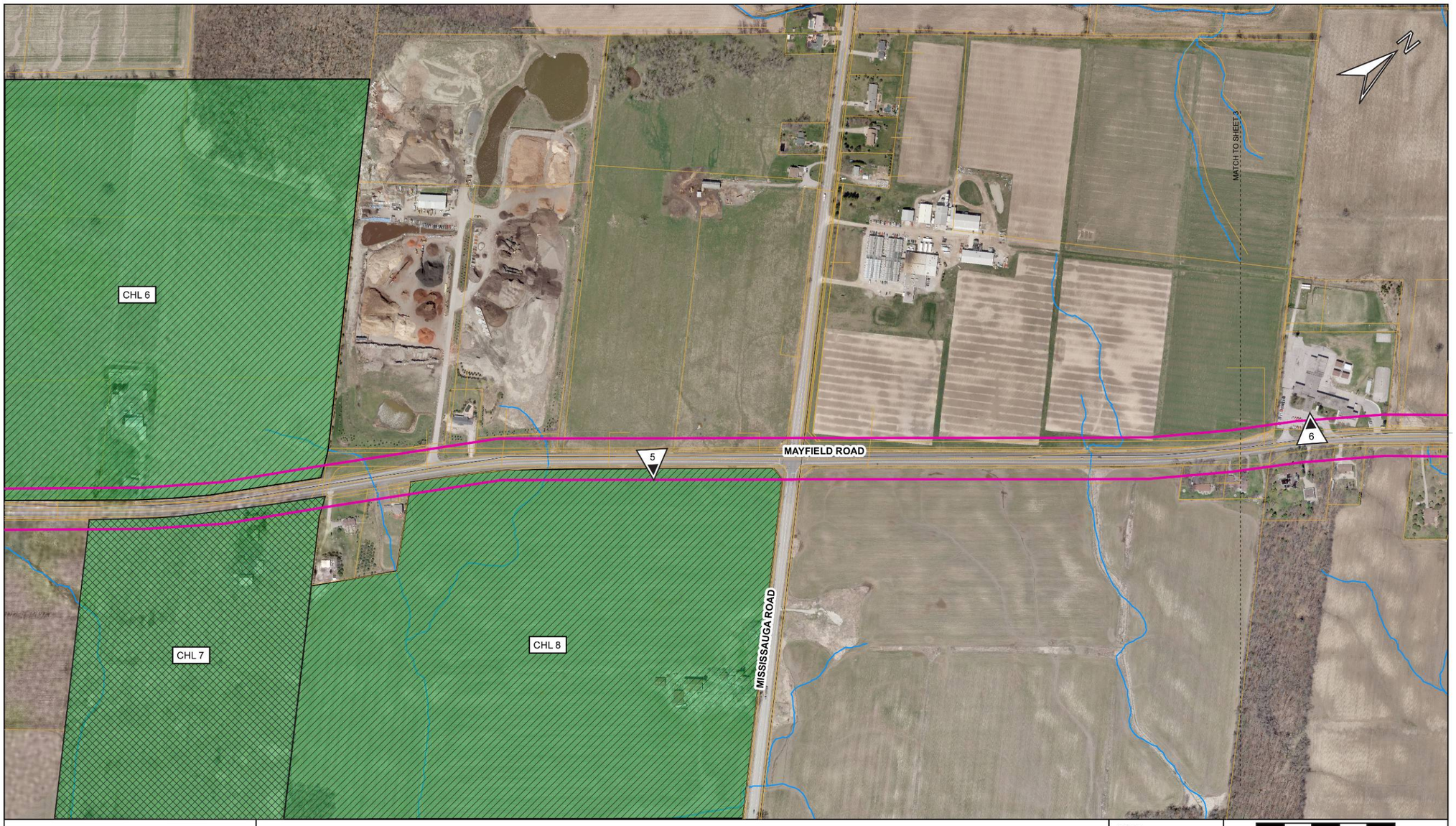


Figure 10: Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard – Location of Identified Cultural Heritage Resources (Sheet 2)

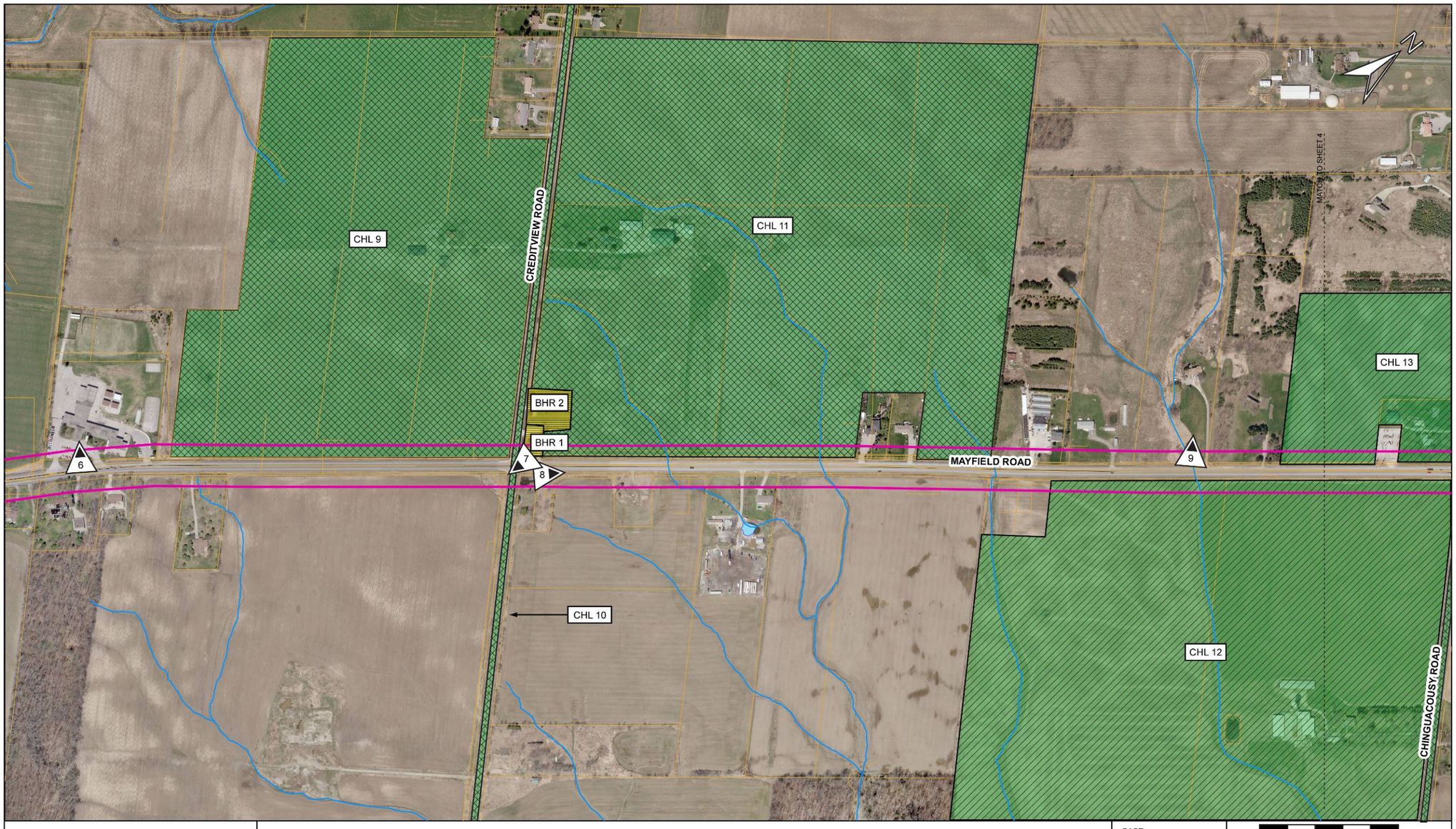


Figure 11: Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard – Location of Identified Cultural Heritage Resources (Sheet 3)

Figure 12: Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard – Location of Identified Cultural Heritage Resources (Sheet 4)

7.0 PROPOSED WORK

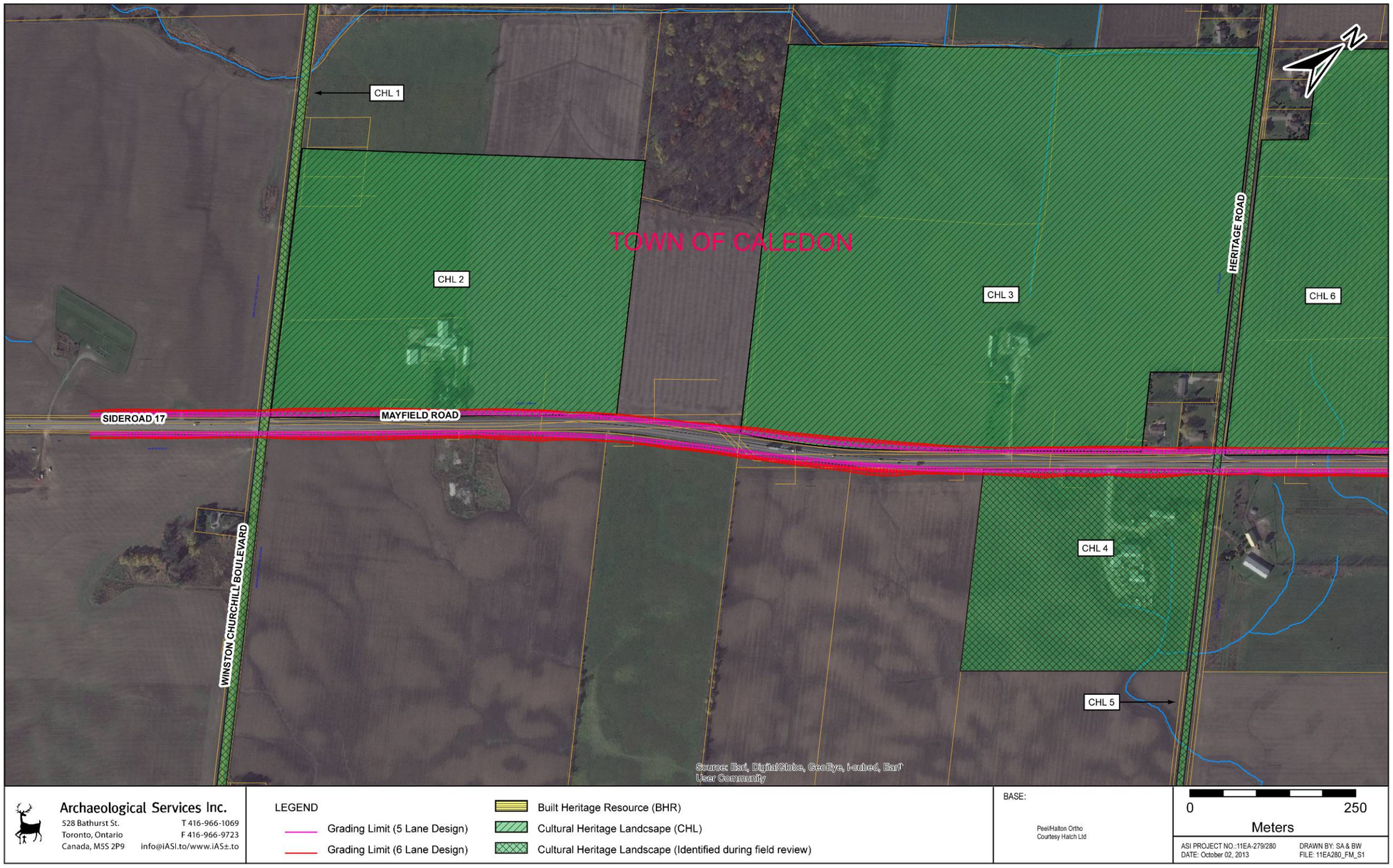


Figure 13: Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard – Proposed Work (Sheet 1)

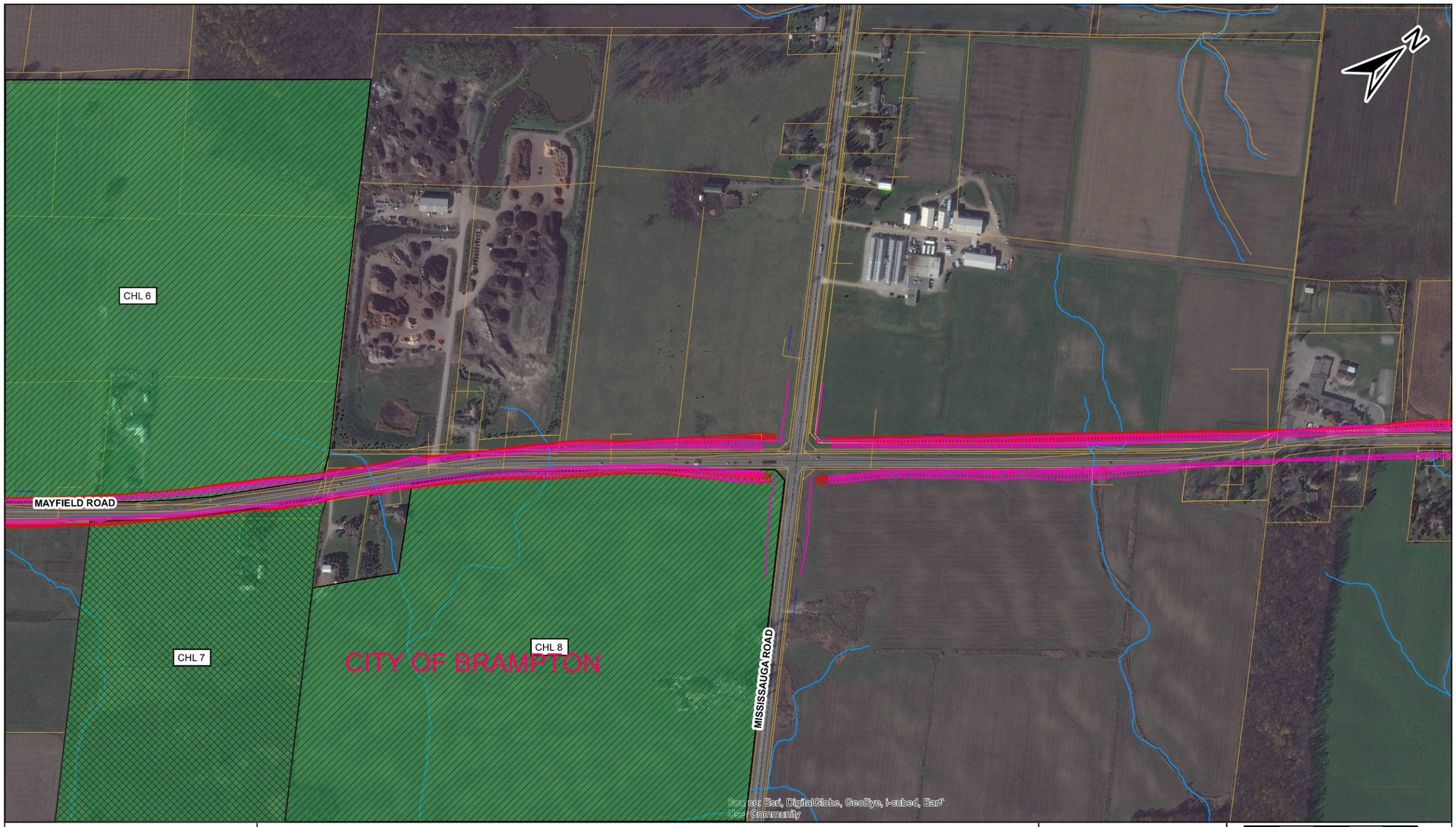


Figure 14: Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard – Proposed Work (Sheet 2)

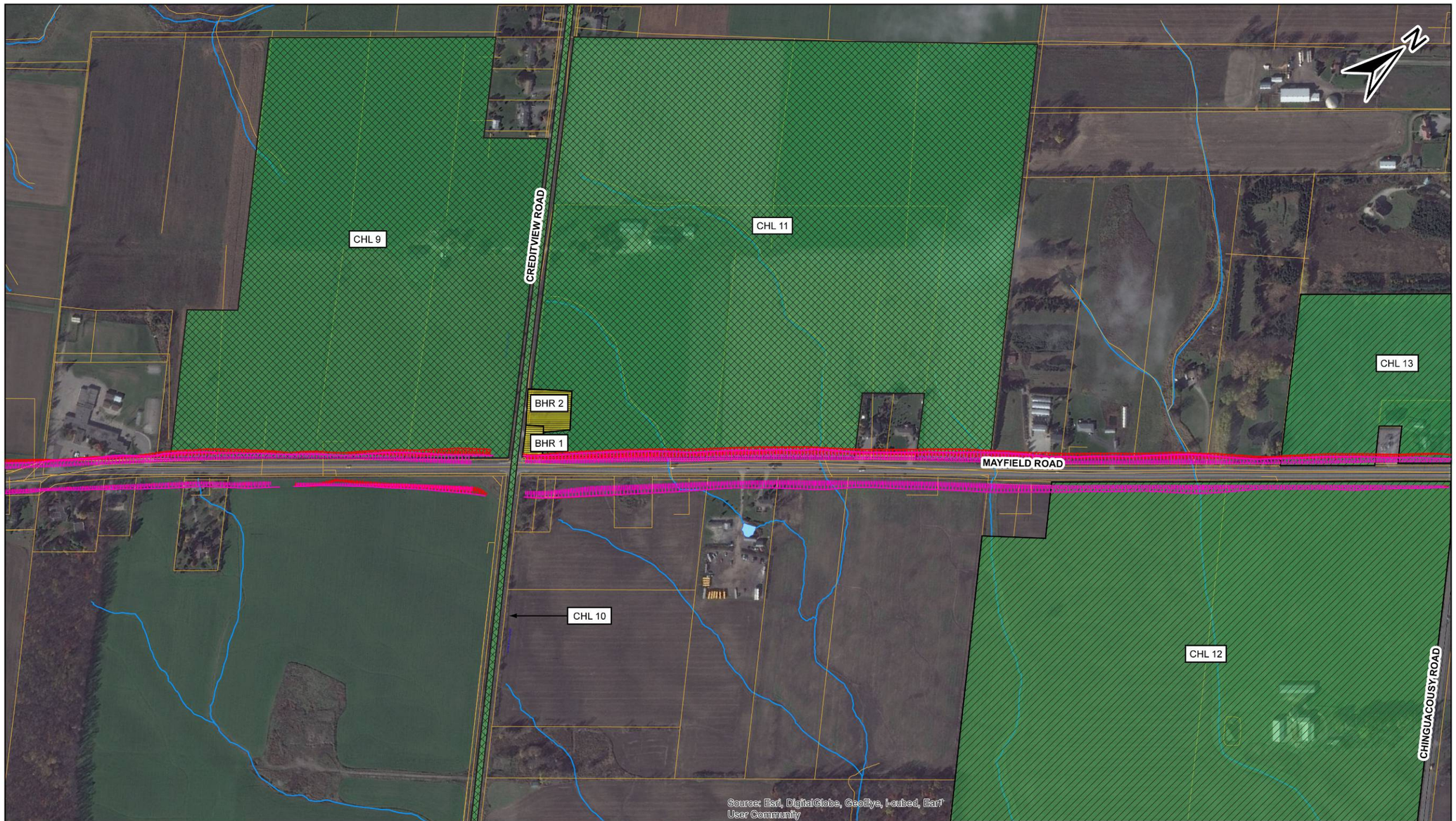


Figure 15: Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard – Proposed Work (Sheet 3)

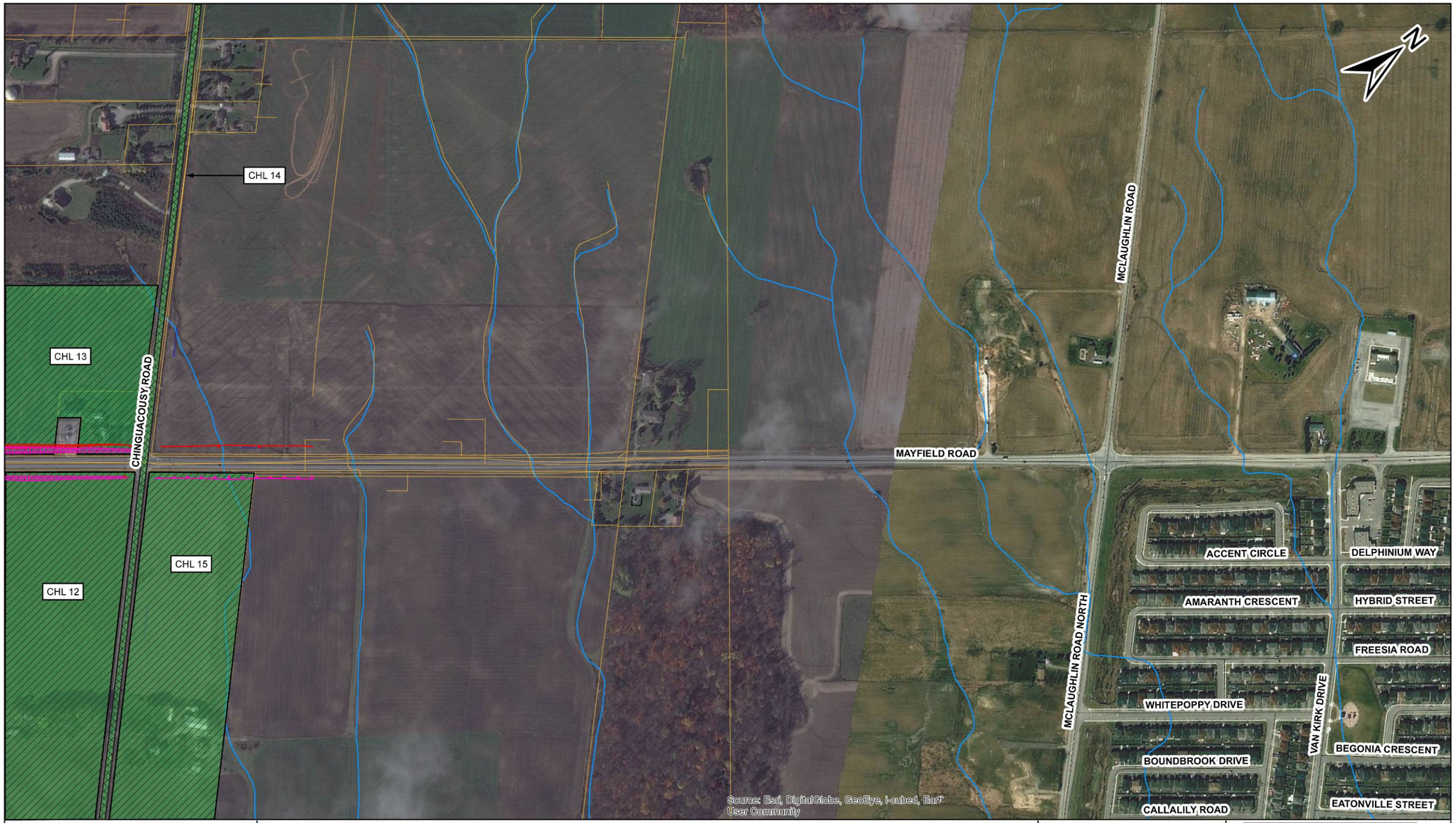


Figure 16: Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard – Proposed Work (Sheet 4)

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NOISE IMPACT ASSESSMENT

Mayfield Road Expansion, Region of Peel

PR-314225

Noise Impact Assessment

August 7, 2015

Revision and Version Tracking

Mayfield Road Expansion, Region of Peel – Noise Impact Assessment

Rev	Filename:	Editor/ Checker	Approver	Date:
0	Approved for Use	M. Choy	M. Alexander	07/08/0215

Table of Contents

1. Introduction

Mayfield Road is a two-lane east-west road forming the boundary between the City of Brampton and the Town of Caledon within the Peel Region and extends approximately 5.6km to the Halton-Peel regional boundary. Mayfield Road is largely bordered by agricultural fields with some residential, commercial and institutional properties. A Class Environmental Assessment (Class EA) for the expansion of Mayfield Road was initiated in October 2013.

The purpose of this study is to assess the noise impact of expanding Mayfield Road as part of the Class EA. This noise study is carried out based on the requirements for noise assessment and mitigation relating to the expansion of roadways as outlined in the Ontario Ministry of Transportation publication *Environmental Guide for Noise* [1].

2. Scope

The scope of the noise study presented herein includes a comparison of noise levels at sensitive residential locations resulting from projected road traffic growth with and without the Mayfield Road expansion. The projected noise levels for the horizon year of 2031, 10-years following the expected completion of construction in 2021, were calculated from a survey taken in March 2012. The traffic volume data gathered from this survey is outlined in the Hatch Mott MacDonald report, *AADT volumes for Mayfield Road* [2]. The results of the 2031 noise predictions are compared to the noise criteria currently outlined within the MTO publication, *Environmental Guide for Noise* [1].

3. Project Location

The proposed expansion of Mayfield Road is from approximately 300m southwest of Winston Churchill Boulevard to Chinguacousy Road as shown in Figure 1.

Major roads that intersect Mayfield Road within the study area include:

- Winston Churchill Boulevard
- Heritage Road
- Mississauga Road
- Creditview Road
- Chinguacousy Road

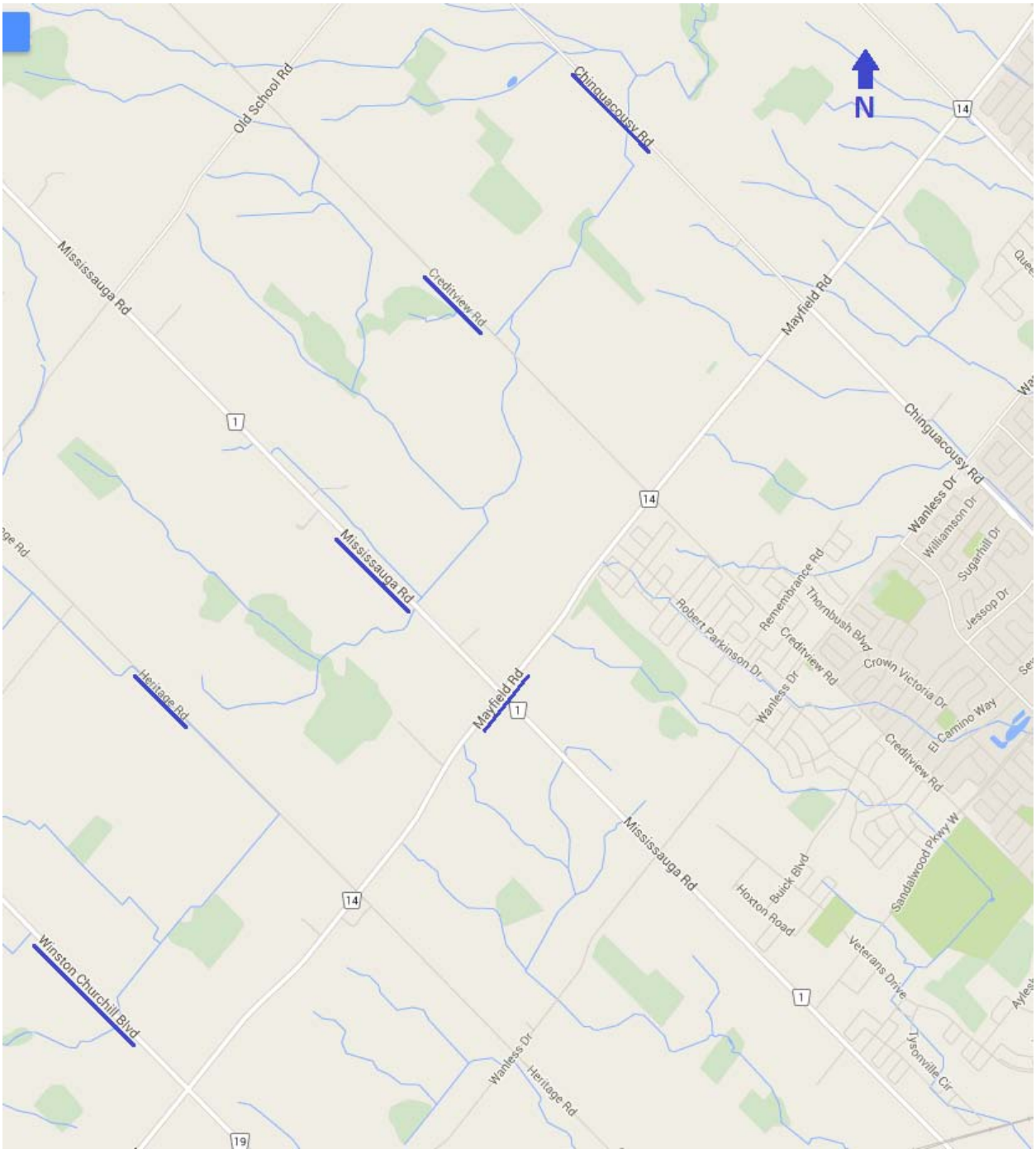


Figure 1: Frequently used roadways around the proposed Mayfield Road expansion

4. Criteria

The road traffic noise levels resulting from changes in vehicular volume due to the Mayfield Road expansion are compared to the noise levels from road traffic before the expansion takes place. General practice when assessing the noise impact due to transportation sources (see section 7 of MTO Environmental Guide for Noise [1]) requires a noise prediction accounting for a minimum 10 years of vehicular volume growth. Since the expansion project from two to four lanes is expected to be completed by 2021, the traffic growth incorporated into the noise model was extended to observe sound levels in 2031.

The MTO Environmental Guide for Noise [1] is typically a guideline for the noise assessments related to the expansion of provincial highways. However, it is common practice to employ the same criteria for the noise assessment of municipal road construction projects. The Ministry of the Environment (MOE) publication NPC-300 also contains criteria for noise levels from transportation sources within noise sensitive areas, which are more restrictive than those presented by the MTO. These MOE guidelines typically apply to the development of land for residential dwellings and commercial buildings; where noise mitigation in the form of building materials and the provision of air-conditioning units are additional options apart from barriers and berms. Therefore, the criteria that will be applied is outlined in the MTO Environmental Guide for Noise [1]. Table 1 outlines the noise mitigation effort required based on projected noise levels with the proposed improvements.

Table 1: Mitigation Effort required for the Projected Noise level with the Proposed Improvements above the Ambient, 10 Years Following Project Completion [1]

Projected Change or Overall Noise	Mitigation Effort Required
< 5 dB change or <65 dBA	None
≥ 5 dB change or ≥ 65 dB	Introduce Noise Mitigation Measures (Noise control measures should achieve a min. 5 dBA attenuation)

5. Traffic Counts

This study calculates the impact of frequently used roads around Mayfield Road in order to determine an overall traffic volume as well as the significance of each contributing road segment. The milestones for traffic volumes are as follows:

2012 – Base Case – Prior to expansion construction
2021 – Completion of expansion construction
2031 – 10-years following completion of expansion construction

Traffic counts resulting from the expansion are provided for each of the above milestones in Appendix A. However, in order to evaluate the 'no build' traffic noise level and compare that against the expansion cases for 2021 and 2031, traffic volumes for 2021 and 2031 years were to be predicted without the expansion moving forward.

The no-expansion traffic volumes of Mayfield Road for 2021 and subsequently 2031 were estimated using a 2.5% annual growth factor on the reported 2012 base case volumes. Where the predicted AADT volumes for the no-expansion case exceeded the volumes of the expansion case (it is anticipated volumes will be higher following the expansion), a 1.0% annual growth factor was used instead of 2.5%. Table 2 summarizes the Average Annual Daily Traffic (AADT) volumes used for the traffic noise analysis.

Table 2: Road Traffic and Speed Limit for frequently used Roadways around the Mayfield Road Expansion.

Road	Start	End	Link #	AADT Current (2021) (No Expansion)	Future AADT (10 years) (2031) No Expansion	Future AADT (10 years) (2031) Expansion	% of Trucks 2021	% of Trucks 2031 No Expansion	% of Trucks 2031 Expansion	Speed km/hr
Winston Churchill Blvd	Old School Rd	Mayfield Rd	(Link 1)	1750	2240	2500	5	5	5	80
Heritage Rd	Old School Rd	Mayfield Rd	(Link 2)	1180	1510	1670	9	9	8	70
Mississauga Rd	Old School Rd	Mayfield Rd	(Link 3)	8790	11252	11640	8	8	8	80
Creditview Rd	Old School Rd	Mayfield Rd	(Link 4)	2480	2739	2850	4	4	4	70
Chinguacousy Rd	Old School Rd	Mayfield Rd	(Link 5)	3680	4065	4610	3	4	3	70
Winston Churchill Blvd	Mayfield Rd	Wanless Dr	(Link 6)	5320	6810	8590	4	4	3	80
Heritage Rd	Mayfield Rd	Wanless Dr	(Link 7)	4460	5709	7700	5	5	5	70
Mississauga Rd	Mayfield Rd	Wanless Dr	(Link 8)	8700	11137	12540	7	7	7	80
Creditview Rd	Mayfield Rd	Wanless Dr	(Link 9)	3840	4242	4510	3	3	3	70
Chinguacousy Rd	Mayfield Rd	Wanless Dr	(Link 10)	9470	10461	11880	2	2	2	70
Mayfield Rd	10^{th} Line	Winston Churchill Blvd	(Link 11)	18270	23387	28460	4	4	3	80
Mayfield Rd	Winston Churchill Blvd	Heritage Rd	(Link 12)	18860	24142	30440	4	4	4	80
Mayfield Rd	Heritage Rd	Mississauga Rd	(Link 13)	20620	26395	33950	3	3	3	80
Mayfield Rd	Mississauga Rd	Creditview Rd	(Link 14)	21760	27855	35830	4	4	4	80
Mayfield Rd	Creditview Rd	Chinguacousy Rd	(Link 15)	24000	30722	38410	4	4	4	80
Mayfield Rd	Chinguacousy Rd	McLaughlin Rd	(Link 16)	26430	33833	41580	4	4	4	80

6. Receptor Locations

The purpose of the Class EA is to identify a preliminary design for the expansion of Mayfield Road. The preliminary design involves expanding Mayfield Road from two (2) to six (6) lanes from Chinguacousy Road to 1.5km west of Mississauga Road, and widening Mayfield Road from two (2) to four (4) lanes from 1.5km west of Mississauga Road to Winston Churchill Boulevard. Six (6) receptors were chosen to model locations that would be significantly affected by the roadway expansion. Each receptor selected was the nearest receptor to Mayfield Road for segments of Mayfield Road, broken-up by the following major intersections:

- Winston Churchill Boulevard
- Heritage Road
- Mississauga Road
- Creditview Road
- Chinguacousy Road

Figure 2 shows the receptor locations.

Figure 2: Location of Receptor Points

R1to R6 are the outdoor amenity areas modeled at 1.2m during the day.

- R1, House, South of Mayfield Rd on Winston Churchill Blvd
- R2, House, on Mayfield Rd between Winston Churchill Blvd and Heritage Rd
- R3, House, on Mayfield Rd between Heritage Rd and Mississauga Rd
- R4, House, on Mayfield Rd between Mississauga Rd and Creditview Rd
- R5, House, on Mayfield Rd between Creditview Rd and Chinguacousy Rd

- R6, House, South of Mayfield Rd on Chinguacousy Rd

Refer to Appendix D for a detailed view of the houses chosen as receptor locations. As the properties were conservatively assumed to have full exposure, in either direction, to traffic noise from Mayfield Road.

The Impact of North and South bound Roads on Receptors in close Proximity to Mayfield Road

In order to demonstrate the noise impact of north/southbound roads on receptors in close proximity to Mayfield Road, Receptor 5 was selected as a sample case as it was surrounded by the highest traffic volumes (Mayfield Road as well as the north/southbound side intersecting roads of Creditview and Chinguacousy Road). The location of Receptor 5 was 39 meters from Mayfield Road and exceeded 350 meters to either of the side roads, Creditview Road and Chinguacousy Road. Due to the proximity of the receptor to Mayfield Road, the calculated noise levels did not significantly differ when considering noise contributions from the side road traffic (Table 3). As a result the sound levels at receptors 2, 3 and 4 were calculated by considering only the noise contributions of Mayfield Road due to their short distance to Mayfield Road in comparison to north/southbound side roads. The noise levels at receptors 1 and 6 were evaluated by considering the traffic volumes of both Mayfield Road and the respective side roads due to their proximity to the side roads and the volume on them.

Table 3. Day-time Equivalent Sound Level (Leq) Comparison at Receptor 5 with/without Side Road Consideration in 2012. Minimal noise impact of side roads shown.

Day Leq (16 hrs) [dBA]			
All Roads* (2021)	Mayfield Road (2021)	All Roads* Expansion (2031)	Mayfield Road Expansion (2031)
62.9	62.8	64.9	64.9

*All roads encompasses Creditview Road, Chinguacousy Road and Mayfield Road.

7. Predicted Noise Levels

Using the AADT values presented in Table 2 and basic topographical information, the daytime sound levels were evaluated at the receptor locations using STAMSON V5.0 (the computer software application applying the *Ontario Road Noise Analysis Method for Environment and Transportation* (ORNAMENT)[3]). The use of STAMSON V5.0 is applicable for this study as the topography of the project area is not complex and will not significantly change as a result of the proposed changes to Mayfield Road.

Table 4 summarizes the predicted sound pressure levels at the receptors in 2021 and 2031. For input parameters to STAMSON V5.0 models, refer to Appendix B. Refer to Appendix C for the STAMSON V5.0 calculation outputs of each road segment.

Table 4. Predicted Day-time Equivalent Sound Levels (Leq) at Receptor Points in 2031.

Receptor	No. of Noise Sensitive Land Uses	Day Leq (16 hrs) [dBA]		Change due to Undertaking [dB]
		Mayfield No Expansion (2031)	Mayfield Expansion (2031)	
R1	1	57.5	58.4	0.9
R2	1	67.2	68.2*	1.0
R3	1	64.0	65.0	1.0
R4	1	62.6	63.7	1.1
R5	1	63.9	64.9	1.0
R6	1	56.5	56.7	0.2

* Exceeds noise criteria outlined in Table 1.

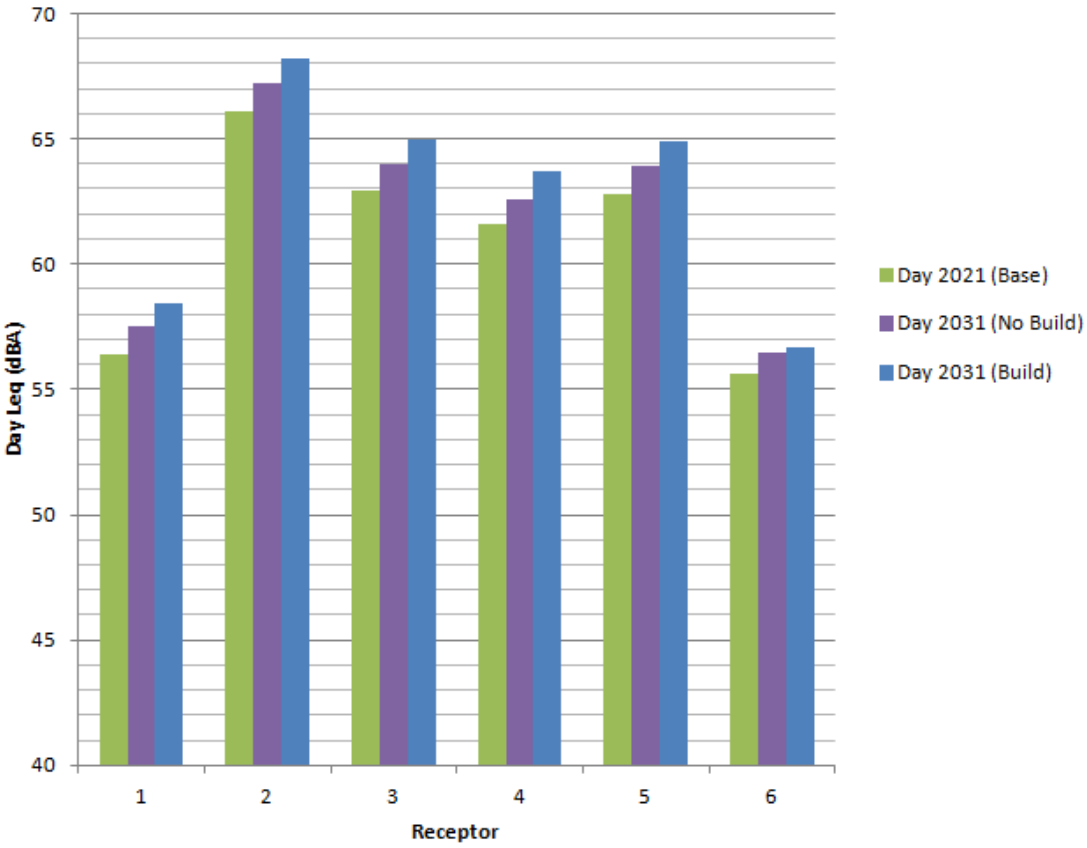
8. Analysis

The predicted noise levels as summarized in Table 4 indicate the following when compared to the criteria outlined in Table 1:

1. Predicted Noise levels 10 years following the completion of the Mayfield expansion (2031) between the expansion versus no-expansion case will not differ by more than 5dB.

2. Overall the noise levels in 2031 at the sensitive receptors indicate that all but one receptor (R2) meets the MTO Environmental Noise Guidelines of less than 65 dBA. Figure 3 demonstrates that the noise level at R2 will have already exceeded the MTO guideline of 65 dBA by 2021. Note that there is less than 1 dB difference in noise levels between the build and no build cases of 2031.

Figure 3. Predicted Day-time Equivalent Sound Levels (Leq) Comparing the 2021 No-build Case to the Build and No-Build Cases of 2031.



9. Noise Controls

In order to achieve the criteria of 65 dBA or less, as outlined in Table 1, at Receptor R2 during the daytime, it is recommended a 1.5m tall, 25m long berm be positioned on either side of the driveway leading to the residential unit (Table 5). Similar size berms are to be placed along Mayfield Road flanking residential driveway connected to Mayfield Road where the residential dwellings are less than 30m from Mayfield Road. Similarly, where residential driveways do not connect to Mayfield Road, and the residence is still within 30m of Mayfield Road, a minimum 1.5m tall, 50m long berm, centered at the residential dwelling shall be constructed.

Table 5. Receptor R2 Day-time Equivalent Sound Level (Leq) Exposure with/without a Berm for Mayfield Road Expansion.

Day Leq (16 hrs) [dBA]		Change due to Undertaking [dB]
Expansion without Berm (2031)	Expansion with Berm (2031)	
68.2	65.0	3.2

10. Summary and Conclusions

Predicted noise levels will not differ by more than 5 dB at the 6 representative noise sensitive areas between the expansion versus no expansion scenarios 10 years following the anticipated completion of the Mayfield Road expansion in 2021. One (1) receptor is expected to exceed 65 dBA in 2031 regardless of whether or not the expansion takes place. This noise sensitive area is approximately 21m from Mayfield Road.

Due to the potential of future residential development in this area, prior to the commencement of the construction, it is recommended that a 1.5m tall, 50m long berm be graded as close as possible to Mayfield Road, adjacent to each residential dwelling within 30m of Mayfield Road, or two (2) 25m long berms, one flanking either side of driveways connected to Mayfield Road, where the residential dwelling is less than 30m from Mayfield road. It is predicted that this measure will reduce daytime noise levels to 65 dBA and below for sensitive receptors in close proximity to Mayfield Road up to 10-years following the completion of construction in 2021.

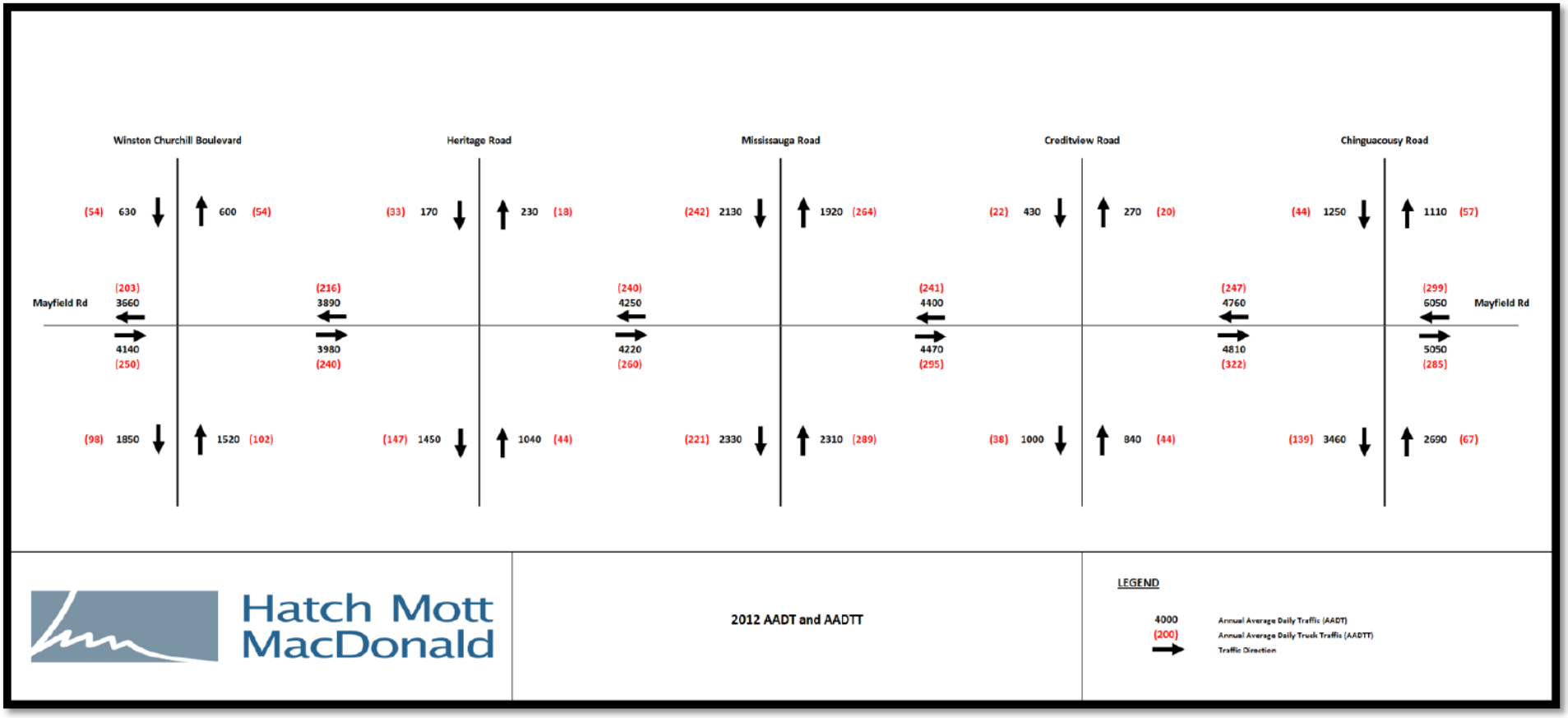
11. References

[1] *Environmental Guide for Noise,* Ontario Ministry of Transportation, October 2006

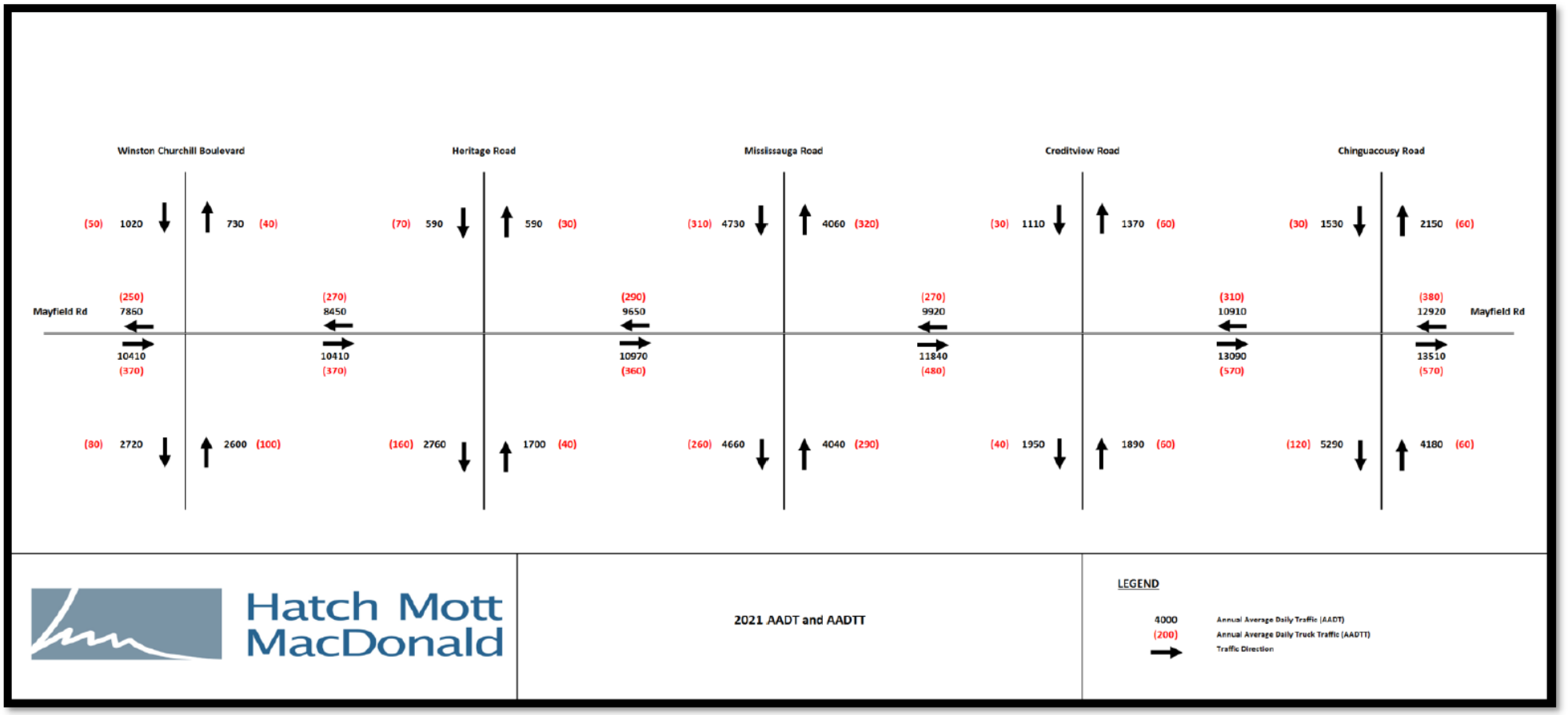
[2] *AADT Volumes for Mayfield Road,* Hatch Mott MacDonald, May 2015

[3] *ORNAMENT,* Ontario Road Noise Analysis Method for Environment and Transportation, Technical Document, Ontario Ministry of the Environment, November 1988

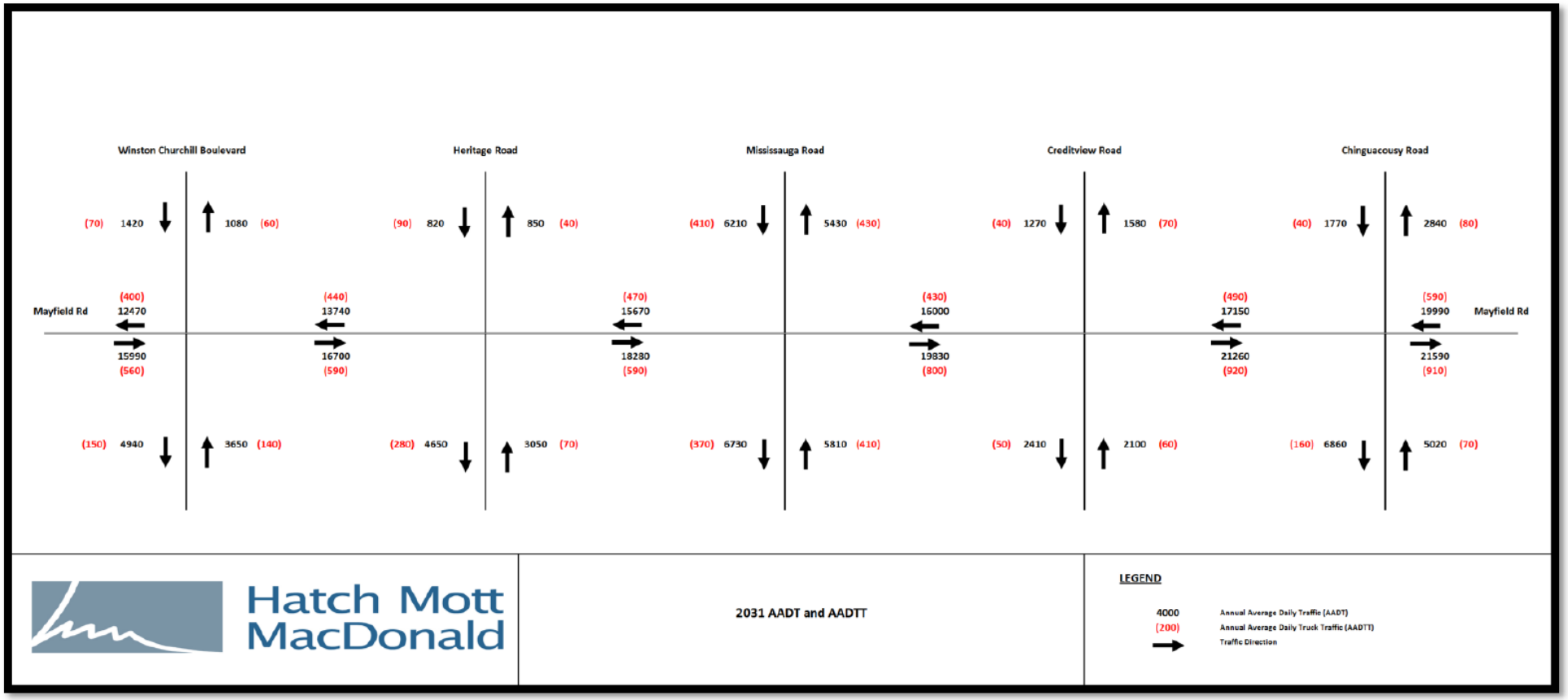
Appendix A
Traffic Count Maps



2012 Annual Average Daily Traffic and Annual Average Daily Truck Traffic



2021 Annual Average Daily Traffic including Trucks



2031 Annual Average Daily Traffic including Trucks

Appendix B
STAMSON V5.0 Parameters

Receptor	Road	Start	End	Comment	Speed Limit (km/h)	Road Gradient %	Road Pavement	Angle 1	Angle 2	Topography	Wood Depth	No of Rows of Houses	Intermediate Surface	Receiver Height Day (m)	Receiver Height Night (m)	Source Receiver Distance
R1	Mayfield Rd	10th Line	Winston Churchill	(Link 11)	80	0	1	-90	90	1	0	0	1	1.2	4.5	130
	Winston Churchill	Mayfield Rd	Wanless Dr	(Link 6)	80	0	1	-90	90	1	0	0	1	1.2	4.5	57
R2	Mayfield Rd	Winston Churchill	Heritage Rd	(Link 12)	80	0	1	-90	90	1	0	0	1	1.2	4.5	21
R3	Mayfield Rd	Heritage Rd	Mississauga Rd	(Link 13)	80	0	1	-90	90	1	0	0	1	1.2	4.5	34
R4	Mayfield Rd	Mississauga Rd	Creditview Rd	(Link 14)	80	0	1	-90	90	1	0	0	1	1.2	4.5	43
R5	Mayfield Rd	Creditview Rd	Chinguacousy Rd	(Link 15)	80	0	1	-90	90	1	0	0	1	1.2	4.5	39
R6	Mayfield Rd	Chinguacousy Rd	McLaughlin Rd	(Link 16)	80	0	1	-90	90	1	0	0	1	1.2	4.5	401
	Chinguacousy Rd	Mayfield Rd	Wanless Dr	(Link 10)	70	0	1	-90	90	1	0	0	1	1.2	4.5	50

Appendix C
Sound Levels of Road Segments at Each Representative Receptor

						Do Nothing 2012		2021 (Base)		2031 (No Build Case)		2031 (Build Case)	
Receptor	Road	Start	End	Comment	Distance (m)	Day Segment Leq (dBA)	Night Segment Leq (dBA)	Day Segment Leq (dBA)	Night Segment Leq (dBA)	Day Segment Leq (dBA)	Night Segment Leq (dBA)	Day Segment Leq (dBA)	Night Segment Leq (dBA)
R1	Mayfield Rd	10th Line	Winston Churchill	(Link 11)	130	50.3	48.2	52.8	50.7	53.9	51.8	54.7	52.6
	Winston Churchill	Mayfield Rd	Wanless Dr	(Link 6)	57	53.2	47.2	56.4	52.5	55.0	49.1	56.0	50.1
	Total Leq				-	55.0	50.7	56.4	52.5	57.5	53.7	58.4	54.5
R2	Mayfield Rd	Winston Churchill	Heritage Rd	(Link 12)	21	63.4	60.7	66.1	63.3	67.2	64.4	68.2	65.4
R2 with berm*	Mayfield Rd	Winston Churchill	Heritage Rd	(Link 12)	21	Same as above						65.0	65.4
R3	Mayfield Rd	Heritage Rd	Mississauga Rd	(Link 13)	34	60.3	57.8	62.9	60.3	64.0	61.3	65.0	62.4
R4	Mayfield Rd	Mississauga Rd	Creditview Rd	(Link 14)	43	58.9	56.4	61.6	59.1	62.6	60.1	63.7	61.2
R5	Mayfield Rd	Creditview Rd	Chinguacousy Rd	(Link 15)	39	59.9	57.4	62.8	60.3	63.9	61.4	64.9	62.3
R6	Mayfield Rd	Chinguacousy Rd	McLaughlin Rd	(Link 16)	401	43.5	55.5	46.4	44.7	47.3	45.5	48.4	46.7
	Chinguacousy Rd	Mayfield Rd	Wanless Dr	(Link 10)	50	41.8	49.4	55.0	49.0	56.0	50.0	56.1	50.1
	Total Leq				-	55.7	50.1	55.6	50.4	56.5	51.3	56.7	51.7

* 1.5m tall, two (2) 25m long berms, one flanking each side of the driveway.

Appendix D
Receptor Locations

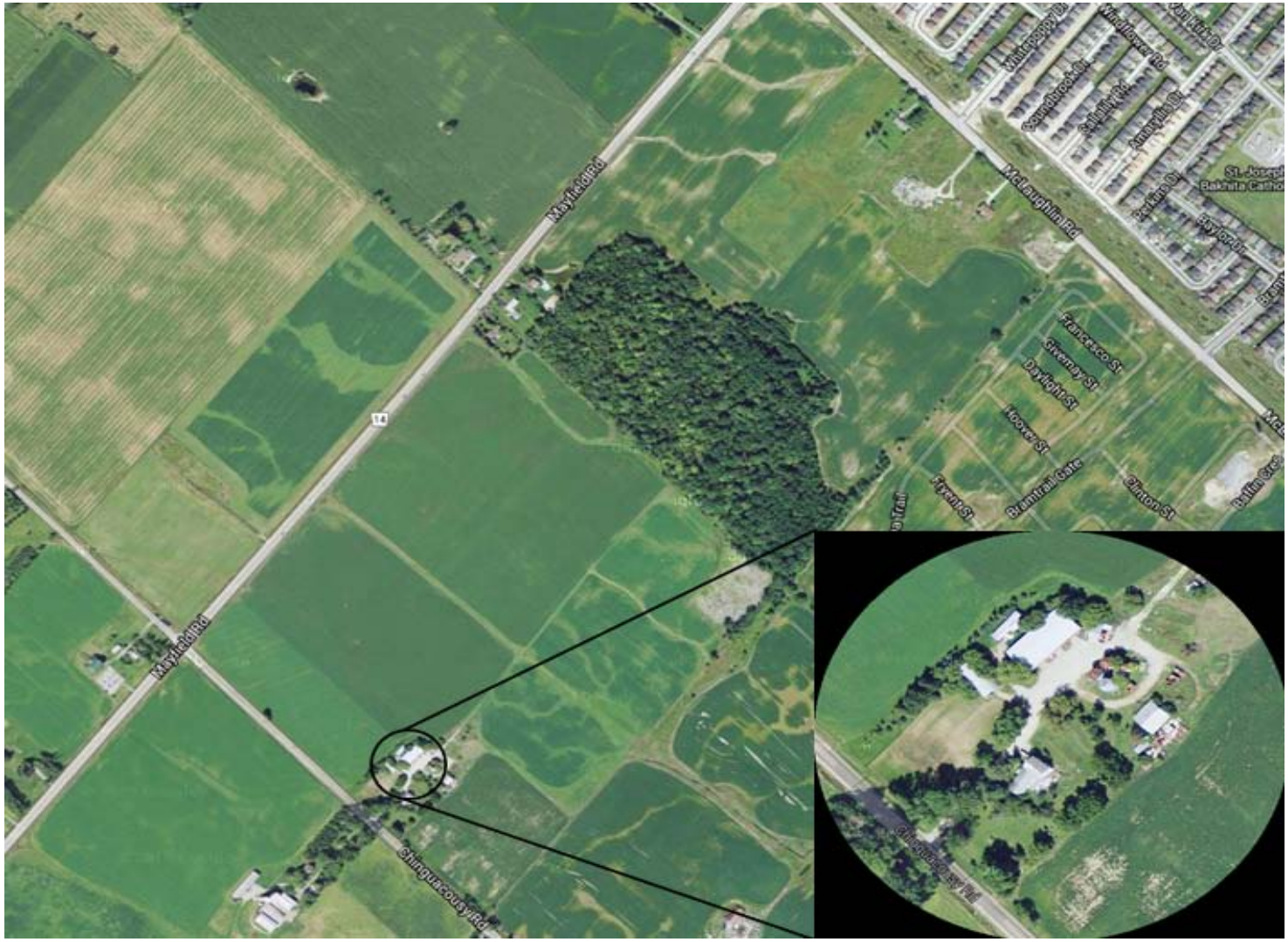
1.Mayfield Road between 10th Line and Winston Churchill Boulevard

2.Mayfield Road between Winston Churchill Boulevard and Heritage Road

3.Mayfield Road between Heritage Road and Mississauga Road

4.Mayfield Road between Mississauga Road and Creditview Road

5.Mayfield Road between Creditview Road and Chinguacousy Road



6. Mayfield Road Chinguacousy Road and McLaughlin Road

Appendix E
STAMSON Calculations

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 16:30:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT
Filename: 6f.te Time Period: Day/Night 16/8 hours
Description: Receptor 1-2012-Mayfield Rd and Winston Churchill Blvd (Excel File Name: 6FF12)
Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 5878/1470 veh/TimePeriod *
Medium truck volume : 181/45 veh/TimePeriod *
Heavy truck volume : 181/45 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
24 hr Traffic Volume (AADT or SADT): 7800
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.90
Heavy Truck % of Total Volume : 2.90
Day (16 hrs) % of Total Volume : 80.00
Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 130.00 / 130.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
Page 2
Road data, segment # 2: WC South (day/night)

Car traffic volume : 2851/317 veh/TimePeriod *
Medium truck volume : 91/10 veh/TimePeriod *
Heavy truck volume : 91/10 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
* Refers to calculated road volumes based on the following input:
24 hr Traffic Volume (AADT or SADT): 3370
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.00
Heavy Truck % of Total Volume : 3.00
Day (16 hrs) % of Total Volume : 90.00
Data for Segment # 2: WC South (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 57.00 / 57.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
Results segment # 1: Mayfield (day)

Source height = 1.31 m
ROAD (0.00 + 50.25 + 0.00) = 50.25 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.66 67.28 0.00 -15.57 -1.46 0.00 0.00 0.00 50.25

Segment Leq : 50.25 dBA
Page 3
Results segment # 2: WC South (day)

Source height = 1.32 m
ROAD (0.00 + 53.15 + 0.00) = 53.15 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.66 64.23 0.00 -9.62 -1.46 0.00 0.00 0.00 53.15

Segment Leq : 53.15 dBA
Total Leq All Segments: 54.95 dBA
Results segment # 1: Mayfield (night)

Source height = 1.30 m
ROAD (0.00 + 48.16 + 0.00) = 48.16 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.58 64.25 0.00 -14.78 -1.31 0.00 0.00 0.00 48.16

Segment Leq : 48.16 dBA
Results segment # 2: WC South (night)

Source height = 1.31 m
ROAD (0.00 + 47.22 + 0.00) = 47.22 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.58 57.67 0.00 -9.14 -1.31 0.00 0.00 0.00 47.22

Segment Leq : 47.22 dBA
Total Leq All Segments: 50.73 dBA
TOTAL Leq FROM ALL SOURCES (DAY): 54.95
(NIGHT): 50.73

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:24:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 6a.te Time Period: Day/Night 16/8 hours
Description: Receptor 1-2021-Mayfield Rd and Winston Churchill Blvd (Excel File Name: 6AF21)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 14122/3530 veh/TimePeriod *
Medium truck volume : 247/62 veh/TimePeriod *
Heavy truck volume : 247/62 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 18270
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.69
Heavy Truck % of Total Volume : 1.69
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 130.00 / 130.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 2: WC South (day/night)

Car traffic volume : 4625/514 veh/TimePeriod *
Medium truck volume : 81/9 veh/TimePeriod *
Heavy truck volume : 81/9 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 5320
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.70
Heavy Truck % of Total Volume : 1.70
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: WC South (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 57.00 / 57.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.14 m

ROAD (0.00 + 52.80 + 0.00) = 52.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	69.83	0.00	-15.57	-1.46	0.00	0.00	0.00	52.80

Segment Leq : 52.80 dBA

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Results segment # 2: WC South (day)

Source height = 1.14 m

ROAD (0.00 + 53.90 + 0.00) = 53.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	64.98	0.00	-9.62	-1.46	0.00	0.00	0.00	53.90

Segment Leq : 53.90 dBA

Total Leq All Segments: 56.40 dBA

Results segment # 1: Mayfield (night)

Source height = 1.14 m

ROAD (0.00 + 50.68 + 0.00) = 50.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	66.82	0.00	-14.83	-1.32	0.00	0.00	0.00	50.68

Segment Leq : 50.68 dBA

Results segment # 2: WC South (night)

Source height = 1.14 m

ROAD (0.00 + 47.96 + 0.00) = 47.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	58.45	0.00	-9.17	-1.32	0.00	0.00	0.00	47.96

Segment Leq : 47.96 dBA

Total Leq All Segments: 52.54 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.40
(NIGHT): 52.54

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:28:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 6b2.te Time Period: Day/Night 16/8 hours
Description: Receptor 1-2031-No Build Case-Mayfield Rd and Winston Churchill Blvd (Excel File Name: 6DNB31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 18073/4518 veh/TimePeriod *
Medium truck volume : 318/80 veh/TimePeriod *
Heavy truck volume : 318/80 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 23387
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.70
Heavy Truck % of Total Volume : 1.70
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 130.00 / 130.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 2: WC South (day/night)

Car traffic volume : 5922/658 veh/TimePeriod *
Medium truck volume : 104/12 veh/TimePeriod *
Heavy truck volume : 104/12 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 6810
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.69
Heavy Truck % of Total Volume : 1.69
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: WC South (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 57.00 / 57.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.14 m

ROAD (0.00 + 53.88 + 0.00) = 53.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	70.91	0.00	-15.57	-1.46	0.00	0.00	0.00	53.88

Segment Leq : 53.88 dBA

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Results segment # 2: WC South (day)

Source height = 1.14 m

ROAD (0.00 + 54.98 + 0.00) = 54.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	66.06	0.00	-9.62	-1.46	0.00	0.00	0.00	54.98

Segment Leq : 54.98 dBA

Total Leq All Segments: 57.48 dBA

Results segment # 1: Mayfield (night)

Source height = 1.14 m

ROAD (0.00 + 51.76 + 0.00) = 51.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	67.91	0.00	-14.82	-1.32	0.00	0.00	0.00	51.76

Segment Leq : 51.76 dBA

Results segment # 2: WC South (night)

Source height = 1.15 m

ROAD (0.00 + 49.12 + 0.00) = 49.12 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	59.60	0.00	-9.16	-1.32	0.00	0.00	0.00	49.12

Segment Leq : 49.12 dBA

Total Leq All Segments: 53.65 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.48

(NIGHT): 53.65

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:26:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 6b.te Time Period: Day/Night 16/8 hours
Description: Receptor 1-2031-Build Case-Mayfield Rd and Winston Churchill Blvd (Excel File Name: 6BF31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 21998/5500 veh/TimePeriod *
Medium truck volume : 385/96 veh/TimePeriod *
Heavy truck volume : 385/96 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 28460
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.69
Heavy Truck % of Total Volume : 1.69
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 130.00 / 130.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 2: WC South (day/night)

Car traffic volume : 7470/830 veh/TimePeriod *
Medium truck volume : 131/15 veh/TimePeriod *
Heavy truck volume : 131/15 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8590
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.69
Heavy Truck % of Total Volume : 1.69
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: WC South (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 57.00 / 57.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.14 m

ROAD (0.00 + 54.73 + 0.00) = 54.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.75	0.00	-15.57	-1.46	0.00	0.00	0.00	54.73

Segment Leq : 54.73 dBA

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Results segment # 2: WC South (day)

Source height = 1.14 m

ROAD (0.00 + 55.98 + 0.00) = 55.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.07	0.00	-9.62	-1.46	0.00	0.00	0.00	55.98

Segment Leq : 55.98 dBA

Total Leq All Segments: 58.41 dBA

Results segment # 1: Mayfield (night)

Source height = 1.14 m

ROAD (0.00 + 52.59 + 0.00) = 52.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	68.74	0.00	-14.83	-1.32	0.00	0.00	0.00	52.59

Segment Leq : 52.59 dBA

Results segment # 2: WC South (night)

Source height = 1.15 m

ROAD (0.00 + 50.11 + 0.00) = 50.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	60.59	0.00	-9.16	-1.32	0.00	0.00	0.00	50.11

Segment Leq : 50.11 dBA

Total Leq All Segments: 54.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.41

(NIGHT): 54.53

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 16:32:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 1f.te Time Period: Day/Night 16/8 hours
Description: Receptor 2-2012-Only Mayfield Rd between Winston Churchill Blvd and Heritage Rd (Excel File Name: 1FF12)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 5931/1483 veh/TimePeriod *
Medium truck volume : 183/46 veh/TimePeriod *
Heavy truck volume : 183/46 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 7870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.90
Heavy Truck % of Total Volume : 2.90
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.31 m

ROAD (0.00 + 63.44 + 0.00) = 63.44 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.32	0.00	-2.43	-1.46	0.00	0.00	0.00	63.44

Segment Leq : 63.44 dBA

Total Leq All Segments: 63.44 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.31 m

ROAD (0.00 + 60.71 + 0.00) = 60.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	64.33	0.00	-2.30	-1.31	0.00	0.00	0.00	60.71

Segment Leq : 60.71 dBA

Total Leq All Segments: 60.71 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.44
(NIGHT): 60.71

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:31:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 1b.te Time Period: Day/Night 16/8 hours
Description: Receptor 2-2021-Only Mayfield Rd between Winston Churchill Blvd and Heritage Rd (Excel File Name: 1BF21)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 14575/3644 veh/TimePeriod *
Medium truck volume : 256/64 veh/TimePeriod *
Heavy truck volume : 256/64 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 18860
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.70
Heavy Truck % of Total Volume : 1.70
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.14 m

ROAD (0.00 + 66.09 + 0.00) = 66.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	69.97	0.00	-2.43	-1.46	0.00	0.00	0.00	66.09

Segment Leq : 66.09 dBA

Total Leq All Segments: 66.09 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.14 m

ROAD (0.00 + 63.33 + 0.00) = 63.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	66.96	0.00	-2.31	-1.32	0.00	0.00	0.00	63.33

Segment Leq : 63.33 dBA

Total Leq All Segments: 63.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.09

(NIGHT): 63.33

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:32:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 1d2.te Time Period: Day/Night 16/8 hours
Description: Receptor 2-2031-No Build Case-Only Mayfield Rd between Winston Churchill Blvd and Heritage Rd (Excel File Name: 1DNB31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 18657/4664 veh/TimePeriod *
Medium truck volume : 328/82 veh/TimePeriod *
Heavy truck volume : 328/82 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 24142
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.70
Heavy Truck % of Total Volume : 1.70
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.14 m

ROAD (0.00 + 67.16 + 0.00) = 67.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.05	0.00	-2.43	-1.46	0.00	0.00	0.00	67.16

Segment Leq : 67.16 dBA

Total Leq All Segments: 67.16 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.14 m

ROAD (0.00 + 64.40 + 0.00) = 64.40 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	68.04	0.00	-2.31	-1.32	0.00	0.00	0.00	64.40

Segment Leq : 64.40 dBA

Total Leq All Segments: 64.40 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.16
(NIGHT): 64.40

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:32:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 1d.te Time Period: Day/Night 16/8 hours
Description: Receptor 2-2031-Build Case-Only Mayfield Rd between Winston Churchill Blvd and Hertiage Rd (Excel File Name: 1DF31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 23529/5882 veh/TimePeriod *
Medium truck volume : 412/103 veh/TimePeriod *
Heavy truck volume : 412/103 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 30440
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.69
Heavy Truck % of Total Volume : 1.69
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.14 m

ROAD (0.00 + 68.16 + 0.00) = 68.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	72.05	0.00	-2.43	-1.46	0.00	0.00	0.00	68.16

Segment Leq : 68.16 dBA

Total Leq All Segments: 68.16 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.14 m

ROAD (0.00 + 65.40 + 0.00) = 65.40 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	69.04	0.00	-2.31	-1.32	0.00	0.00	0.00	65.40

Segment Leq : 65.40 dBA

Total Leq All Segments: 65.40 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.16
(NIGHT): 65.40

STAMSON 5.0 NORMAL REPORT Date: 08-07-2015 09:29:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 1d3.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Mayfield L (day/night)

Car traffic volume : 23529/5882 veh/TimePeriod *
Medium truck volume : 412/103 veh/TimePeriod *
Heavy truck volume : 412/103 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 30440
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.69
Heavy Truck % of Total Volume : 1.69
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield L (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 1.20 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -57.00 deg Angle2 : -5.00 deg
Barrier height : 1.50 m
Barrier receiver distance : 17.00 / 17.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m

Reference angle : 0.00

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Road data, segment # 2: Mayfield R (day/night)

Car traffic volume : 23529/5882 veh/TimePeriod *
Medium truck volume : 412/103 veh/TimePeriod *
Heavy truck volume : 412/103 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 30440
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.69
Heavy Truck % of Total Volume : 1.69
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 2: Mayfield R (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height : 1.20 / 4.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 5.00 deg Angle2 : 57.00 deg
Barrier height : 1.50 m
Barrier receiver distance : 17.00 / 17.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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Results segment # 1: Mayfield L (day)

Source height = 1.14 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.14 ! 1.20 ! 1.15 ! 1.15

ROAD (58.40 + 58.06 + 54.05) = 62.00 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 -57 0.66 72.05 0.00 -2.43 -11.22 0.00 0.00 0.00 58.40

-57 -5 0.59 72.05 0.00 -2.32 -5.89 0.00 0.00 -5.77 58.06

-5 0 0.66 72.05 0.00 -2.43 -15.57 0.00 0.00 0.00 54.05

Segment Leq : 62.00 dBA

Results segment # 2: Mayfield R (day)

Source height = 1.14 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.14 ! 1.20 ! 1.15 ! 1.15

ROAD (54.05 + 58.06 + 58.40) = 62.00 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---

```
   0     5   0.66  72.05   0.00  -2.43 -15.57   0.00   0.00   0.00  54.05
-------------------------------------------------------------------------------
   5    57   0.59  72.05   0.00  -2.32  -5.89   0.00   0.00  -5.77  58.06
-------------------------------------------------------------------------------
  57    90   0.66  72.05   0.00  -2.43 -11.22   0.00   0.00   0.00  58.40
-------------------------------------------------------------------------------
```

Segment Leq : 62.00 dBA

Total Leq All Segments: 65.01 dBA

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Results segment # 1: Mayfield L (night)

Source height = 1.14 m

Barrier height for grazing incidence

```
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
      1.14 !       4.50 !       1.78 !        1.78
```

ROAD (55.92 + 60.84 + 51.16) = 62.39 dBA

```
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
  -90   -57   0.58  69.04   0.00  -2.31 -10.81   0.00   0.00   0.00  55.92
-------------------------------------------------------------------------------
  -57    -5   0.49  69.04   0.00  -2.18  -5.81   0.00   0.00  -4.46  56.59*
  -57    -5   0.58  69.04   0.00  -2.31  -5.88   0.00   0.00   0.00  60.84
-------------------------------------------------------------------------------
   -5     0   0.58  69.04   0.00  -2.31 -15.57   0.00   0.00   0.00  51.16
-------------------------------------------------------------------------------
```

 * Bright Zone !

Segment Leq : 62.39 dBA

Results segment # 2: Mayfield R (night)

Source height = 1.14 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)

1.14 ! 4.50 ! 1.78 ! 1.78

ROAD (51.16 + 60.84 + 55.92) = 62.39 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	5	0.58	69.04	0.00	-2.31	-15.57	0.00	0.00	0.00	51.16
5	57	0.49	69.04	0.00	-2.18	-5.81	0.00	0.00	-4.46	56.59*
5	57	0.58	69.04	0.00	-2.31	-5.88	0.00	0.00	0.00	60.84
57	90	0.58	69.04	0.00	-2.31	-10.81	0.00	0.00	0.00	55.92

* Bright Zone !

Segment Leq : 62.39 dBA

Total Leq All Segments: 65.40 dBA

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TOTAL Leq FROM ALL SOURCES (DAY): 65.01
(NIGHT): 65.40

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 16:33:41
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2f.te Time Period: Day/Night 16/8 hours
Description: Receptor 3-2012-Only Mayfield Rd between Heritage Rd and Mississauga Rd (Excel File Name: 2FF12)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 6376/1594 veh/TimePeriod *
Medium truck volume : 200/50 veh/TimePeriod *
Heavy truck volume : 200/50 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8470
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.95
Heavy Truck % of Total Volume : 2.95
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 34.00 / 34.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.31 m

ROAD (0.00 + 60.32 + 0.00) = 60.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.68	0.00	-5.90	-1.46	0.00	0.00	0.00	60.32

Segment Leq : 60.32 dBA

Total Leq All Segments: 60.32 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.31 m

ROAD (0.00 + 57.75 + 0.00) = 57.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	64.67	0.00	-5.60	-1.31	0.00	0.00	0.00	57.75

Segment Leq : 57.75 dBA

Total Leq All Segments: 57.75 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.32
(NIGHT): 57.75

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:34:27
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2b.te Time Period: Day/Night 16/8 hours
Description: Receptor 3-2021-Only Mayfield Rd between Heritage Rd and Mississauga Rd (Excel File Name: 2BF21)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 15975/3994 veh/TimePeriod *
Medium truck volume : 261/65 veh/TimePeriod *
Heavy truck volume : 261/65 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 20620
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.58
Heavy Truck % of Total Volume : 1.58
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 34.00 / 34.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.12 m

ROAD (0.00 + 62.88 + 0.00) = 62.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	70.23	0.00	-5.90	-1.46	0.00	0.00	0.00	62.88

Segment Leq : 62.88 dBA

Total Leq All Segments: 62.88 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.12 m

ROAD (0.00 + 60.27 + 0.00) = 60.27 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	67.22	0.00	-5.62	-1.32	0.00	0.00	0.00	60.27

Segment Leq : 60.27 dBA

Total Leq All Segments: 60.27 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.88
(NIGHT): 60.27

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:36:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2d2.te Time Period: Day/Night 16/8 hours
Description: Receptor 3-2031-No Build Case-Only Mayfield Rd between Heritage Rd and Mississauga Rd (Excel File Name: 2DNB31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 20449/5112 veh/TimePeriod *
Medium truck volume : 334/83 veh/TimePeriod *
Heavy truck volume : 334/83 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 26395
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.58
Heavy Truck % of Total Volume : 1.58
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 34.00 / 34.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.12 m

ROAD (0.00 + 63.95 + 0.00) = 63.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.31	0.00	-5.90	-1.46	0.00	0.00	0.00	63.95

Segment Leq : 63.95 dBA

Total Leq All Segments: 63.95 dBA

Page 2

Results segment # 1: Mayfield (night)

Source height = 1.12 m

ROAD (0.00 + 61.34 + 0.00) = 61.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	68.28	0.00	-5.62	-1.32	0.00	0.00	0.00	61.34

Segment Leq : 61.34 dBA

Total Leq All Segments: 61.34 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.95
(NIGHT): 61.34

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:35:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 2d.te Time Period: Day/Night 16/8 hours
Description: Receptor 3-2031-Only Mayfield Rd between Heritage Rd and Mississauga Rd (Excel File Name: 2DF31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 26313/6578 veh/TimePeriod *
Medium truck volume : 424/106 veh/TimePeriod *
Heavy truck volume : 424/106 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 33950
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.56
Heavy Truck % of Total Volume : 1.56
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 34.00 / 34.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.12 m

ROAD (0.00 + 65.02 + 0.00) = 65.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	72.38	0.00	-5.90	-1.46	0.00	0.00	0.00	65.02

Segment Leq : 65.02 dBA

Total Leq All Segments: 65.02 dBA

Page 2

Results segment # 1: Mayfield (night)

Source height = 1.12 m

ROAD (0.00 + 62.42 + 0.00) = 62.42 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	69.36	0.00	-5.62	-1.32	0.00	0.00	0.00	62.42

Segment Leq : 62.42 dBA

Total Leq All Segments: 62.42 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.02
(NIGHT): 62.42

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 16:35:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 3f.te Time Period: Day/Night 16/8 hours
Description: Receptor 4-2012-Only Mayfield Rd between Mississauga Rd and Creditview Rd (Excel File Name: 3FF12)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 6670/1668 veh/TimePeriod *
Medium truck volume : 213/53 veh/TimePeriod *
Heavy truck volume : 213/53 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8870
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.00
Heavy Truck % of Total Volume : 3.00
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 43.00 / 43.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.32 m

ROAD (0.00 + 58.87 + 0.00) = 58.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	67.92	0.00	-7.59	-1.46	0.00	0.00	0.00	58.87

Segment Leq : 58.87 dBA

Total Leq All Segments: 58.87 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.31 m

ROAD (0.00 + 56.38 + 0.00) = 56.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	64.90	0.00	-7.21	-1.31	0.00	0.00	0.00	56.38

Segment Leq : 56.38 dBA

Total Leq All Segments: 56.38 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.87
(NIGHT): 56.38

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:38:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 3b.te Time Period: Day/Night 16/8 hours
Description: Receptor 4-2021-Only Mayfield Rd between Mississauga Rd and Creditview Rd (Excel File Name: 3BF21)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 16806/4201 veh/TimePeriod *
Medium truck volume : 301/75 veh/TimePeriod *
Heavy truck volume : 301/75 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 21760
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.73
Heavy Truck % of Total Volume : 1.73
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 43.00 / 43.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.15 m

ROAD (0.00 + 61.58 + 0.00) = 61.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	70.63	0.00	-7.59	-1.46	0.00	0.00	0.00	61.58

Segment Leq : 61.58 dBA

Total Leq All Segments: 61.58 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.15 m

ROAD (0.00 + 59.06 + 0.00) = 59.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	67.61	0.00	-7.23	-1.32	0.00	0.00	0.00	59.06

Segment Leq : 59.06 dBA

Total Leq All Segments: 59.06 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.58
(NIGHT): 59.06

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:41:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 3d2.te Time Period: Day/Night 16/8 hours
Description: Receptor 4-2031-No Build Case-Only Mayfield Rd between Mississauga Rd and Creditview Rd (Excel File Name: 3DNB31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 21517/5379 veh/TimePeriod *
Medium truck volume : 383/96 veh/TimePeriod *
Heavy truck volume : 383/96 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 27855
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.72
Heavy Truck % of Total Volume : 1.72
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 43.00 / 43.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.15 m

ROAD (0.00 + 62.64 + 0.00) = 62.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.69	0.00	-7.59	-1.46	0.00	0.00	0.00	62.64

Segment Leq : 62.64 dBA

Total Leq All Segments: 62.64 dBA

Page 2

Results segment # 1: Mayfield (night)

Source height = 1.15 m

ROAD (0.00 + 60.13 + 0.00) = 60.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	68.68	0.00	-7.23	-1.32	0.00	0.00	0.00	60.13

Segment Leq : 60.13 dBA

Total Leq All Segments: 60.13 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.64
(NIGHT): 60.13

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:40:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 3d.te Time Period: Day/Night 16/8 hours
Description: Receptor 4-2031-Build Case-Only Mayfield Rd between Mississauga Rd and Creditview Rd (Excel File Name: 3DF31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 27678/6919 veh/TimePeriod *
Medium truck volume : 493/123 veh/TimePeriod *
Heavy truck volume : 493/123 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 35830
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.72
Heavy Truck % of Total Volume : 1.72
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 43.00 / 43.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.15 m

ROAD (0.00 + 63.73 + 0.00) = 63.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	72.78	0.00	-7.59	-1.46	0.00	0.00	0.00	63.73

Segment Leq : 63.73 dBA

Total Leq All Segments: 63.73 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.14 m

ROAD (0.00 + 61.22 + 0.00) = 61.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	69.77	0.00	-7.23	-1.32	0.00	0.00	0.00	61.22

Segment Leq : 61.22 dBA

Total Leq All Segments: 61.22 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.73
(NIGHT): 61.22

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 16:37:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4f.te Time Period: Day/Night 16/8 hours
Description: Receptor 5-2012-Only Mayfield Rd between Creditview Rd and Chinguacousy Rd (Excel File Name: 4FF12)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 7197/1799 veh/TimePeriod *
Medium truck volume : 230/57 veh/TimePeriod *
Heavy truck volume : 230/57 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 9570
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 3.00
Heavy Truck % of Total Volume : 3.00
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 / 39.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.32 m

ROAD (0.00 + 59.91 + 0.00) = 59.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	68.25	0.00	-6.89	-1.46	0.00	0.00	0.00	59.91

Segment Leq : 59.91 dBA

Total Leq All Segments: 59.91 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.31 m

ROAD (0.00 + 57.37 + 0.00) = 57.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	65.22	0.00	-6.54	-1.31	0.00	0.00	0.00	57.37

Segment Leq : 57.37 dBA

Total Leq All Segments: 57.37 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.91
(NIGHT): 57.37

STAMSON 5.0 NORMAL REPORT Date: 02-07-2015 14:38:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4a.te Time Period: Day/Night 16/8 hours
Description: Receptor 5-2021-All Roads (Mayfield Rd, Creditview Rd and Chinguacousy Rd) (Excel File Name: 4AF21)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 18490/4622 veh/TimePeriod *
Medium truck volume : 355/89 veh/TimePeriod *
Heavy truck volume : 355/89 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 24000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.85
Heavy Truck % of Total Volume : 1.85
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 / 39.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 2: CView (day/night)

Car traffic volume : 5517/613 veh/TimePeriod *
Medium truck volume : 85/9 veh/TimePeriod *
Heavy truck volume : 85/9 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 6320
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: CView (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 368.00 / 368.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 3: Ching (day/night)

Car traffic volume : 11586/1287 veh/TimePeriod *
Medium truck volume : 124/14 veh/TimePeriod *
Heavy truck volume : 124/14 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 13150
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.05
Heavy Truck % of Total Volume : 1.05
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 3: Ching (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 366.00 / 366.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.17 m

ROAD (0.00 + 62.84 + 0.00) = 62.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.18	0.00	-6.89	-1.46	0.00	0.00	0.00	62.84

Segment Leq : 62.84 dBA

Results segment # 2: CView (day)

Source height = 1.11 m

ROAD (0.00 + 36.62 + 0.00) = 36.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq

```
  -90     0   0.66  64.16   0.00 -23.07  -4.47   0.00   0.00   0.00  36.62
--------------------------------------------------------------------------------
```

Segment Leq : 36.62 dBA

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Results segment # 3: Ching (day)

Source height = 1.01 m

ROAD (0.00 + 39.24 + 0.00) = 39.24 dBA

```
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    0    90   0.66  66.74   0.00 -23.03  -4.47   0.00   0.00   0.00  39.24
--------------------------------------------------------------------------------
```

Segment Leq : 39.24 dBA

Total Leq All Segments: 62.87 dBA

Results segment # 1: Mayfield (night)

Source height = 1.17 m

ROAD (0.00 + 60.30 + 0.00) = 60.30 dBA

```
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
  -90    90   0.58  68.18   0.00  -6.56  -1.32   0.00   0.00   0.00  60.30
--------------------------------------------------------------------------------
```

Segment Leq : 60.30 dBA

Results segment # 2: CView (night)

Source height = 1.09 m

ROAD (0.00 + 31.21 + 0.00) = 31.21 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.58	57.53	0.00	-21.99	-4.33	0.00	0.00	0.00	31.21

Segment Leq : 31.21 dBA

Results segment # 3: Ching (night)

Source height = 1.02 m

ROAD (0.00 + 33.91 + 0.00) = 33.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.58	60.23	0.00	-21.98	-4.34	0.00	0.00	0.00	33.91

Segment Leq : 33.91 dBA

Total Leq All Segments: 60.32 dBA

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TOTAL Leq FROM ALL SOURCES (DAY): 62.87
(NIGHT): 60.32

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:42:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4b.te Time Period: Day/Night 16/8 hours
Description: Receptor 5-2021-Only Mayfield Rd between Creditview Rd and Chinguacousy Rd (Excel File Name: 4BF21)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 18497/4624 veh/TimePeriod *
Medium truck volume : 351/88 veh/TimePeriod *
Heavy truck volume : 351/88 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 24000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.83
Heavy Truck % of Total Volume : 1.83
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 / 39.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.16 m

ROAD (0.00 + 62.81 + 0.00) = 62.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.16	0.00	-6.89	-1.46	0.00	0.00	0.00	62.81

Segment Leq : 62.81 dBA

Total Leq All Segments: 62.81 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.16 m

ROAD (0.00 + 60.28 + 0.00) = 60.28 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	68.15	0.00	-6.56	-1.32	0.00	0.00	0.00	60.28

Segment Leq : 60.28 dBA

Total Leq All Segments: 60.28 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.81
(NIGHT): 60.28

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:45:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4d2.te Time Period: Day/Night 16/8 hours
Description: Receptor 5-2031-No Build Case-Only Mayfield Rd between Creditview Rd and Chinguacousy Rd (Excel File Name: 4DNB31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 23673/5918 veh/TimePeriod *
Medium truck volume : 452/113 veh/TimePeriod *
Heavy truck volume : 452/113 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 30722
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.84
Heavy Truck % of Total Volume : 1.84
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 / 39.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.16 m

ROAD (0.00 + 63.90 + 0.00) = 63.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	72.24	0.00	-6.89	-1.46	0.00	0.00	0.00	63.90

Segment Leq : 63.90 dBA

Total Leq All Segments: 63.90 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.16 m

ROAD (0.00 + 61.35 + 0.00) = 61.35 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	69.23	0.00	-6.56	-1.32	0.00	0.00	0.00	61.35

Segment Leq : 61.35 dBA

Total Leq All Segments: 61.35 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.90
(NIGHT): 61.35

STAMSON 5.0 NORMAL REPORT Date: 08-07-2015 15:53:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4c.te Time Period: Day/Night 16/8 hours
Description: Receptor 5-2031-Build Case-All Roads (Mayfield Rd, Creditview Rd and Chinguacousy Rd) (Excel File Name: 4DNB31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 29597/7399 veh/TimePeriod *
Medium truck volume : 565/141 veh/TimePeriod *
Heavy truck volume : 565/141 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 38410
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.84
Heavy Truck % of Total Volume : 1.84
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 / 39.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 2: Cview (day/night)

Car traffic volume : 6425/714 veh/TimePeriod *
Medium truck volume : 99/11 veh/TimePeriod *
Heavy truck volume : 99/11 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 7360
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.50
Heavy Truck % of Total Volume : 1.50
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Cview (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 368.00 / 368.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 3: Ching (day/night)

Car traffic volume : 14526/1614 veh/TimePeriod *
Medium truck volume : 157/17 veh/TimePeriod *
Heavy truck volume : 157/17 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 16490
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.06
Heavy Truck % of Total Volume : 1.06
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 3: Ching (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 366.00 / 366.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.16 m

ROAD (0.00 + 64.87 + 0.00) = 64.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	73.21	0.00	-6.89	-1.46	0.00	0.00	0.00	64.87

Segment Leq : 64.87 dBA

Results segment # 2: Cview (day)

Source height = 1.11 m

ROAD (0.00 + 37.28 + 0.00) = 37.28 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq

-90 0 0.66 64.82 0.00 -23.07 -4.47 0.00 0.00 0.00 37.28

Segment Leq : 37.28 dBA

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Results segment # 3: Ching (day)

Source height = 1.01 m

ROAD (0.00 + 40.24 + 0.00) = 40.24 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

---

0 90 0.66 67.74 0.00 -23.03 -4.47 0.00 0.00 0.00 40.24

Segment Leq : 40.24 dBA

Total Leq All Segments: 64.89 dBA

Results segment # 1: Mayfield (night)

Source height = 1.16 m

ROAD (0.00 + 62.32 + 0.00) = 62.32 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq

---

-90 90 0.58 70.20 0.00 -6.56 -1.32 0.00 0.00 0.00 62.32

Segment Leq : 62.32 dBA

Results segment # 2: Cview (night)

Source height = 1.11 m

ROAD (0.00 + 31.97 + 0.00) = 31.97 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.58	58.29	0.00	-21.98	-4.33	0.00	0.00	0.00	31.97

Segment Leq : 31.97 dBA

Results segment # 3: Ching (night)

Source height = 1.01 m

ROAD (0.00 + 34.84 + 0.00) = 34.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.58	61.17	0.00	-21.99	-4.34	0.00	0.00	0.00	34.84

Segment Leq : 34.84 dBA

Total Leq All Segments: 62.33 dBA

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TOTAL Leq FROM ALL SOURCES (DAY): 64.89
(NIGHT): 62.33

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 13:44:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 4d.te Time Period: Day/Night 16/8 hours
Description: Receptor 5-2031-Build Case-Only Mayfield Rd between Creditview Rd and Chinguacousy Rd (Excel File Name: 4DF31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 29597/7399 veh/TimePeriod *
Medium truck volume : 565/141 veh/TimePeriod *
Heavy truck volume : 565/141 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 38410
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.84
Heavy Truck % of Total Volume : 1.84
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 39.00 / 39.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.16 m

ROAD (0.00 + 64.87 + 0.00) = 64.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	73.21	0.00	-6.89	-1.46	0.00	0.00	0.00	64.87

Segment Leq : 64.87 dBA

Total Leq All Segments: 64.87 dBA

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Results segment # 1: Mayfield (night)

Source height = 1.16 m

ROAD (0.00 + 62.32 + 0.00) = 62.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	70.20	0.00	-6.56	-1.32	0.00	0.00	0.00	62.32

Segment Leq : 62.32 dBA

Total Leq All Segments: 62.32 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.87
(NIGHT): 62.32

STAMSON 5.0 NORMAL REPORT Date: 30-06-2015 16:39:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 5f.te Time Period: Day/Night 16/8 hours
Description: Receptor 6-2012-Mayfield Rd and Chinguacousy Rd (Excel File Name: 5FF12)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 8409/2102 veh/TimePeriod *
Medium truck volume : 235/59 veh/TimePeriod *
Heavy truck volume : 235/59 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 11100
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.65
Heavy Truck % of Total Volume : 2.65
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 401.00 / 401.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 2: Ching South (day/night)

Car traffic volume : 5347/594 veh/TimePeriod *
Medium truck volume : 94/10 veh/TimePeriod *
Heavy truck volume : 94/10 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 6150
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.70
Heavy Truck % of Total Volume : 1.70
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Ching South (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 50.00 / 50.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.28 m

ROAD (0.00 + 43.45 + 0.00) = 43.45 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	68.59	0.00	-23.69	-1.46	0.00	0.00	0.00	43.45

Segment Leq : 43.45 dBA

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Results segment # 2: Ching South (day)

Source height = 1.14 m

ROAD (0.00 + 55.48 + 0.00) = 55.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	65.62	0.00	-8.68	-1.46	0.00	0.00	0.00	55.48

Segment Leq : 55.48 dBA

Total Leq All Segments: 55.74 dBA

Results segment # 1: Mayfield (night)

Source height = 1.28 m

ROAD (0.00 + 41.78 + 0.00) = 41.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	65.59	0.00	-22.50	-1.31	0.00	0.00	0.00	41.78

Segment Leq : 41.78 dBA

Results segment # 2: Ching South (night)

Source height = 1.13 m

ROAD (0.00 + 49.41 + 0.00) = 49.41 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	59.00	0.00	-8.27	-1.32	0.00	0.00	0.00	49.41

Segment Leq : 49.41 dBA

Total Leq All Segments: 50.10 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.74

(NIGHT): 50.10

STAMSON 5.0 NORMAL REPORT Date: 08-07-2015 08:51:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 5a.te Time Period: Day/Night 16/8 hours
Description: Receptor 6-2021-Mayfield Rd and Chinguacousy Rd (Excel File Name: 5AF21)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 20383/5096 veh/TimePeriod *
Medium truck volume : 381/95 veh/TimePeriod *
Heavy truck volume : 381/95 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 26430
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.80
Heavy Truck % of Total Volume : 1.80
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 401.00 / 401.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 2: Ching South (day/night)

Car traffic volume : 8361/929 veh/TimePeriod *
Medium truck volume : 81/9 veh/TimePeriod *
Heavy truck volume : 81/9 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 9470
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 0.95
Heavy Truck % of Total Volume : 0.95
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Ching South (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 50.00 / 50.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.16 m

ROAD (0.00 + 46.40 + 0.00) = 46.40 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	71.55	0.00	-23.69	-1.46	0.00	0.00	0.00	46.40

Segment Leq : 46.40 dBA

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Results segment # 2: Ching South (day)

Source height = 0.99 m

ROAD (0.00 + 55.04 + 0.00) = 55.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	65.17	0.00	-8.68	-1.46	0.00	0.00	0.00	55.04

Segment Leq : 55.04 dBA

Total Leq All Segments: 55.60 dBA

Results segment # 1: Mayfield (night)

Source height = 1.16 m

ROAD (0.00 + 44.66 + 0.00) = 44.66 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	68.53	0.00	-22.55	-1.32	0.00	0.00	0.00	44.66

Segment Leq : 44.66 dBA

Results segment # 2: Ching South (night)

Source height = 0.99 m

ROAD (0.00 + 49.02 + 0.00) = 49.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.59	58.64	0.00	-8.29	-1.33	0.00	0.00	0.00	49.02

Segment Leq : 49.02 dBA

Total Leq All Segments: 50.38 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.60

(NIGHT): 50.38

STAMSON 5.0 NORMAL REPORT Date: 08-07-2015 08:59:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 5b2.te Time Period: Day/Night 16/8 hours
Description: Receptor 6-2031-No Build Case-Mayfield Rd and Chinguacousy Rd (Excel File Name: 5DNB31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 24847/6212 veh/TimePeriod *
Medium truck volume : 464/116 veh/TimePeriod *
Heavy truck volume : 464/116 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 32218
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.80
Heavy Truck % of Total Volume : 1.80
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 401.00 / 401.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 2: Ching South (day/night)

Car traffic volume : 10182/1131 veh/TimePeriod *
Medium truck volume : 104/12 veh/TimePeriod *
Heavy truck volume : 104/12 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 11544
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.00
Heavy Truck % of Total Volume : 1.00
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Ching South (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 50.00 / 50.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.16 m

ROAD (0.00 + 47.26 + 0.00) = 47.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	72.41	0.00	-23.69	-1.46	0.00	0.00	0.00	47.26

Segment Leq : 47.26 dBA

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Results segment # 2: Ching South (day)

Source height = 1.00 m

ROAD (0.00 + 55.97 + 0.00) = 55.97 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	66.11	0.00	-8.68	-1.46	0.00	0.00	0.00	55.97

Segment Leq : 55.97 dBA

Total Leq All Segments: 56.52 dBA

Results segment # 1: Mayfield (night)

Source height = 1.16 m

ROAD (0.00 + 45.53 + 0.00) = 45.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	69.40	0.00	-22.55	-1.32	0.00	0.00	0.00	45.53

Segment Leq : 45.53 dBA

Results segment # 2: Ching South (night)

Source height = 1.01 m

ROAD (0.00 + 50.02 + 0.00) = 50.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	59.63	0.00	-8.29	-1.33	0.00	0.00	0.00	50.02

Segment Leq : 50.02 dBA

Total Leq All Segments: 51.34 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.52

(NIGHT): 51.34

STAMSON 5.0 NORMAL REPORT Date: 08-07-2015 08:53:27
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: 5b.te Time Period: Day/Night 16/8 hours
Description: Receptor 6-2031-Build Case-Mayfield Rd and Chinguacousy Rd (Excel File Name: 5BF31)

Road data, segment # 1: Mayfield (day/night)

Car traffic volume : 32060/8015 veh/TimePeriod *
Medium truck volume : 602/151 veh/TimePeriod *
Heavy truck volume : 602/151 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 41580
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 1.81
Heavy Truck % of Total Volume : 1.81
Day (16 hrs) % of Total Volume : 80.00

Data for Segment # 1: Mayfield (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 401.00 / 401.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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Road data, segment # 2: Ching South (day/night)

Car traffic volume : 10485/1165 veh/TimePeriod *
Medium truck volume : 104/12 veh/TimePeriod *
Heavy truck volume : 104/12 veh/TimePeriod *
Posted speed limit : 70 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 11880
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 0.97
Heavy Truck % of Total Volume : 0.97
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 2: Ching South (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 50.00 / 50.00 m
Receiver height : 1.20 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Mayfield (day)

Source height = 1.16 m

ROAD (0.00 + 48.38 + 0.00) = 48.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	73.53	0.00	-23.69	-1.46	0.00	0.00	0.00	48.38

Segment Leq : 48.38 dBA

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Results segment # 2: Ching South (day)

Source height = 0.99 m

ROAD (0.00 + 56.06 + 0.00) = 56.06 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	66.19	0.00	-8.68	-1.46	0.00	0.00	0.00	56.06

Segment Leq : 56.06 dBA

Total Leq All Segments: 56.74 dBA

Results segment # 1: Mayfield (night)

Source height = 1.16 m

ROAD (0.00 + 46.65 + 0.00) = 46.65 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	70.52	0.00	-22.55	-1.32	0.00	0.00	0.00	46.65

Segment Leq : 46.65 dBA

Results segment # 2: Ching South (night)

Source height = 1.00 m

ROAD (0.00 + 50.10 + 0.00) = 50.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.58	59.72	0.00	-8.29	-1.33	0.00	0.00	0.00	50.10

Segment Leq : 50.10 dBA

Total Leq All Segments: 51.72 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.74

(NIGHT): 51.72

M AIR QUALITY

Local Air Quality Assessment
Mayfield Road Improvements from Chinguacousy Road to Winston Churchill Boulevard
Brampton, Ontario

Novus Reference No. 12-0194 FINAL November 17th, 2015

NOVUS PROJECT TEAM:

Scientist:	Laura Clark, B.Eng., EIT
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Project Manager:	Scott Shayko, Hon.B.Comm., B.Sc.

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1.0 Introduction

Novus Environmental Inc. (Novus) was retained by Hatch Mott MacDonald to conduct an air quality assessment for the proposed improvements and widening of Mayfield Road in Brampton, Ontario. This project is to assess the existing conditions, as well as the impacts of the increased traffic volumes as a result of the proposed widening of Mayfield Road. The study area is approximately 5.5 km in length and is shown in **Figure 1**.

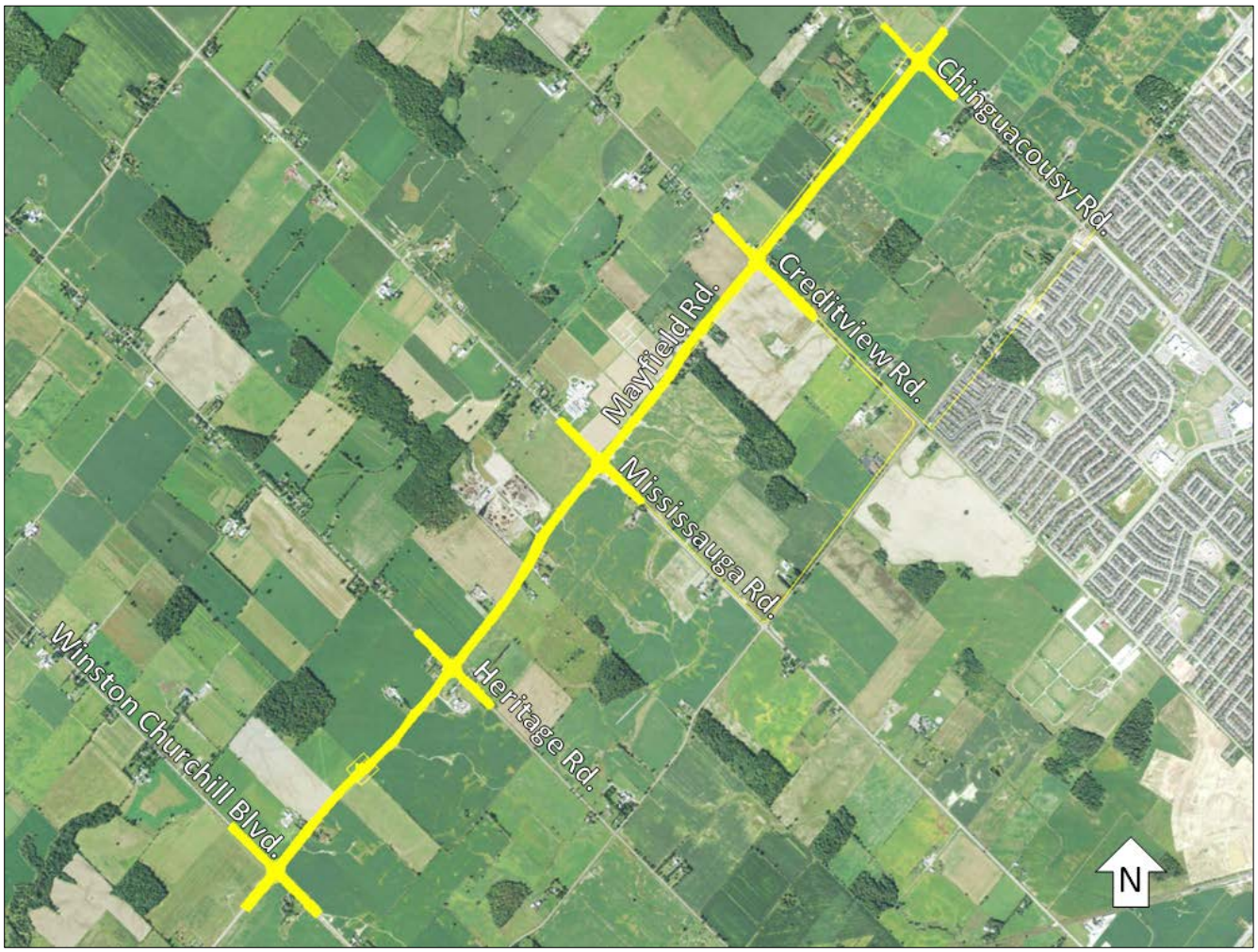


Figure 1: Study Area for Local Air Quality Assessment, Showing Existing (Yellow)

1.1 Background

This project assesses the impacts of proposed improvements to Mayfield Road which forms the boundary between the City of Brampton and the Town of Caledon, in Ontario. The study considers the expected traffic volume increases along Mayfield Road due to the proposed widening. The proposed improvements include widening Mayfield Road from two to six lanes from Chinguacousy Road to just west of Mississauga Road, and from two to four lanes from

just west of Mississauga Road to Winston Churchill Boulevard. Traffic stop light improvements are planned at each intersecting crossroad along the study area, with the addition of turning storage lanes at select intersections.

1.2 Study Objectives

The purpose of the study is to assess the local air quality impacts due to predicted increases in traffic volumes, the widening of Mayfield Road and crossroads from Chinguacousy Road to Winston Churchill Boulevard, and traffic signal additions. The objectives of this study are as follows:

- to predict the concentrations of selected contaminants resulting from roadway traffic for the 2013 existing scenario;
- to predict the concentrations of selected contaminants resulting from roadway traffic for the 2031 future build scenario, including the roadway widening and intersection improvements;
- to predict the combined effect of roadway traffic and ambient background concentrations at representative worst-case receptors; and
- to use these predictions to assess potential impacts of the project according to the applicable guidelines.

1.3 Contaminants of Interest

The contaminants of interest for this study are those regularly assessed for transportation assessments in Ontario, as determined by the Ministry of Transportation Ontario and Ministry of the Environment and Climate Change. Motor vehicle emissions have largely been determined by scientists and engineers with United States and Canadian government agencies such as the U.S. Environmental Protection Agency (EPA), the Ontario Ministry of the Environment and Climate Change (MOECC), Environment Canada (EC), Health Canada (HC), and the Ministry of Transportation Ontario (MTO). These contaminants are emitted due to fuel combustion, brake wear, tire wear, the breakdown of dust on the roadway, fuel leaks, evaporation and permeation, and refuelling leaks and spills as illustrated in **Figure 2**. Note that emissions related to refuelling leaks and spills are not applicable to motor vehicle emissions from roadway travel. Instead, these emissions contribute to the overall background levels of the applicable contaminants. All of the selected contaminants are emitted during fuel combustion, and the contaminants emitted from brake wear, tire wear, and breakdown of road dust are emitted as particulates. A summary of these contaminants are provided in **Table 1**.

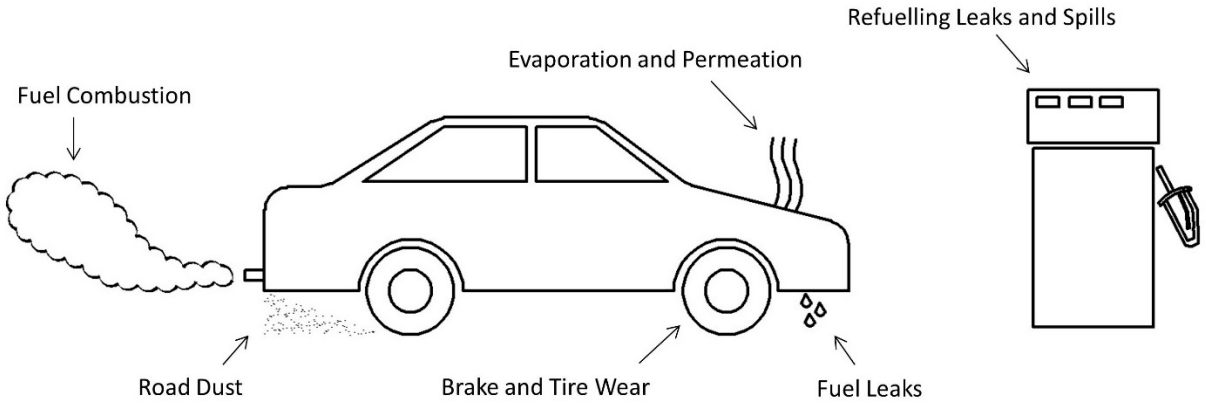


Figure 2: Motor Vehicle Emission Sources

Table 1: Contaminants of Interest

Contaminants		Volatile Organic Compounds (VOCs)	
Name	**Symbol**	**Name**	**Symbol**
Nitrogen Dioxide	NO_2	Acetaldehyde	C_2H_4O
Carbon Monoxide	CO	Acrolein	C_3H_4O
Fine Particulate Matter (<2.5 microns in diameter)	$PM_{2.5}$	Benzene	C_6H_6
Coarse Particulate Matter (<10 microns in diameter)	PM_{10}	1,3-Butadiene	C_4H_6
Total Suspended Particulate Matter (<44 microns in diameter)	TSP	Formaldehyde	CH_2O

1.4 Applicable Guidelines

In order to assess the impact of the project, the predicted effects at sensitive receptors were compared to guidelines established by government agencies and organizations. Relevant agencies and organizations in Canada and their applicable contaminant guidelines are:

- MOECC Ambient Air Quality Criteria (AAQC);
- Health Canada/Environment Canada National Ambient Air Quality Objectives (NAAQOs); and
- Canadian Council of Ministers of the Environment (CCME) Canada Wide Standards (CWSs).

Within the guidelines, the threshold value for each contaminant and its applicable averaging period was used to assess the maximum predicted effect at sensitive receptors derived from computer simulations. The contaminants of interest are compared against 1-, 8-, and 24-hour averaging periods. The threshold values and averaging periods used in this assessment are presented in **Table 2** below. It should be noted that the Canada Wide Standard (CWS) for

$PM_{2.5}$ is not based on the maximum threshold value; $PM_{2.5}$ is assessed based on the annual 98th percentile value, averaged over 3 consecutive years.

Table 2: Applicable Contaminant Guidelines

Contaminant	Averaging Period (hrs)	Threshold Value (µg/m^3)	Source
NO_2	1	400	AAQC
	24	200	AAQC
CO	1	36,200	AAQC
	8	15,700	AAQC
$PM_{2.5}$	24	27*	CWS (27 µg/m^3 standard is to be phased in in 2020)
PM_{10}	24	50	Interim AAQC
TSP	24	120	AAQC
Acetaldehyde	24	500	AAQC
Acrolein	24	0.4	MOECC Environmental Registry
Benzene	24	2.3	MOECC Environmental Registry
1,3-Butadiene	24	10	MOECC Environmental Registry
Formaldehyde	24	65	AAQC

* The CWS is based on the annual 98th percentile concentration, averaged over three consecutive years

1.5 General Assessment Methodology

The worst-case contaminant concentrations due to motor vehicle emissions from the roadways were predicted at nearby receptors using dispersion modelling software on an hourly basis for a five-year period. 2009-2013 historical meteorological data from the Toronto Pearson International Airport was used. Five years were modelled in order to capture the worst-case meteorological conditions. Two emissions scenarios were assessed:

2013:

- Existing vehicle volumes on existing roadway and crossroads

2031 Build:

- Increased vehicle volumes with the proposed roadway widening and intersection improvements

Combined concentrations were determined by adding modelled and background concentrations (i.e., ambient data) together on an hourly basis. Background concentrations for all available contaminants were determined from MOECC and NAPS (National Air Pollution Surveillance) datasets for the most representative locations; typically the 'representative locations' are stations within a close proximity to the study area.

Maximum 1-hour, 8-hour and 24-hour predicted combined concentrations were determined for comparison with the applicable guidelines using emission and dispersion models published by

the U.S. Environmental Protection Agency (EPA). The worst-case predicted impacts are presented in this report, however, it is important to note that the worst-case impacts may only occur at one receptor for a short duration.

Local background concentrations are presented in **Section 2.0**. Impacts due to roadway traffic for 2013 and 2031 are presented in **Section 3.0**.

2.0 Background Ambient Data

2.1 Overview

Background (ambient) conditions are measured contaminant concentrations that are exclusive of emissions from the existing or proposed project infrastructure. These emissions are typically the result of trans-boundary (macro-scale), regional (meso-scale), and local (micro-scale) emission sources and result due to both primary and secondary formation. Primary contaminants are emitted directly by the source and secondary contaminants are formed by complex chemical reactions in the atmosphere. Secondary pollution is generally formed over great distances in the presence of sunlight and heat and most noticeably results in the formation of fine particulate matter ($PM_{2.5}$) and ground-level ozone (O_3), also known as smog.

In Ontario, a significant amount of smog originates from emission sources in the United States which is the major contributor during smog events which usually occur in the summer season (MOECC, 2005). During smog episodes, the U.S. contribution to $PM_{2.5}$ can be as much as 90 percent near the southwest U.S. border. The effect of U.S. air pollution in Ontario on a high $PM_{2.5}$ day and on an average $PM_{2.5}$ spring/summer day is illustrated in **Figure 3**.

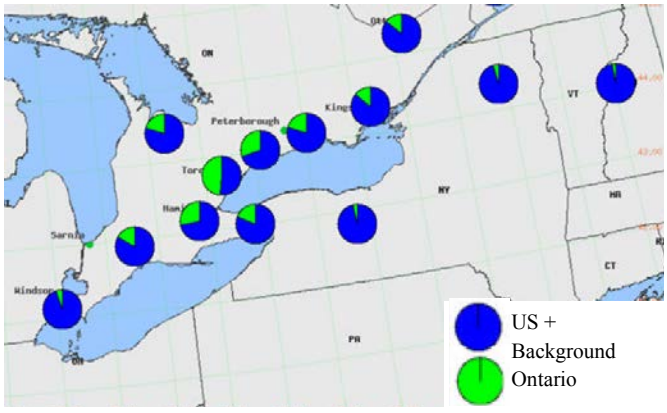
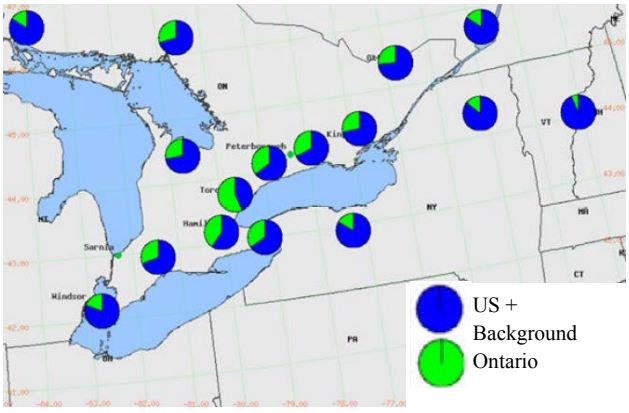
High $PM_{2.5}$ Days	Average $PM_{2.5}$ of Spring/Summer Season
	

Figure 3: Effect of Trans-Boundary Air Pollution (MOECC, 2005)

Air pollution is strongly influenced by weather systems (i.e., meteorology) that typically move out of central Canada into the mid-west of the U.S. then eastward to the Atlantic coast. This weather system generally produces winds with a southerly component that travel over major emission sources in the U.S. and result in the transport of pollution into Ontario. This phenomenon is demonstrated in the following figure and is based on a computer simulation from the Weather Research and Forecasting (WRF) Model.

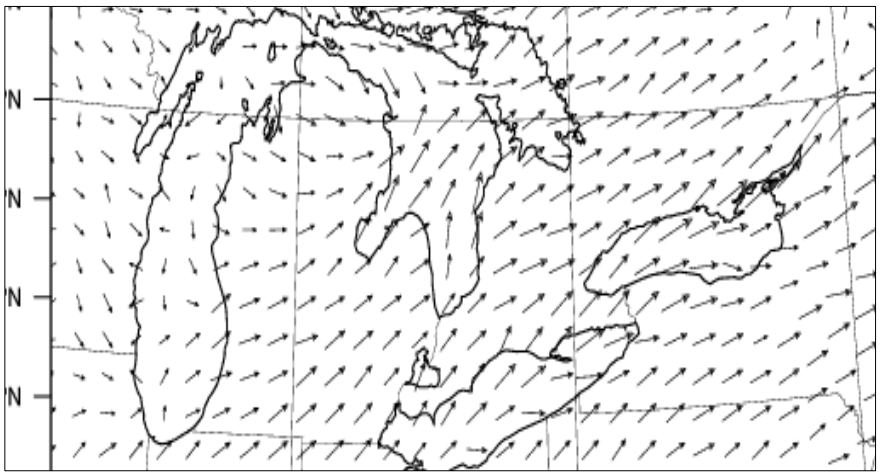


Figure 4: Typical Wind Direction during a Smog Episode

As discussed, understanding the composition of background air pollution and its influences is important in determining the potential impacts of a project, considering that the majority of the combined concentrations are typically due to existing elevated ambient background levels. In this assessment, background conditions were characterized utilizing existing ambient monitoring data from MOECC and NAPS Network stations which were added to the modelled predictions in order to conservatively estimate the combined concentration.

2.2 Selection of Relevant Ambient Monitoring Stations

A review of MOECC and NAPS ambient monitoring stations in Ontario was undertaken to identify the monitoring stations that are in relative proximity to the study area and that would be representative of background contaminant concentrations in the study area. Six MOECC (Brampton, Mississauga, Guelph, Toronto Downtown, Toronto North, and Toronto West) and five NAPS (Etobicoke West, Etobicoke South, Brampton, Windsor West, and Egbert) stations were determined to be representative. It should be understood that the selection of the Egbert and Windsor stations is due to the fact that formaldehyde and acetaldehyde have only been recently measured at the Egbert and Windsor stations and acrolein has only been recently measured at the Windsor station. It is likely that acrolein concentrations from Windsor result in conservative background concentrations in the study area due to the large amount of industrial activity in the Windsor area.

The locations of the relevant ambient monitoring stations in relation to the study area are shown in **Figure 5** and **Figure 6**. Station information is presented in **Table 3**.

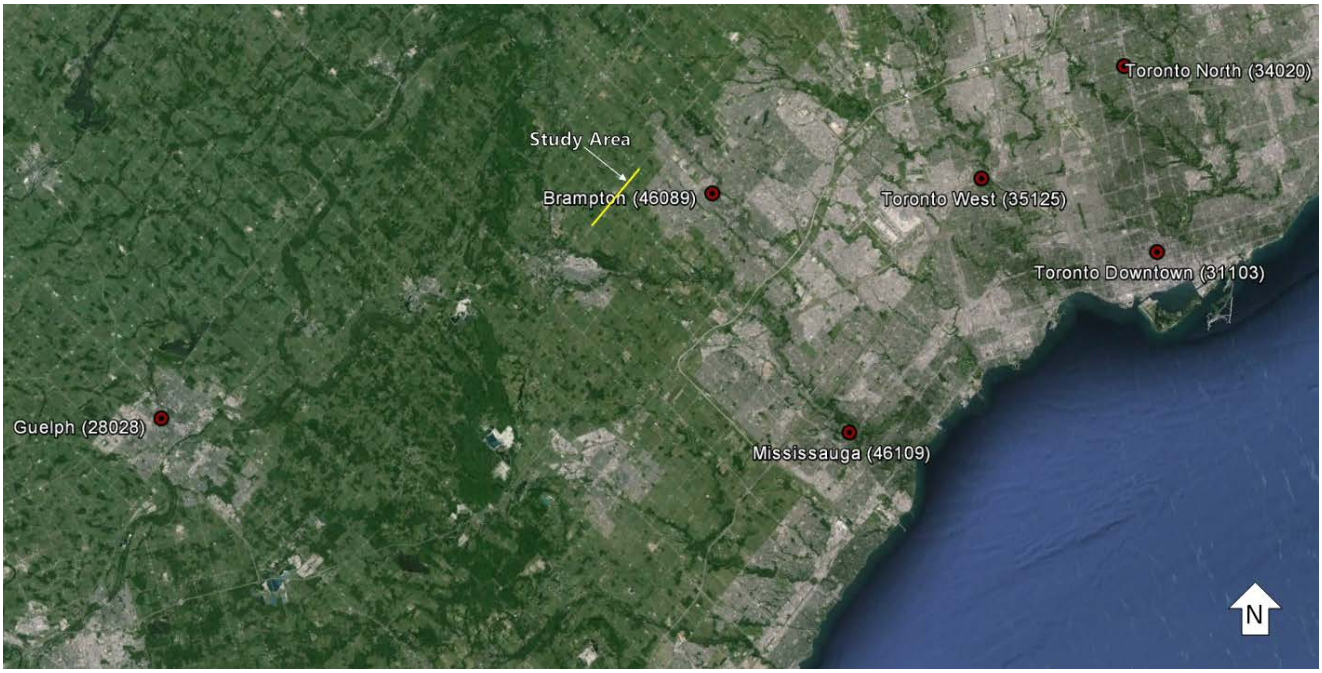


Figure 5: Relevant MOECC (shown in red) Monitoring Stations

Figure 6: Relevant NAPS (shown in green) Monitoring Stations

Table 3: Relevant MOECC and NAPS Station Information

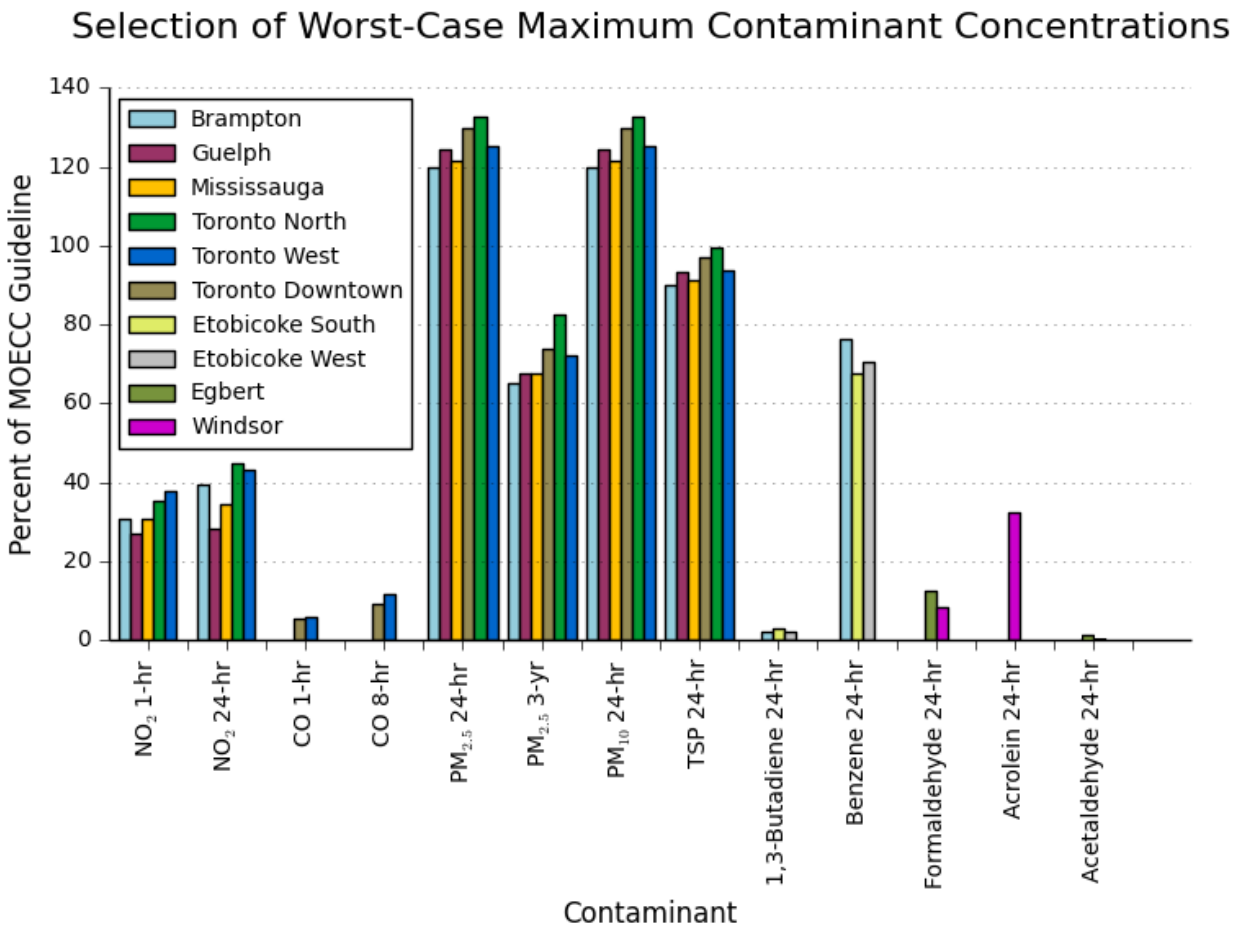
City/Town	Station ID	Location	Operator	Contaminants
Toronto North	34020	Hendon Ave. / Young St.	MOECC	NO_2 | $PM_{2.5}$
Toronto Downtown	31103	Bay St. / Wellesley St. W.	MOECC	CO | $PM_{2.5}$
Toronto West	35125	College St.	MOECC	NO_2 | CO | $PM_{2.5}$
Mississauga	46109	Mississauga Rd. N	MOECC	NO_2 | $PM_{2.5}$
Brampton	46089	Main St. N.	MOECC	NO_2 | $PM_{2.5}$
Guelph	28028	Exhibition Park	MOECC	NO_2 | $PM_{2.5}$
Etobicoke South	60435	Kipling Ave.	NAPS	1,3-Butadiene | Benzene
Etobicoke West	60413	Elmcrest Rd.	NAPS	1,3-Butadiene | Benzene
Egbert	64401	West Ave. & Homewood	NAPS	Acetaldehyde | Formaldehyde
Brampton	60428	Main St. N.	NAPS	1,3-Butadiene | Benzene
Windsor	60211	College St. / South St.	NAPS	Formaldehyde | Acrolein | Acetaldehyde

Since there are several monitoring stations which could be used to represent the study area, a comparison was performed for the available data on a contaminant basis, to determine the worst-case representative background concentration (see **Section 2.3**). Selecting the worst-case ambient data will result in a conservative combined assessment.

2.3 Selection of Worst-Case Monitoring Stations

Year 2009 to 2013 hourly ambient monitoring data from the selected stations was statistically summarized for the desired averaging periods: 1-hour, 8-hour and 24-hour. For the contaminants with hourly monitoring data (NO_2, CO and $PM_{2.5}$), the station with the highest maximum value over the five-year period for each contaminant and averaging period was selected to represent background concentrations in the study area. The maximum concentration represents an absolute worst-case background scenario. Ambient VOC data is not monitored hourly, but is typically measured every six days. To combine this dataset with the hourly modelled concentrations, each measured six-day value was applied to all hours between measurement dates, when there were 6 days between measurements. When there was greater than 6 days between measurements, the 90^{th} percentile measured value for the year in question was applied for those days in order to determine combined concentrations. This method is conservative in determining combined impacts as it assumed the 10^{th} percentile highest concentrations whenever data was not available. **Table 4** shows a comparison of the relevant stations for each contaminant of interest, and the selection of the worst-case station.

Table 4: Comparison of Background Concentrations



Note: PM_{10} and TSP are not measured in Ontario; therefore, background concentrations were estimated by applying a $PM_{2.5}/PM_{10}$ ratio of 0.54 and a $PM_{2.5}$/TSP ratio of 0.3 (Lall et al., 2004).

Contaminant	Worst-Case Station	Contaminant	Worst-Case Station
NO_2 (1-Hr)	Toronto West	TSP	Toronto North
NO_2 (24-Hr)	Toronto North	1,3-Butadiene	Etobicoke South
CO (1-Hr)	Toronto West	Benzene	Brampton
CO (8-hr)	Toronto West	Formaldehyde	Egbert
$PM_{2.5}$	Toronto North	Acrolein	Windsor
PM_{10}	Toronto North	Acetaldehyde	Egbert

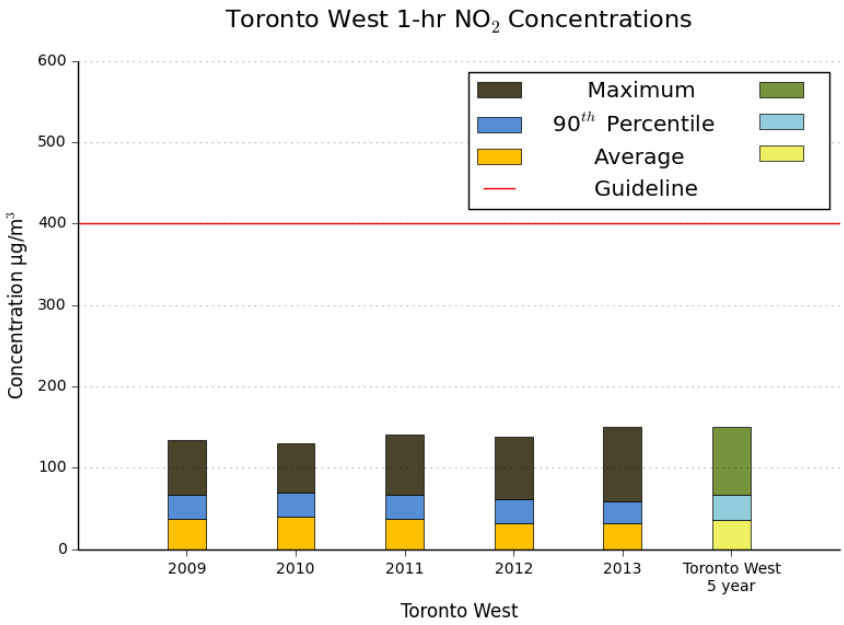
2.4 Detailed Analysis of Selected Worst-case Monitoring Stations

A detailed statistical analysis of the selected worst-case background monitoring station for each of the contaminants is presented below, summarized for average, 90th percentile and maximum concentrations. Maximum ambient concentrations represented a worst-case day. The 90th percentile concentration represents a day with reasonably worst-case background

concentrations, and the average concentration represents a typical day. Each site is presented on a yearly basis and for the five-year period. Where measurements exceeded the guideline, frequency analysis was performed.

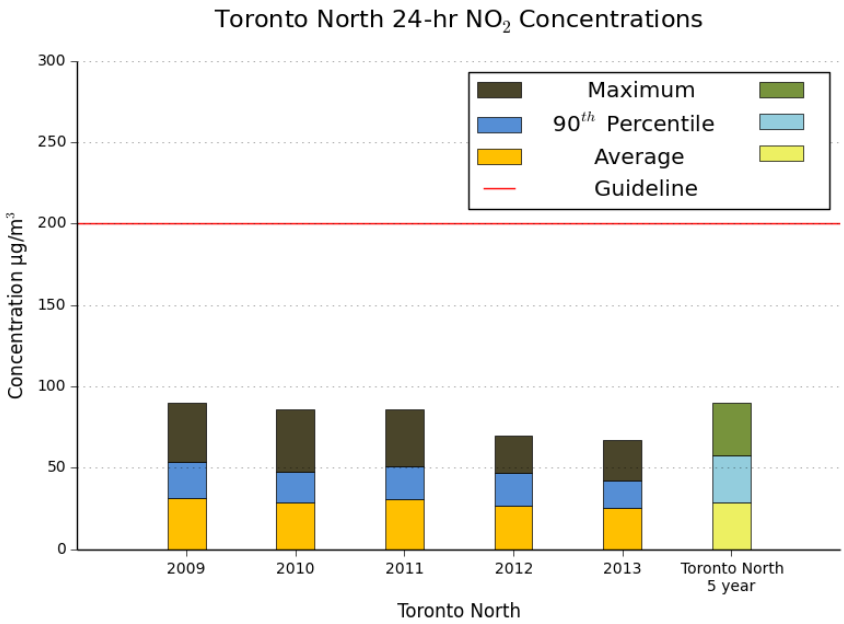
Table 5: Summary of Background NO_2

Statistical Analysis	Five-Year Summary



Statistic	% of Guideline
Maximum	38%
90th Percentile	16%
Average	9%

Conclusion:
A review of five years of ambient monitoring data from the Toronto West station indicated that background concentrations are below the Guideline on a 1-hour basis.

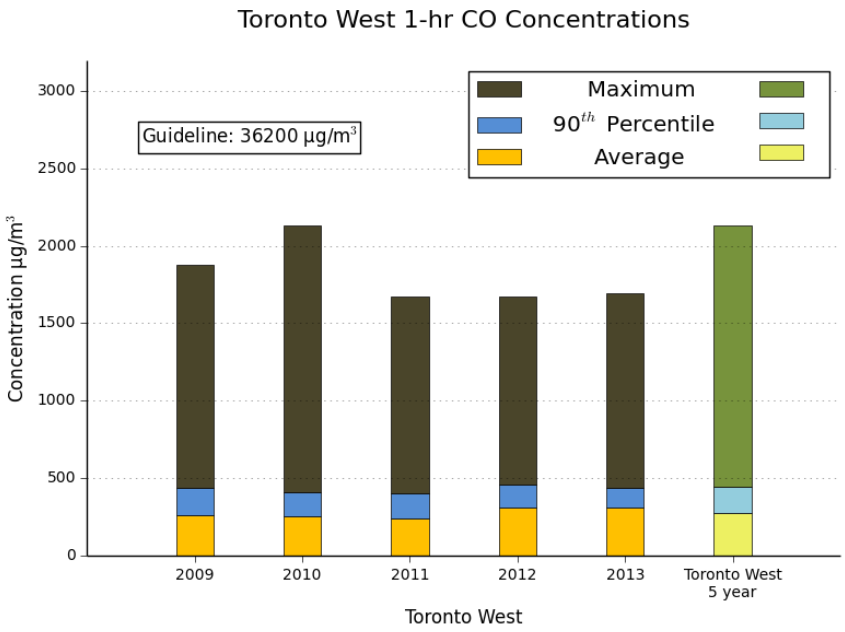


Statistic	% of Guideline
Maximum	45%
90th Percentile	24%
Average	14%

Conclusion:
A review of five years of ambient monitoring data from the Toronto North station indicated that background concentrations are below the Guideline on a 24-hour basis.

Table 6: Summary of Background CO

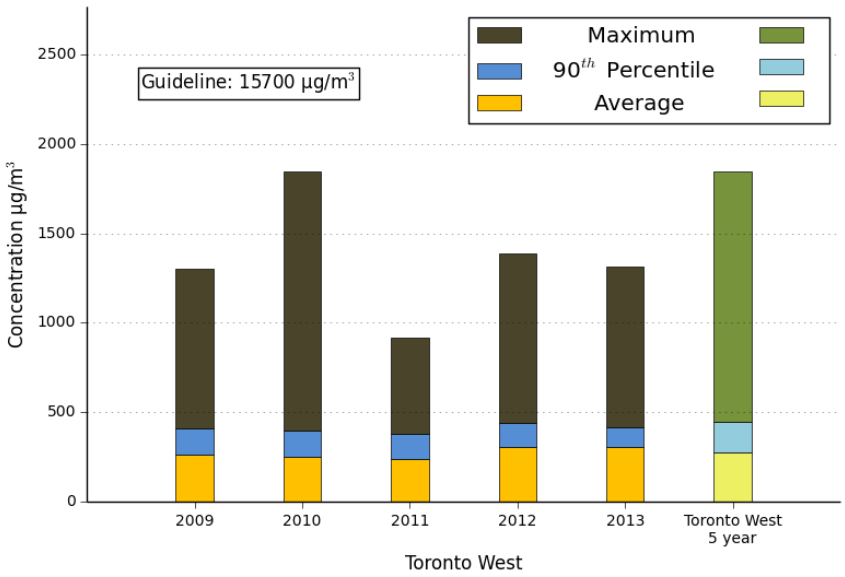
Statistical Analysis	Five-Year Summary



Statistic	% of Guideline
Maximum	6%
90th Percentile	1%
Average	1%

Conclusion:

A review of five years of ambient monitoring data from the Toronto West station indicated that background concentrations are well below the Guideline on a 1-hour basis.



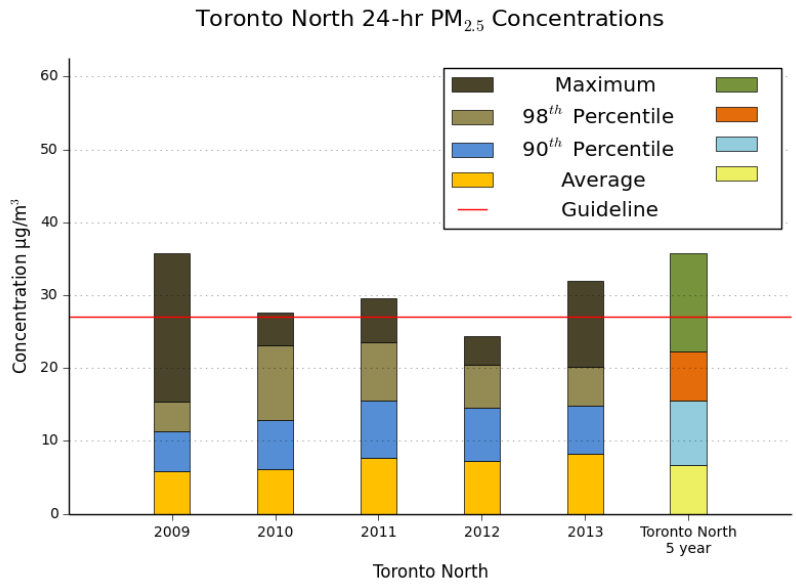
Statistic	% of Guideline
Maximum	12%
90th Percentile	3%
Average	2%

Conclusion:

A review of five years of ambient monitoring data from the Toronto West station indicated that background concentrations are well below the Guideline on an 8-hour basis.

Table 7: Summary of Background $PM_{2.5}$

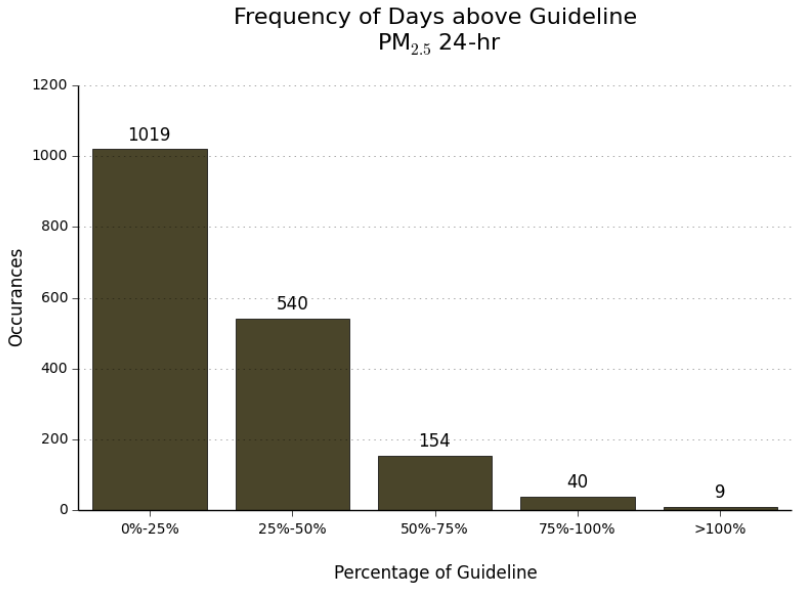
Statistical Analysis



Five-Year Summary

Statistic	% of Guideline
Maximum	133%
98th Percentile	83%
90th Percentile	53%
Average	26%

Conclusion:
A review of five years of ambient monitoring data from the Toronto North station indicated that the maximum background concentration exceeded the CWS on a 24-hour basis. The guideline for $PM_{2.5}$ is based on the 98th percentile annual value averaged over three consecutive years. The highest 3-year average of 22.3 µg/m³ is 83% of the guideline. Frequency analysis was conducted in order to show the number of days the background exceeded the guideline (see below).

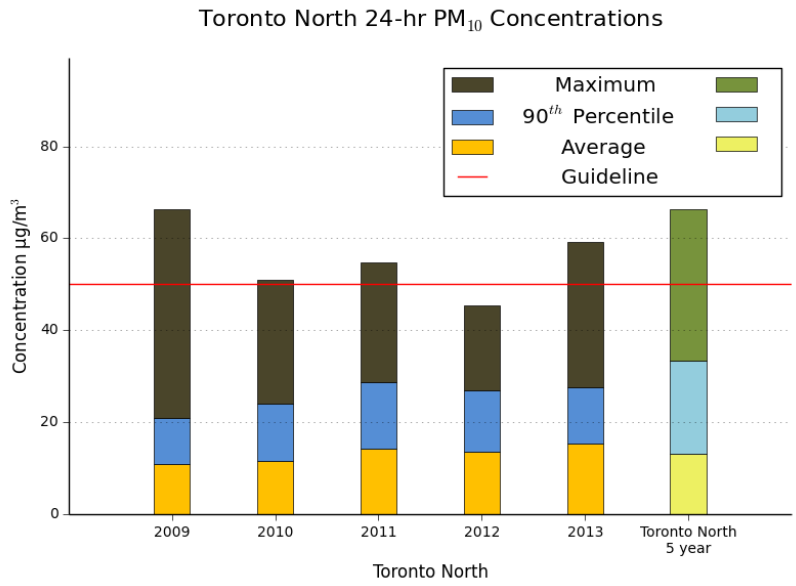


Number of Days Measured	Number of Days > Guideline
1,762	9

Conclusion:
Frequency analysis determined that 24-hr concentrations exceeded the guideline on an infrequent basis. Measured concentrations exceeded the guideline 9 days over the 5-year period. This means that the background concentration exceeded the guideline less than 1% of the time over the 5-year period.

Table 8: Summary of Background PM_{10}

Statistical Analysis

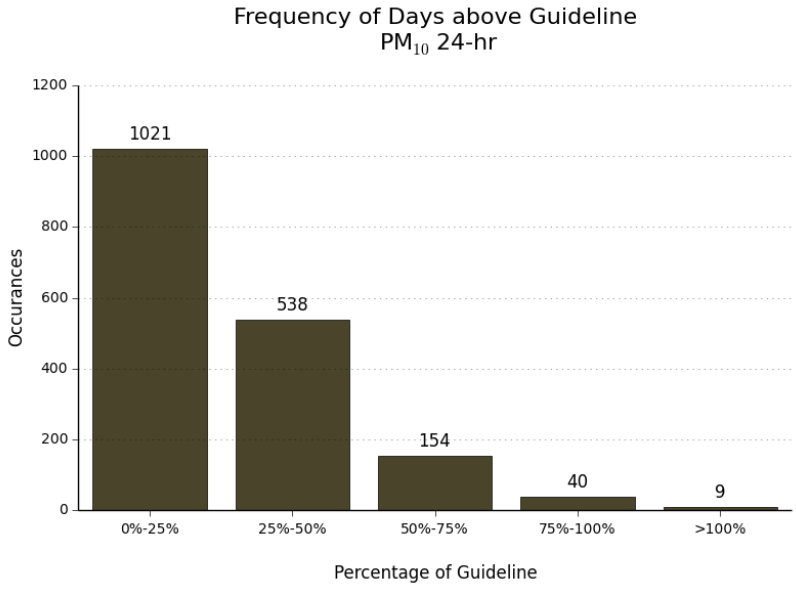


Note: PM_{10} is not monitored in Ontario; therefore, background concentrations were estimated by applying a $PM_{2.5}/PM_{10}$ ratio of 0.54. Lall et al. (2004)

Five-Year Summary

Statistic	% of Guideline
Maximum	133%
90th Percentile	53%
Average	26%

Conclusion:
A review of five years of PM_{10} data calculated from $PM_{2.5}$ ambient monitoring data from the Toronto North station indicated that the estimated maximum background concentration exceeded the guideline on a 24-hour basis. Therefore, frequency analysis was conducted to determine the number of days the estimated background exceeded the guideline (see below).

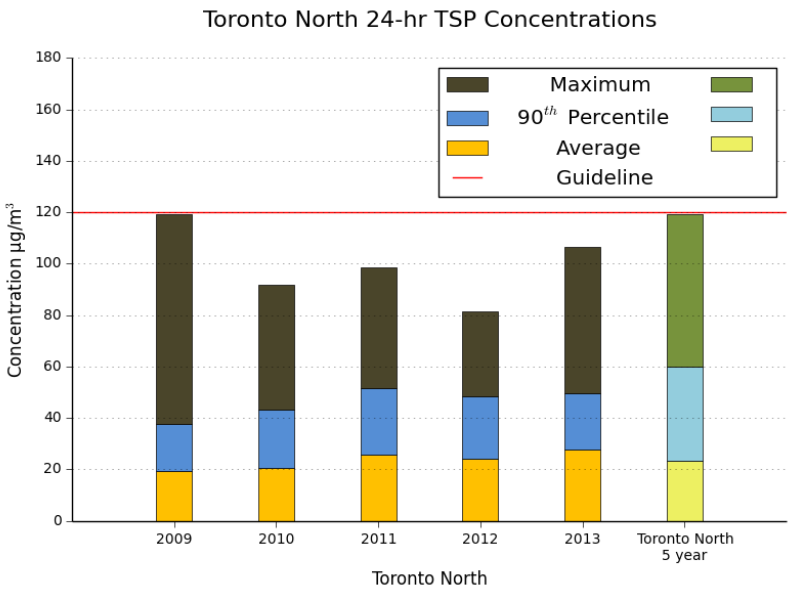


Number of Days Measured	Number of Days > Guideline
1,762	9

Conclusion:
Frequency analysis determined that 24-hr concentrations exceeded the guideline on an infrequent basis. Measured concentrations exceeded the guideline 9 days over the 5-year period. This means that the background concentration exceeded the guideline less than 1% of the time over the 5-year period.

Table 9: Summary of Background TSP

Statistical Analysis



Note: TSP is not monitored in Ontario; therefore, background concentrations were estimated by applying a PM2.5/TSP ratio of 0.3. Lall et al. (2004)

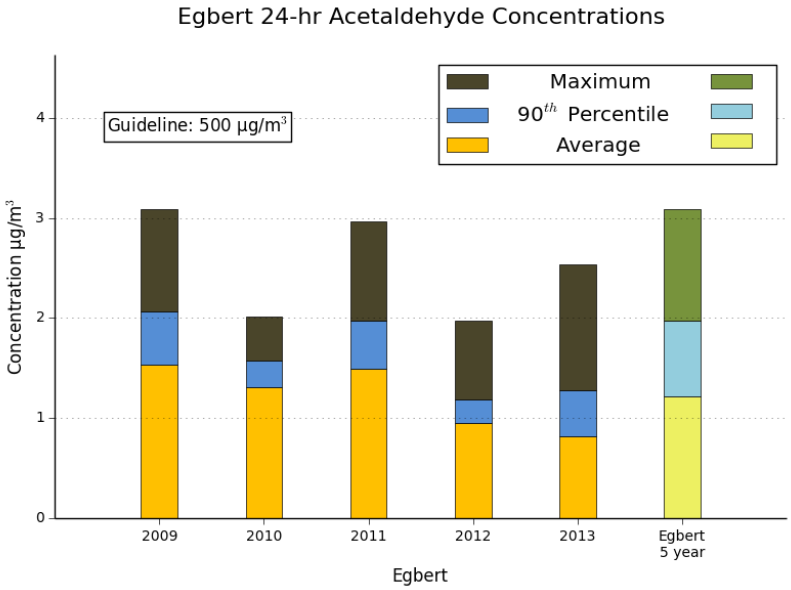
Five-Year Summary

Statistic	% of Guideline
Maximum	99%
90th Percentile	40%
Average	11%

Conclusion:
A review of five years of TSP data calculated from $PM_{2.5}$ ambient monitoring data from the Toronto North station indicated that the estimated maximum background concentration does not exceed the guideline on a 24-hour basis. Therefore, frequency analysis was not conducted.

Table 10: Summary of Background Acetaldehyde

Statistical Analysis	Five-Year Summary

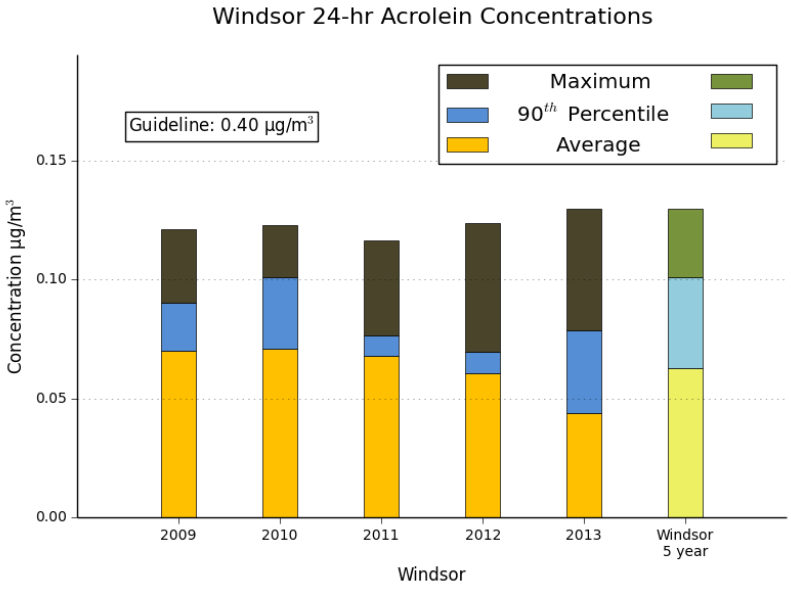


Statistic	% of Guideline
Maximum	1%
90th Percentile	<1%
Average	<1%

Conclusion:
A review of five years of ambient monitoring data from the Egbert station indicated that the maximum background concentration was well below the guideline.

Table 11: Summary of Background Acrolein

Statistical Analysis	Five-Year Summary

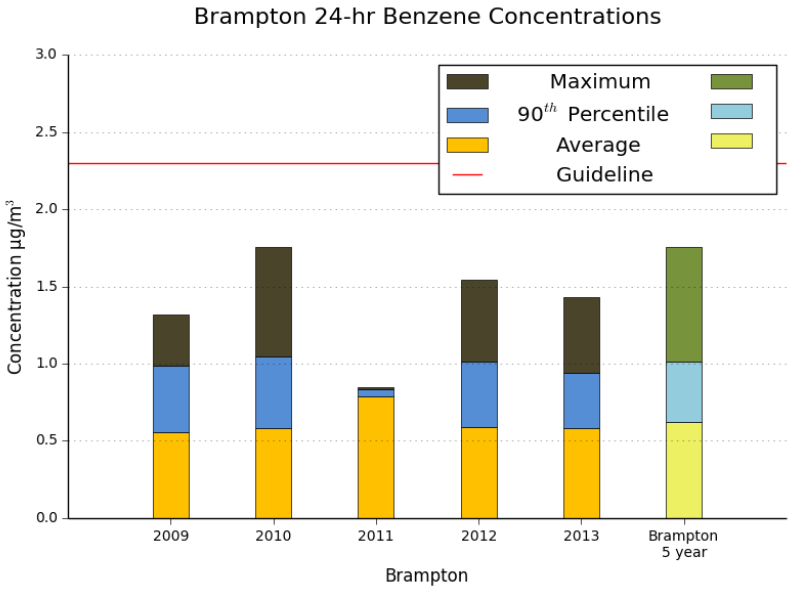


Statistic	% of Guideline
Maximum	32%
90th Percentile	25%
Average	15%

Conclusion:
A review of five years of ambient monitoring data from the Windsor station indicated that the maximum background concentration was well below the guideline.

Table 12: Summary of Background Benzene

Statistical Analysis	Five-Year Summary

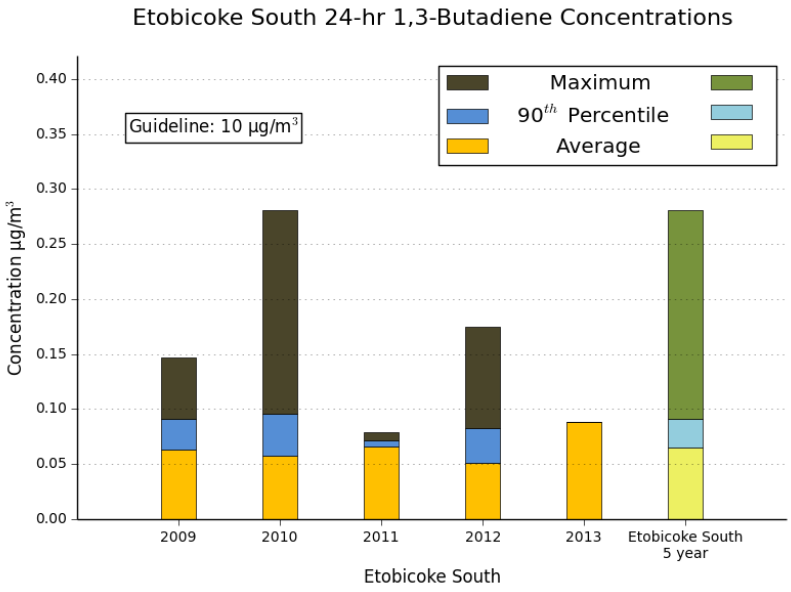


Statistic	% of Guideline
Maximum	76%
90th Percentile	37%
Average	25%

Conclusion:
A review of five years of benzene data calculated from the Brampton station indicated that the estimated maximum background concentration does not exceed the guideline on a 24-hour basis.

Table 13: Summary of Background 1,3-Butadiene

Statistical Analysis	Five-Year Summary

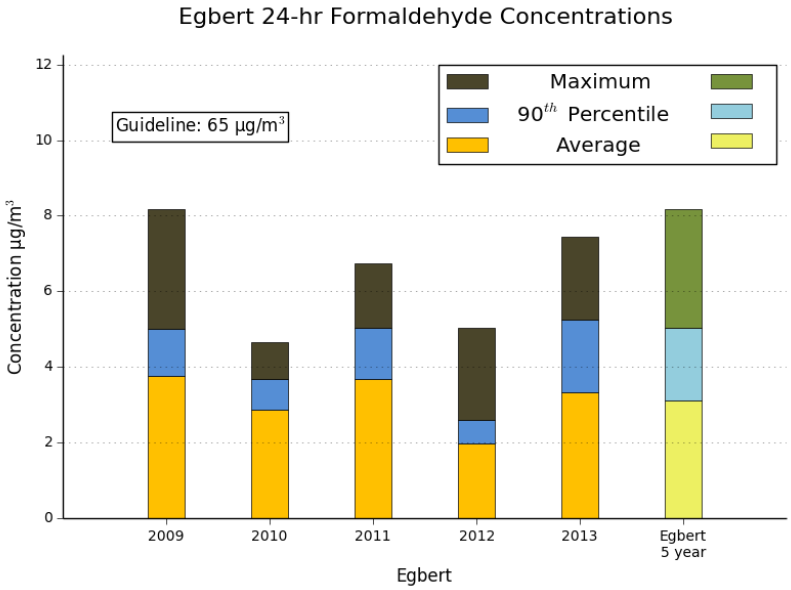


Statistic	% of Guideline
Maximum	3%
90th Percentile	1%
Average	1%

Conclusion:
A review of five years of ambient monitoring data from the Etobicoke South station indicated that the maximum background concentration was well below the guideline.

Table 14: Summary of Background Formaldehyde

Statistical Analysis



Five-Year Summary

Statistic	% of Guideline
Maximum	13%
90th Percentile	8%
Average	5%

Conclusion:
A review of five years of ambient monitoring data from the Egbert station indicated that the maximum background concentration was well below the guideline.

2.5 Summary of Background Conditions

Based on a review ambient monitoring data from 2009-2013, all contaminants were below their respective guidelines with the exception of PM_{10}. It should be noted that PM_{10} and TSP were calculated based on their relationship to $PM_{2.5}$. The guideline for $PM_{2.5}$ is based on an average annual 98th percentile concentration, averaged over 3 consecutive years. Therefore, it was determined that the maximum rolling 98th percentile average was 22.3 µg/m^3, which is 83% of the guideline.

From a review of the VOC dataset, it was determined that due to the lack of monitoring data, the 90th percentile value would be used to supplement monitored data when a greater than six day gap occurred between measurements. However, the summary of ambient monitoring data presented in this section provides the statistics for all available data.

A summary of the background concentrations as a percentage of their respective guidelines or CWS is presented in **Figure 7**.

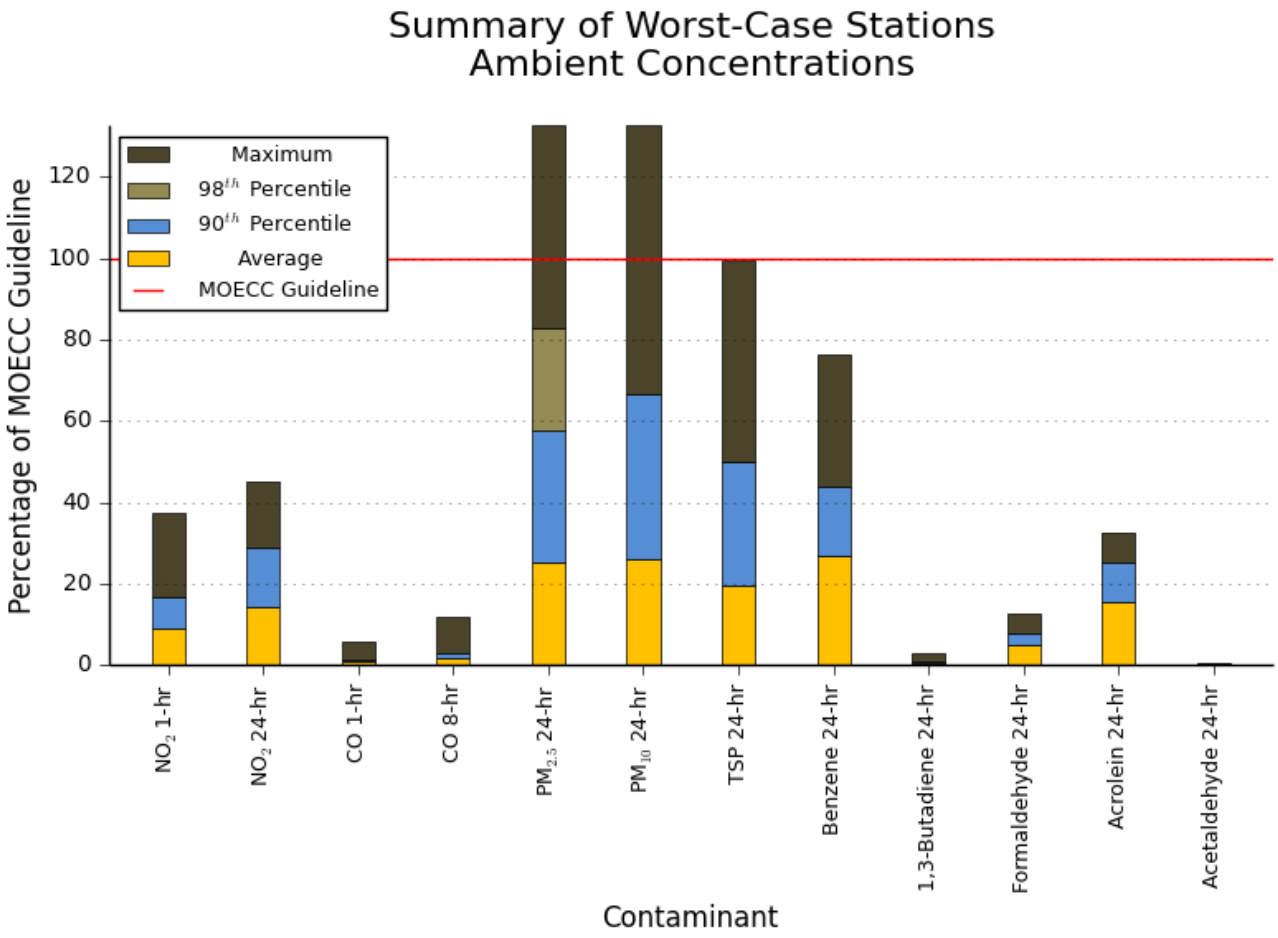


Figure 7: Summary of Background Conditions

3.0 Local Air Quality Assessment

3.1 Overview

The worst-case impacts due to roadway vehicle emissions were assessed for two scenarios: existing 2013, and 2031 future build conditions. The two scenarios include the following activities:

2013:

- Existing vehicle volumes on the existing roadway, and crossroads

2031 Build:

- Increased vehicle volumes with the proposed roadway widening and intersection improvements

The assessment was performed using U.S. EPA approved vehicle emission and air dispersion models to predict worst-case impacts at representative sensitive receptor locations. The details of the assessment are discussed below.

3.2 Location of Sensitive Receptors within the Study Area

Land uses which are defined as sensitive receptors for evaluating potential air quality effects are:

- Health care facilities;
- Senior citizens' residences or long-term care facilities;
- Child care facilities;
- Educational facilities;
- Places of worship; and
- Residential dwellings.

40 sensitive receptors were modelled to represent worst-case impacts surrounding the project area. The sensitive receptors are summarized in **Table 15** and their locations are mapped in **Figures 8** through **11**. Roadway-to-receptor distances in **Table 15** are measured from the edge of the highway for the future-build scenario.

Representative worst-case impacts were predicted by the dispersion model at the sensitive receptors closest to the roadway. This is due to the fact that contaminant concentrations disperse significantly with downwind distance from the motor vehicles resulting in reduced contaminant concentrations. At approximately 500 m from the roadway, contaminant concentrations from motor vehicles generally become indistinguishable from background levels. The maximum predicted contaminant concentrations at the closest sensitive receptors will usually occur during weather events which produce calm to light winds (< 3 m/s). During weather events with higher wind speeds, the contaminant concentrations disperse much more quickly.

Table 15: Representative Worst-Case Sensitive Receptors

Receptor Number	Land-Use	Distance from Highway (m)
R1	Residence	43
R2	Residence	50
R3	Residence	184
R4	Residence	75
R5	Residence	55
R6	Residence	55
R7	Residence	55

Receptor Number	Land-Use	Distance from Highway (m)
R8	Residence	49
R9	Church	16
R10	Residence	113
R11	Residence	35
R12	Residence	35
R13	Residence	27
R14	Residence	25
R15	Residence	21
R16	Residence	21
R17	Residence	26
R18	Residence	24
R19	Residence	26
R20	Residence	21
R21	Residence	20
R22	Residence	22
R23	Residence	44
R24	Residence	38
R25	School	32
R26	School	57
R27	Residence	44
R28	Residence	44
R29	Residence	313
R30	Residence	45
R31	Residence	60
R32	Residence	48
R33	Residence	38
R34	Residence	36
R35	Residence	51
R36	Residence	21
R37	Residence	138
R38	Residence	51
R39	Residence	45
R40	Residence	170

Figure 8: Receptor Locations within the Study Area (R1-R10)

Figure 9: Receptor Locations within the Study Area (R11-R29); Note R11-R24 and R7, R28 Represent Future Residential Sites

Figure 10: Receptor Locations within the Study Area (R29-R35)

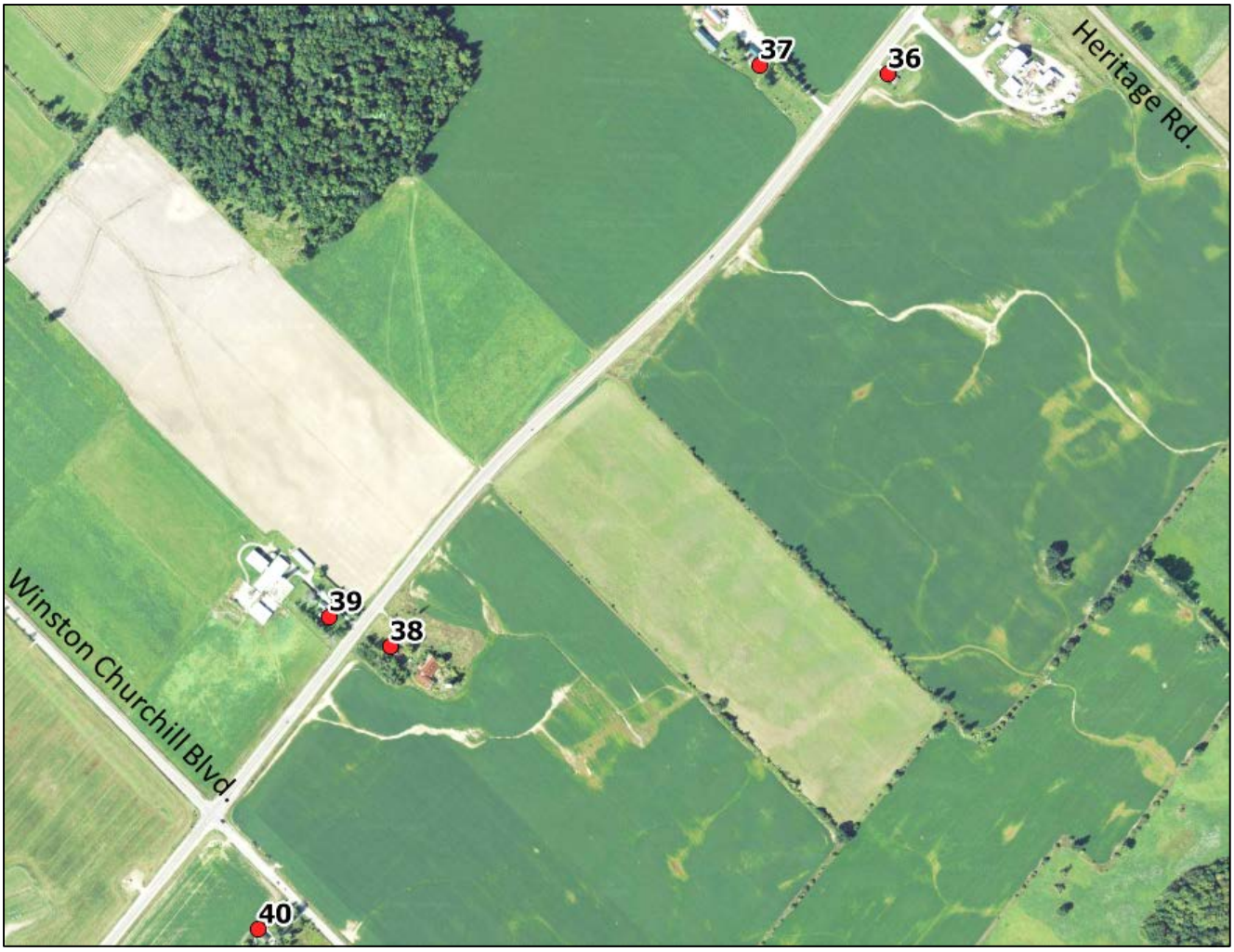


Figure 11: Receptor Locations within the Study Area (R36-R40)

3.3 Road Traffic Data

Two cases were modelled in this assessment, the existing roadway (2013), and the future build scenario for the year 2031. Hourly traffic distributions and traffic volumes were provided by Hatch Mott MacDonald are in the form of annual average daily traffic (AADT) for all scenarios.

The mainline and crossroad traffic volumes used in the assessment are provided in **Table 16** and **Table 17**, respectively. US EPA rural hourly vehicle distributions for weekend days were used in the analysis, as shown in **Table 18** and the hourly weekday distributions provided by Hatch Mott MacDonald are shown in **Table 19**. The heavy duty vehicle percentage presented in **Table 17** were provided, however an average heavy duty vehicle of 7.1 % was used in the dispersion modelling for all sections of the roadway. This heavy duty vehicle percentage is the worst case PM peak hour reported for Mayfield Road west of Chinguacousy Road.

Table 16: Mainline Traffic Volumes (AADT) and Heavy Duty Vehicle Percentages

Mayfield Road Section	2013 (Existing)		2031 (Future Build)		Heavy Duty Vehicle Percentage
	EB	WB	EB	WB	
West of Winston Churchill Blvd.	4,220	3,730	15,990	12,470	-
Winston Churchill Blvd. to Heritage Rd.	4,060	3,970	16,700	12,740	5.7
Heritage Rd. to Mississauga Rd.	4,300	4,340	18,280	15,670	5.2
Mississauga Rd. to Creditview Rd.	4,560	4,490	19,830	16,000	5.8
Creditview Rd. to Chinguacousy Rd.	4,910	4,860	21,260	17,150	7.1
East of Chinguacousy Rd.	5,150	6,170	21,590	19,990	5.7

Table 17: Arterial Road Traffic Volumes (AADT) and Heavy Duty Vehicle Percentages

Section	2013 (Existing)		2031 (Future Build)		Heavy Duty Vehicle Percentage
	NB	SB	NB	SB	
Chinguacousy Rd., South of Mayfield Rd.	2,740	3,530	5,020	6,860	2.2
Chinguacousy Rd., North of Mayfield Rd.	1,130	1,280	2,840	1,770	2.3
Creditview Rd., South of Mayfield Rd.	860	1,020	2,100	2,410	0
Creditview Rd., North of Mayfield Rd.	280	440	1,580	1,270	3.4
Mississauga Rd., South of Mayfield Rd.	2,360	2,380	5,810	6,730	5.7
Mississauga Rd., North of Mayfield Rd.	1,960	2,170	5,430	6,210	6.2
Heritage Rd., South of Mayfield Rd.	1,060	1,480	3,050	4,650	7.4
Heritage Rd., North of Mayfield Rd.	230	170	850	820	2.1
Winston Churchill Blvd., South of Mayfield Rd.	1,550	1,890	3,650	4,940	5.9
Winston Churchill Blvd., North of Mayfield Rd.	610	640	1,080	1,420	6.1

Table 18: U.S. EPA Rural Hourly Vehicle Distribution

Hour	Weekend
1	1.8%
2	1.1%
3	0.9%
4	0.8%
5	0.8%
6	1.0%
7	1.9%
8	2.7%
9	3.9%
10	5.2%
11	6.3%
12	7.0%
13	7.2%
14	7.2%
15	7.3%
16	7.4%
17	7.3%
18	7.0%
19	6.1%
20	5.1%
21	4.1%
22	3.3%
23	2.6%
24	2.0%

Table 19: Weekday Hourly Vehicle Distribution

Hour	Creditview Rd. to Chinguacousy Rd.		Mississauga Rd. to Creditview Rd.		Heritage Rd. to Mississauga Rd.		Winston Churchill Blvd. to Heritage Rd.	
	EB	WB	EB	WB	EB	WB	EB	WB
1	0.4%	0.5%	0.3%	0.5%	0.3%	0.5%	0.3%	0.4%
2	0.2%	0.4%	0.2%	0.4%	0.2%	0.4%	0.1%	0.4%
3	0.2%	0.3%	0.2%	0.3%	0.2%	0.3%	0.2%	0.3%
4	0.4%	0.2%	0.3%	0.1%	0.3%	0.1%	0.3%	0.1%
5	0.7%	0.5%	0.7%	0.5%	0.7%	0.5%	0.7%	0.4%
6	3.1%	1.3%	3.0%	1.4%	3.2%	1.1%	3.3%	0.9%
7	6.1%	4.7%	6.2%	4.8%	6.9%	4.1%	7.8%	3.7%
8	12.2%	8.9%	13.1%	9.3%	14.4%	9.2%	16.4%	6.8%
9	10.2%	8.1%	10.7%	8.4%	11.0%	8.3%	12.1%	6.4%
10	5.4%	4.6%	4.8%	4.3%	4.6%	4.2%	4.9%	4.1%
11	3.5%	3.0%	3.4%	3.1%	3.4%	3.3%	3.5%	3.4%
12	3.6%	3.5%	3.3%	3.5%	3.4%	3.4%	3.4%	3.5%
13	3.6%	3.8%	3.6%	3.9%	3.4%	3.7%	3.6%	4.1%
14	3.9%	3.9%	3.6%	3.9%	3.7%	3.9%	3.7%	4.0%
15	4.5%	5.2%	4.6%	5.1%	4.5%	5.2%	4.4%	5.5%
16	6.3%	9.3%	6.0%	9.2%	5.7%	9.2%	5.3%	9.5%
17	9.1%	11.5%	9.6%	11.5%	9.4%	12.4%	7.9%	13.6%
18	9.2%	11.1%	9.6%	11.4%	9.6%	11.9%	7.4%	13.1%
19	5.8%	6.8%	6.0%	6.6%	5.2%	6.7%	4.7%	7.2%
20	4.0%	4.1%	3.6%	3.8%	3.3%	4.0%	3.2%	4.3%
21	2.8%	3.0%	2.7%	2.8%	2.5%	2.8%	2.5%	3.0%
22	2.4%	2.5%	2.3%	2.5%	2.3%	2.3%	2.2%	2.5%
23	1.5%	1.6%	1.4%	1.5%	1.2%	1.6%	1.2%	1.8%
24	0.8%	1.3%	0.9%	1.2%	0.8%	1.2%	0.7%	1.2%

3.4 Meteorological Data

2009-2013 hourly meteorological data was obtained from the Toronto Pearson International Airport and upper air data was obtained from Buffalo Niagara International Airport as previously recommended by the MOECC. The combined data was processed to reflect conditions at the study area using the U.S. EPA's PCRAMMET software program which prepares meteorological data for use with the CAL3QHCR model. A wind frequency diagram (wind rose) is shown in **Figure 12**. As can be seen in this figure, predominant winds are from the westerly through northerly directions.

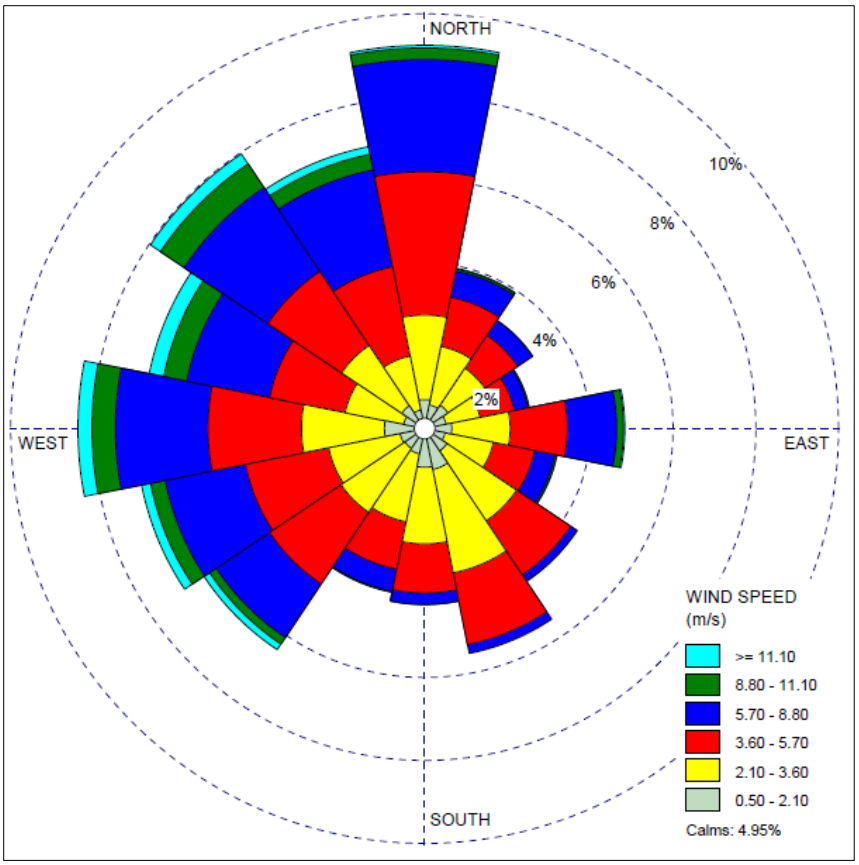


Figure 12: Wind Frequency Diagram for Toronto Pearson International Airport

3.5 Motor Vehicle Emission Rates

The U.S. EPA's Motor Vehicle Emission Simulator (MOVES) model provides estimates of current and future emission rates from motor vehicles based on a variety of factors such as local meteorology and vehicle fleet composition. MOVES 2014, released in October 2014, is the U.S. EPA's latest tool for estimating vehicle emissions due to the combustion of fuel, brake and tire wear, fuel evaporation, permeation and refuelling leaks. The model is based on "an analysis of millions of emission test results and considerable advances in the Agency's understanding of vehicle emissions and accounts for changes in emissions due to proposed standards and regulations". For this project, MOVES was used to estimate vehicle emissions based on vehicle type, road type, model year, and vehicle speed. Emission rates were estimated based on the heavy duty vehicle percentages provided by Hatch Mott MacDonald. Vehicle age was determined based on the U.S. EPA's default distribution. **Table 20** specifies the major inputs into MOVES.

Table 20: MOVES Input Parameters

Parameter	Input
Scale	Custom County Domain
Meteorology	Temperature and Relative Humidity were obtained from meteorological data from the Pearson Airport for the years 2009 to 2013.
Years	2013 (Existing), and 2031 (Future Build)
Geographical Bounds	Custom County Domain
Fuels	Compressed Natural Gas / Diesel Fuels / Gasoline Fuels
Source Use Types	Combination Long-haul Truck / Combination Short-haul Truck / Intercity Bus / Light Commercial Truck / Motor Home / Motorcycle / Passenger Car / Passenger Truck / Refuse Truck / School Bus / Single Unit Long-haul Truck / Single Unit Short-haul Truck / Transit Bus
Road Type	Rural Unrestricted Access
Contaminants and Processes	NO_2 / CO / $PM_{2.5}$ / PM_{10} / Acetaldehyde / Acrolein / Benzene / 1,3-Butadiene / Formaldehyde. TSP can't be directly modelled by MOVES. However, the U.S. EPA has determined, based on emissions test results, that >97% of tailpipe particulate matter is PM_{10} or less. Therefore, the PM_{10} exhaust emission rate was used for TSP.
Vehicle Age Distribution	MOVES defaults based on years selected for the roadway.

From the MOVES outputs, the highest monthly value was selected to represent a worst-case emission rate. The emission rates for each speed modelled for a 7.1% heavy duty vehicle percentage are shown in **Table 21**.

Table 21: MOVES Output Emission Factors for Roadway Vehicles (g/VMT); Idle Emission Rates are in g/VMT

Year	Speed	NO_2	CO	$PM_{2.5}$	PM_{10}	TSP[1]	Acetaldehyde	Acrolein	Benzene	1,3-Butadiene	Formaldehyde
2031	100 km/hr	0.081	3.1	0.0179	0.0321	0.0321	0.0014	0.004	0.00380	0.00038	0.0024
	90 km/hr	0.081	3.2	0.0193	0.0360	0.0360	0.0015	0.00016	0.00390	0.00040	0.0026
	80 km/hr	0.080	3.2	0.0211	0.0415	0.0415	0.0016	0.00017	0.00410	0.00041	0.0027
	70 km/hr	0.080	3.3	0.0221	0.0512	0.0512	0.0016	0.00018	0.0043	0.00044	0.0028
	60 km/hr	0.082	3.7	0.0267	0.0740	0.0740	0.0020	0.00021	0.0050	0.00052	0.0034
	50 km/hr	0.086	4.0	0.0305	0.0900	0.0900	0.0022	0.00023	0.0056	0.00058	0.0037
	40 km/hr	0.099	5.1	0.0430	0.1290	0.1290	0.0029	0.00032	0.0074	0.00078	0.0050
	30 km/hr	0.110	5.8	0.0512	0.1540	0.1540	0.0036	0.00039	0.0087	0.00093	0.0061
	Idle	0.330	24.5	0.2400	0.2650	0.2650	0.039	0.00015	0.00390	0.0107	0.0620
2031	100 km/hr	0.11	1.1	0.0051	0.0177	0.0177	0.0002	0.00003	0.0009	0.000001	0.0006
	90 km/hr	0.11	1.2	0.0057	0.0209	0.0209	0.0002	0.00003	0.0009	0.000002	0.0006
	80 km/hr	0.11	1.1	0.0064	0.0266	0.0266	0.0002	0.00003	0.0009	0.000002	0.0006
	70 km/hr	0.10	1.1	0.0075	0.0351	0.0351	0.0003	0.00003	0.0009	0.000002	0.0007
	60 km/hr	0.10	1.2	0.0104	0.0563	0.0563	0.0003	0.00003	0.0010	0.000002	0.0008
	50 km/hr	0.10	1.3	0.0125	0.0711	0.0711	0.0003	0.00004	0.0011	0.000002	0.0008
	40 km/hr	0.11	1.6	0.0174	0.1025	0.1025	0.0004	0.00005	0.0014	0.000003	0.0011
	30 km/hr	0.12	1.8	0.0205	0.1227	0.1227	0.0005	0.00006	0.0016	0.000004	0.0013
	Idle	0.40	2.6	0.0438	0.0487	0.0487	0.003	0.001	0.015	0.0001	0.0094

1 – Note that TSP can't be directly modelled by MOVES. However, the U.S. EPA has determined, based on emissions test results, that >97% of tailpipe particulate matter is PM_{10} or less. Therefore, the PM_{10} exhaust emission rate was used for TSP.

3.6 Re-suspended Particulate Matter Emission Rates

A large portion of roadway particulate matter emissions comes from dust on the pavement which is re-suspended by vehicles travelling on the roadway. These emissions are estimated using empirically derived values presented by the U.S. EPA in their AP-42 report. The emissions factors for re-suspended PM were estimated by using the following equation from U.S. EPA's Document AP-42 report, Chapter 13.2.1.3 and are summarized in **Table 22**.

$$E = k(sL)^{0.91} * (W)^{1.02}$$

Where: E = the particulate emission factor
k = the particulate size multiplier
sL = silt loading

W = average vehicle weight (Assumed 3 Tons based on Toyota fleet data and U.S. EPA vehicle weight and distribution)

Table 22: Re-suspended Particulate Matter Emission Factors

Roadway AADT	K ($PM_{2.5}/PM_{10}$/TSP)	sL (g/m^2)	W (Tons)	E (g/VMT)		
				$PM_{2.5}$	PM_{10}	TSP
<500	0.25/1.0/5.24	0.6	3	0.503	2.015	10.561
500-5,000	0.25/1.0/5.24	0.2	3	0.185	0.741	3.886
5,000-10,000	0.25/1.0/5.24	0.06	3	0.061	0.247	1.299
>10,000	0.25/1.0/5.24	0.03	3	0.033	0.132	0.70

3.7 Air Dispersion Modelling Using CAL3QHCR

The U.S. EPA's CAL3QHCR dispersion model, based on the Gaussian plume equation, was specifically designed to predict air quality impacts from roadways using site specific meteorological data, vehicle emissions, traffic data, and signal data. The model input requirements include roadway geometry, sensitive receptor locations, meteorology, traffic volumes and motor vehicle emission rates as well as some contaminant physical properties such as settling and deposition velocities. CAL3QHCR uses this information to calculate hourly concentrations which are then used to determine 1-hour, 8-hour and 24-hour averages for the contaminants of interest at the identified sensitive receptor locations. **Table 23** provides the major inputs used in CAL3QHCR. The emission rates used in the model were the outputs from the MOVES and AP-42 models, weighted for the vehicle fleet distributions provided. The outputs of CAL3QHCR are presented in the results section.

Table 23: CAL3QHCR Model Input Parameters

Parameter	Input
Free-Flow and Queue Link Traffic Data	Hourly traffic distributions were applied to the AADT traffic volumes in order to input traffic volumes in vehicles/hour. Emission rates from the MOVES output were input in grams per vehicle mile travelled or grams per vehicle hour. Signal timings for each traffic signal were input in seconds.
Meteorological Data	2009-2013 data from Toronto Pearson International Airport
Deposition Velocity	$PM_{2.5}$: 0.01 cm/s PM_{10}: 0.5 cm/s TSP: 0.15 cm/s NO_2, CO and VOCs: 0 cm/s
Settling Velocity	$PM_{2.5}$: 0.02 cm/s PM_{10}: 0.3 cm/s TSP: 1.8 cm/s CO, NO_2, and VOCs: 0 cm/s
Surface Roughness	The conservative land type surrounding the project site is categorized as 'Rural'. The average surface roughness height for rural land for all seasons of 10 cm was applied in the model.
Vehicle Emission Rate	Emission rates calculated in MOVES and AP-42 were input in g/VMT

3.8 Modelling Results

Presented below are the modelling results for the 2013 existing and 2031 future-build scenario based on 5-years of meteorological data. For each contaminant, combined concentrations are presented along with the relevant contribution due to the background and roadway. Results in this section are presented for the worst-case sensitive receptor (see **Table 24**), which was identified as the location with the maximum combined concentration for the 2031 future-build scenario. Results for all modelled receptors are provided in **Appendix A.** It should be noted that the maximum combined concentration at any sensitive receptor often occurs infrequently and actually may only occur for one hour or day over the 5-year period.

Table 24: Worst-Case Sensitive Receptor for 2031 Future Build Scenario

Contaminant	Averaging Period	Sensitive Receptor
NO_2	1-hour	R1
	24-hour	R30
CO	1-hour	R32
	8-hour	R32
$PM_{2.5}$	24-hour	R32
PM_{10}	24-hour	R30
TSP	24-hour	R32
Acetaldehyde	24-hour	R32
Acrolein	24-hour	R30
Benzene	24-hour	R32
1,3-Butadiene	24-hour	R30
Formaldehyde	24-hour	R32

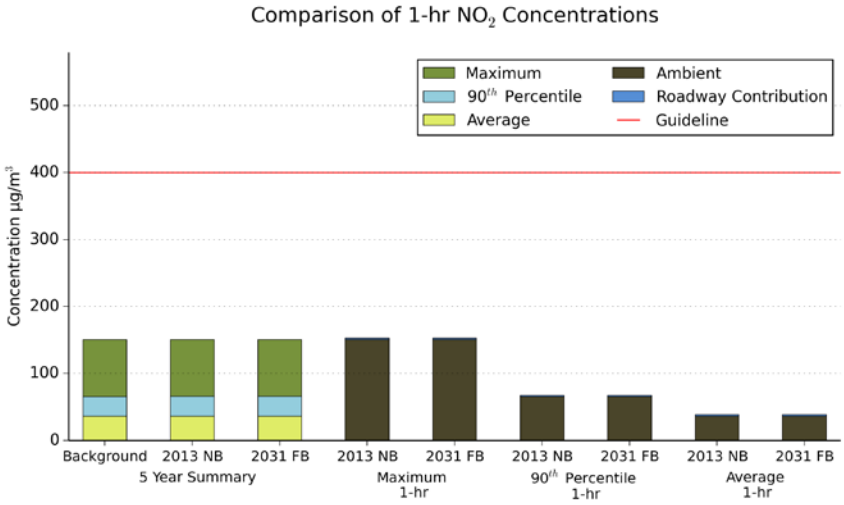
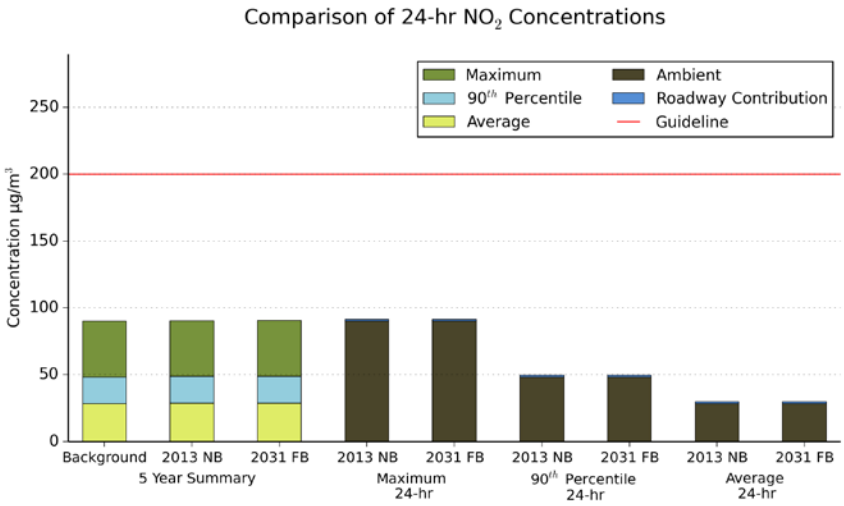
Coincidental hourly modelled roadway and background CAC concentrations were added to derive the combined concentration for each hour over the 5-year period. Hourly combined concentrations were then used to determine contaminant concentrations based on the applicable averaging period. Statistical analysis in the form of maximum, 90th percentile, and average combined concentrations were calculated for the worst-case sensitive receptor for each contaminant and are presented below. The maximum combined concentration was then used to assess compliance with MOECC guidelines or CWS. If predictions showed that guidelines would be exceeded, frequency analysis was undertaken in order to estimate the number of occurrences above the guideline. Provided below are the modelling results for the contaminants of interest.

Nitrogen Dioxide

Table 25 presents the predicted combined concentrations for the worst-case sensitive receptor for 1-hour and 24-hour NO_2 based on 5 years of meteorological data. The results conclude that:

- *Both the maximum 1-hour and 24-hour NO_2 combined concentrations were below their respective MOECC guidelines.*

Table 25: Summary of Predicted NO_2 Concentrations

Statistical Analysis	
	**% of MOECC Guideline:** Maximum: 38% 90th Percentile: 16% Average: 9% **Roadway Contribution:** Maximum: <1% 90th Percentile: <1% Average: <1%
	**% of MOECC Guideline:** Maximum: 45% 90th Percentile: 24% Average: 14% **Roadway Contribution:** Maximum: 1% 90th Percentile: 1% Average: 1%

Conclusions:

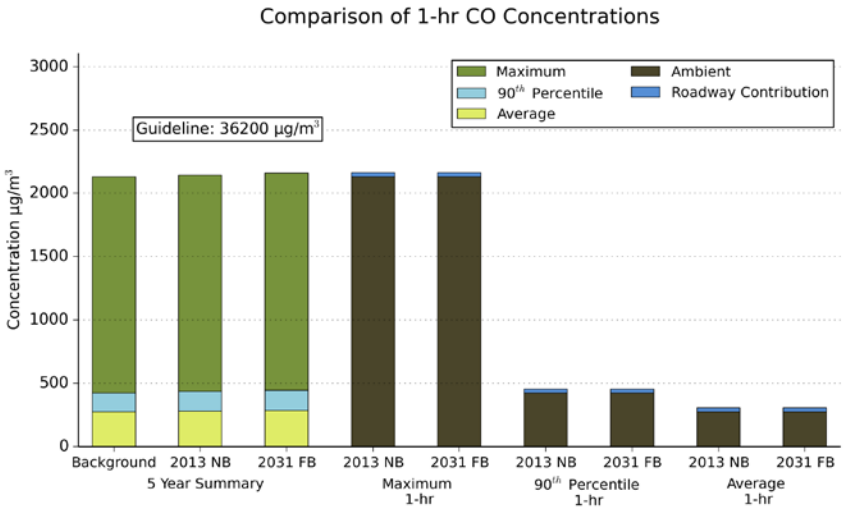
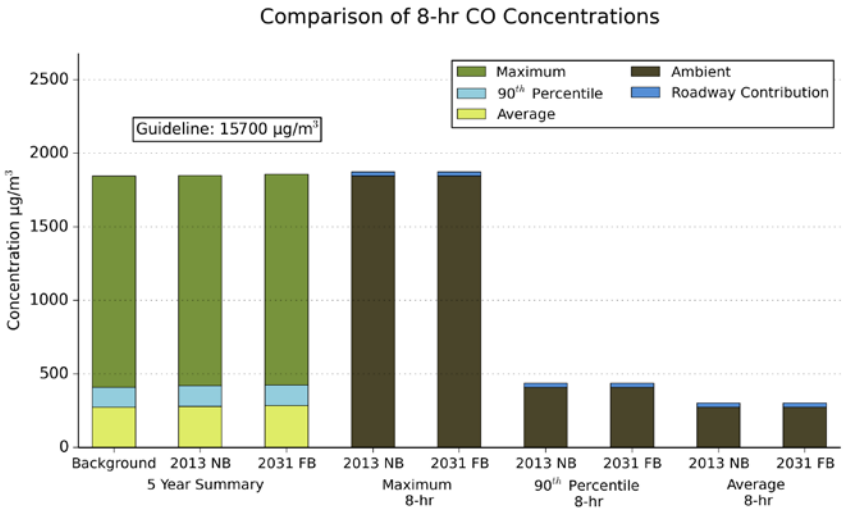
- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was 1% or less.

Carbon Monoxide

Table 26 presents the predicted combined concentrations for the worst-case sensitive receptor for 1-hour and 8-hour CO based on 5 years of meteorological data. The results conclude that:

- *Both the maximum 1-hour and 8-hour CO combined concentrations were well below their respective MOECC guidelines.*

Table 26: Summary of Predicted CO Concentrations

Statistical Analysis	
	**% of MOECC Guideline:**
	Maximum: 6%
	90th Percentile: 1%
	Average: 1%
	Roadway Contribution:
	Maximum: 1%
	90th Percentile: 5%
	Average: 4%
	**% of MOECC Guideline:**
	Maximum: 12%
	90th Percentile: 3%
	Average: 2%
	Roadway Contribution:
	Maximum: 5%
	90th Percentile: 4%
	Average: 3%

Conclusions:

- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was 5% or less.

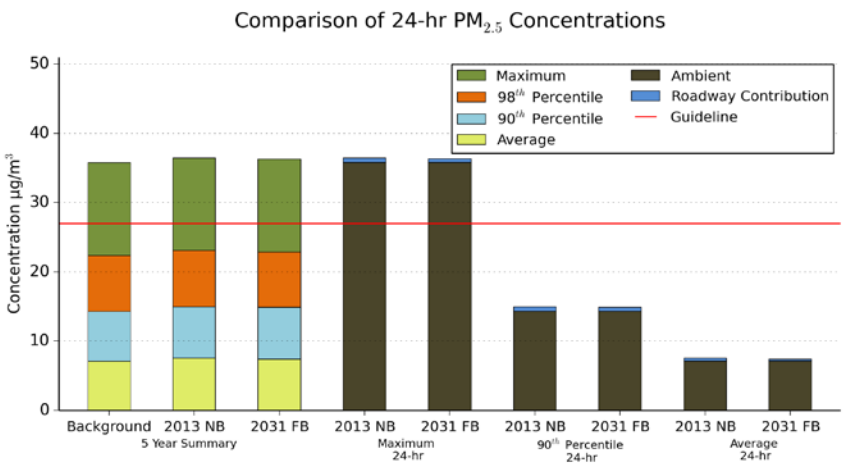
Fine Particulate Matter ($PM_{2.5}$)

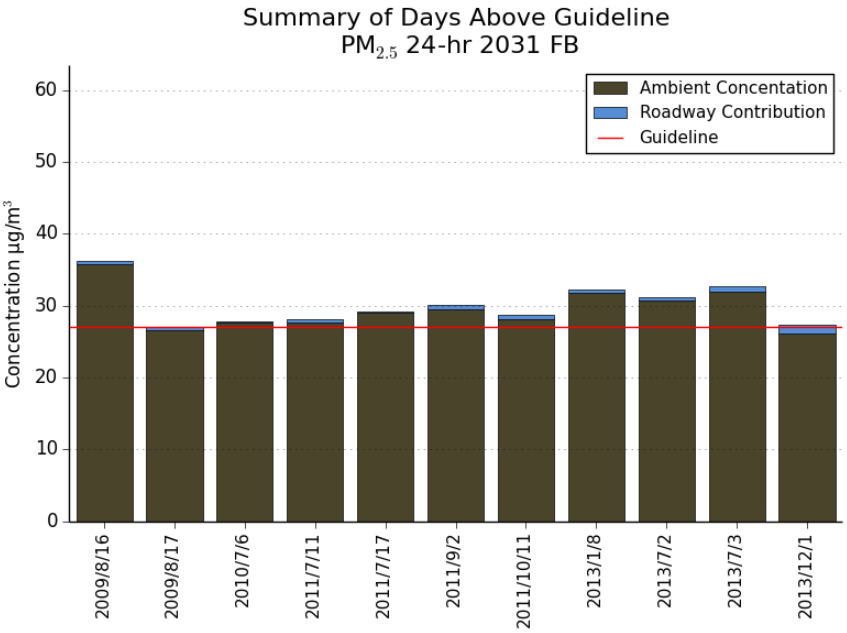
Table 27 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour $PM_{2.5}$ based on 5 years of meteorological data. The results conclude that:

- *The average annual 98th percentile 24-hour $PM_{2.5}$ combined concentration, averaged over three consecutive years was below the CWS.*

Table 27: Summary of Predicted $PM_{2.5}$ Concentrations

Statistical Analysis





% of MOECC Guideline:	
Maximum	134%
98th Percentile	85%
90th Percentile	55%
Average	27%
Roadway Contribution:	
Maximum	1%
98th Percentile	4%
90th Percentile	4%
Average	5%

Conclusions:

The $PM_{2.5}$ results exceed the 3-year CWS. The highest 3 year rolling average of the yearly 98th percentile combined concentrations was calculated to be 22.8 µg/m^3 (years 2010 to 2012) or 85% of the CWS. It should be noted that background concentrations alone were 83% of the CWS.

The average contribution from the roadway to the combined concentrations was 5%; the roadway contribution to the maximum concentration was 1%. Since there were days where elevated $PM_{2.5}$ concentrations were experienced, frequency analysis was conducted.

Frequency analysis showed that 2 additional exceedances are expected due to the roadway over the five-year period.

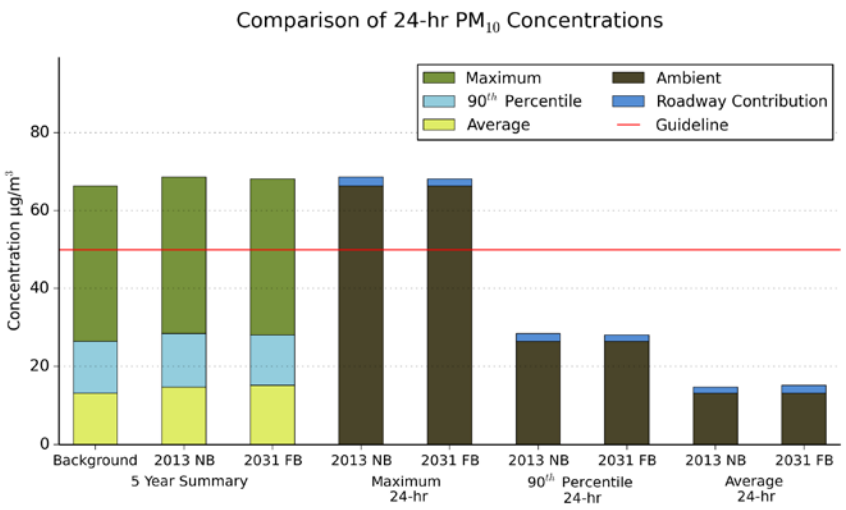
Coarse Particulate Matter (PM_{10})

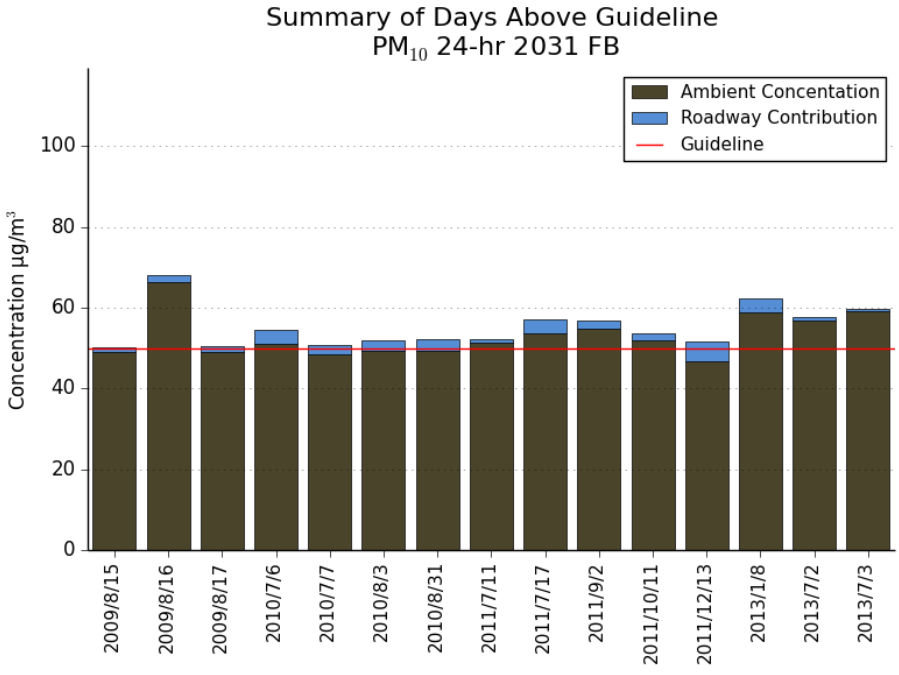
Table 28 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour PM_{10} based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hr PM_{10} combined concentrations exceeded the MOECC guideline.*

Table 28: Summary of Predicted PM_{10} Concentrations

Statistical Analysis





% of MOECC Guideline:	
Maximum	136%
90th Percentile	56%
Average	30%
Roadway Contribution:	
Maximum	3%
90th Percentile	12%
Average	13%

Conclusions:

The combined concentrations of PM_{10} surrounding the study area exceed the standard of 50 µg/m^3. It should be noted, however, that background concentrations alone exceeded the standard and that the roadway contribution is 3% of the maximum value.

Frequency analysis was conducted to show that elevated concentrations were not frequent over a 5-year period.

Frequency analysis showed that 6 additional exceedances are expected due to the roadway over the five-year period.

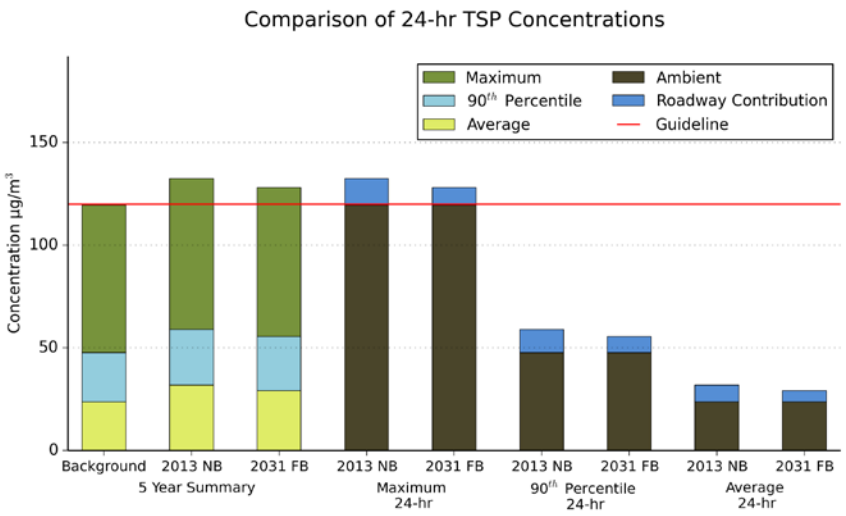
Total Suspended Particulate Matter (TSP)

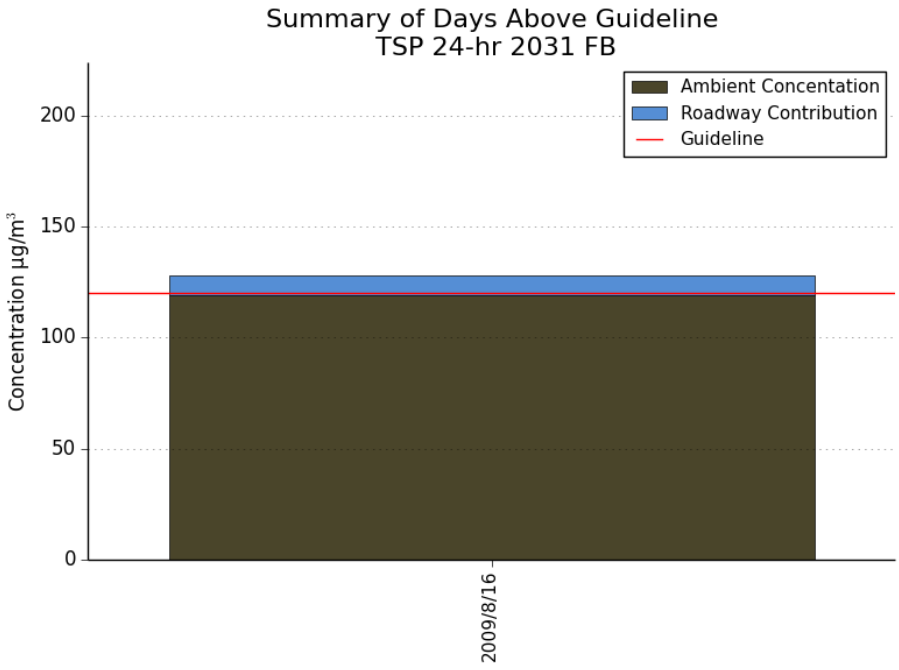
Table 29 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour TSP based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hr TSP combined concentrations exceeded the MOECC guideline.*

Table 29: Summary of Predicted TSP Concentrations

Statistical Analysis





% of MOECC Guideline:	
Maximum	107%
90th Percentile	46%
Average	24%
Roadway Contribution:	
Maximum	7%
90th Percentile	19%
Average	17%

Conclusions:

The TSP results show that the combined concentrations exceed the guideline. It should be noted that ambient concentrations alone were 99% of the guideline and the contribution from the roadway to the maximum concentration was 7%.

Frequency analysis was conducted to show that elevated concentrations were not frequent over a 5 year period.

Frequency analysis showed that one additional exceedance is expected due to the roadway over the five-year period.

Ambient VOC concentrations are typically measured every 6 days in Ontario. In order to be able to combine the ambient data to the modelled results, the measured concentrations were applied to the following 6 days when measurements were 6 days apart. When measurements were further than 6 days apart, the 90th percentile annual value was used to represent the missing data. The combined hourly results were added to these concentrations to obtain the following results.

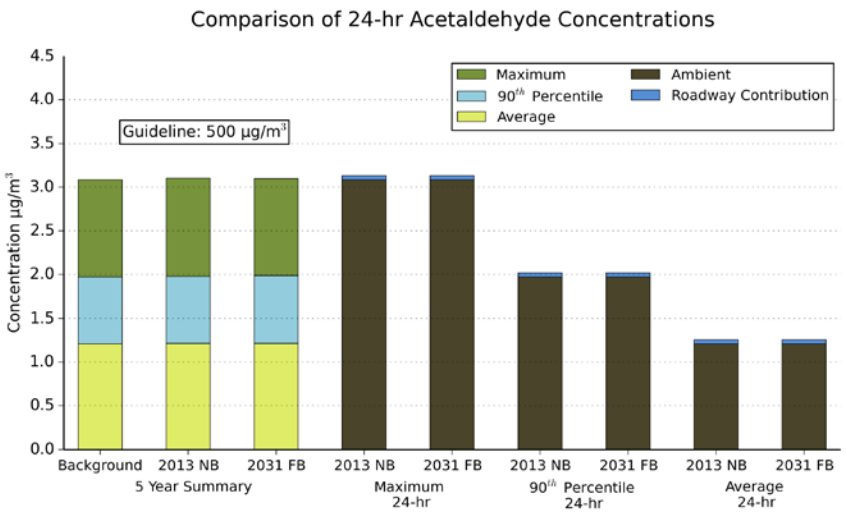
Acetaldehyde

Table 30 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour acetaldehyde based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hour acetaldehyde combined concentration was well below the respective MOECC guideline.*

Table 30: Summary of Predicted Acetaldehyde Concentrations

Statistical Analysis



% of MOECC Guideline:	
Maximum	1%
90th Percentile	<1%
Average	<1%
Roadway Contribution:	
Maximum	<1%
90th Percentile	<1%
Average	<1%

Conclusions:

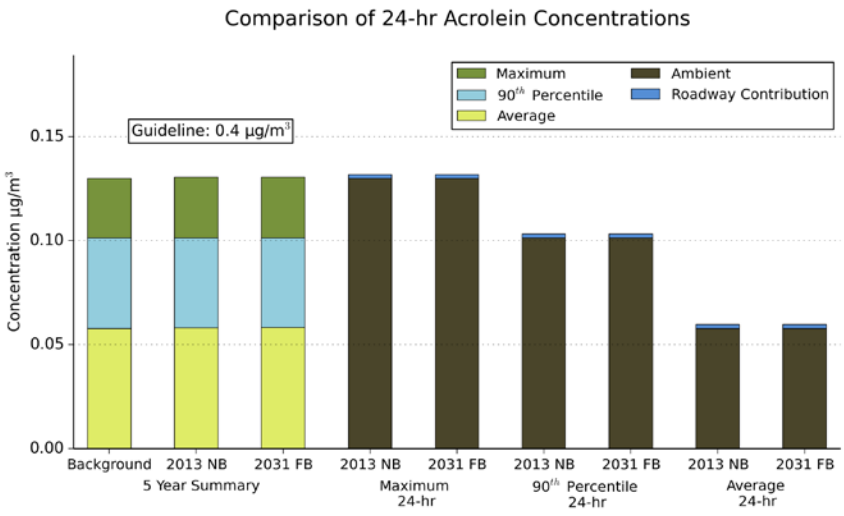
- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was less than 1%.

Acrolein

Table 31 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour acrolein based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hour acrolein combined concentration was below the respective MOECC guideline.*

Table 31: Summary of Predicted Acrolein Concentrations

Statistical Analysis	
	**% of MOECC Guideline:**
	Maximum: 33%
	90th Percentile: 25%
	Average: 15%
	Roadway Contribution:
	Maximum: 1%
	90th Percentile: 1%
	Average: 1%

Conclusions:

- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was 1%.

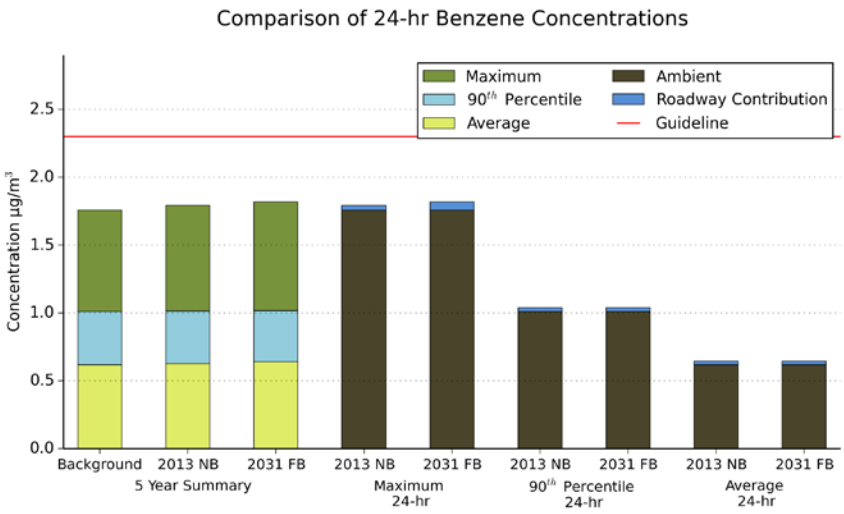
Benzene

Table 32 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour benzene based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hour benzene combined concentration did not exceed the respective MOECC guideline.*

Table 32: Summary of Predicted Benzene Concentrations

Statistical Analysis



% of MOECC Guideline:	
Maximum	79%
90th Percentile	44%
Average	28%
Roadway Contribution:	
Maximum	3%
90th Percentile	2%
Average	4%

Conclusions:

- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was 3%.

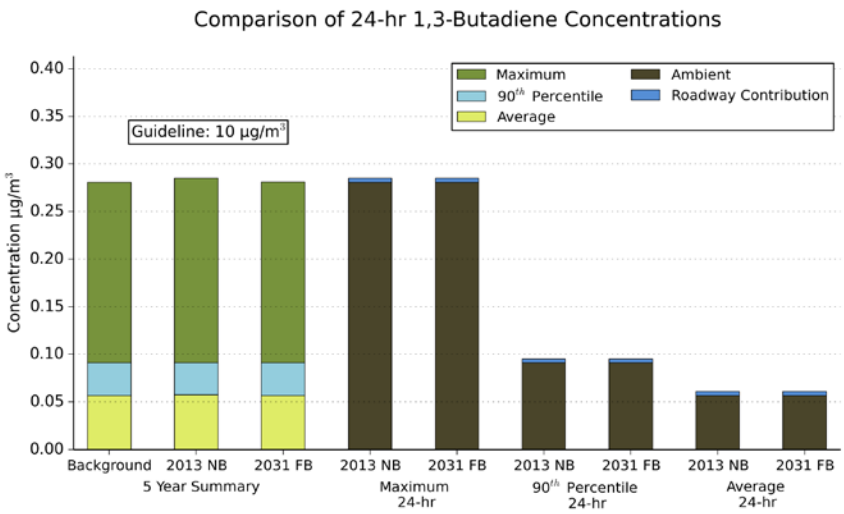
1,3-Butadiene

Table 33 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour 1,3-butadiene based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hour 1,3-butadiene combined concentration was well below the respective MOECC guideline.*

Table 33: Summary of Predicted 1,3-Butadiene Concentrations

Statistical Analysis



% of MOECC Guideline:	
Maximum	3%
90th Percentile	1%
Average	1%
Roadway Contribution:	
Maximum	<1%
90th Percentile	<1%
Average	<1%

Conclusions:

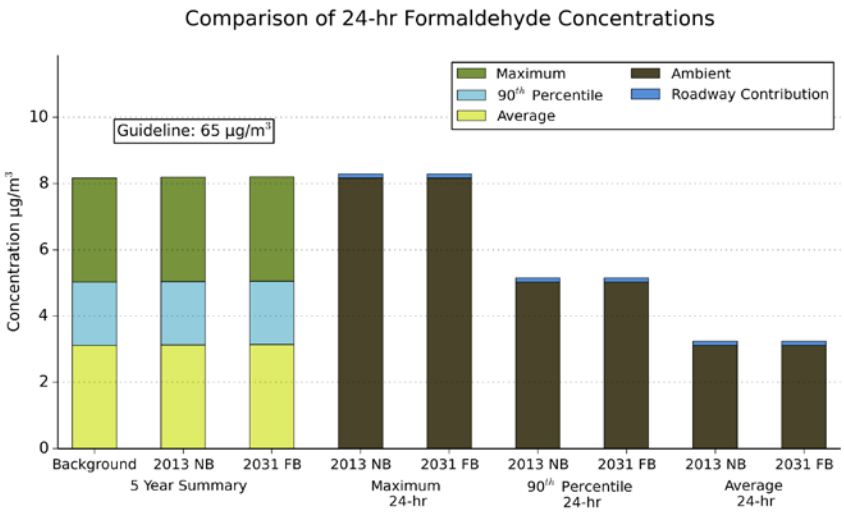
- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was less than 1%.

Formaldehyde

Table 34 presents the predicted combined concentrations for the worst-case sensitive receptor for 24-hour formaldehyde based on 5 years of meteorological data. The results conclude that:

- *The maximum 24-hour formaldehyde combined concentration was below the respective MOECC guideline.*

Table 34: Summary of Predicted Formaldehyde Concentrations

Statistical Analysis	
	**% of MOECC Guideline:**
	Maximum: 13%
	90th Percentile: 8%
	Average: 5%
	Roadway Contribution:
	Maximum: <1%
	90th Percentile: <1%
	Average: <1%

Conclusions:

- All combined concentrations were below their respective MOECC guidelines.
- The contribution from the roadway to the combined concentrations was less than 1%.

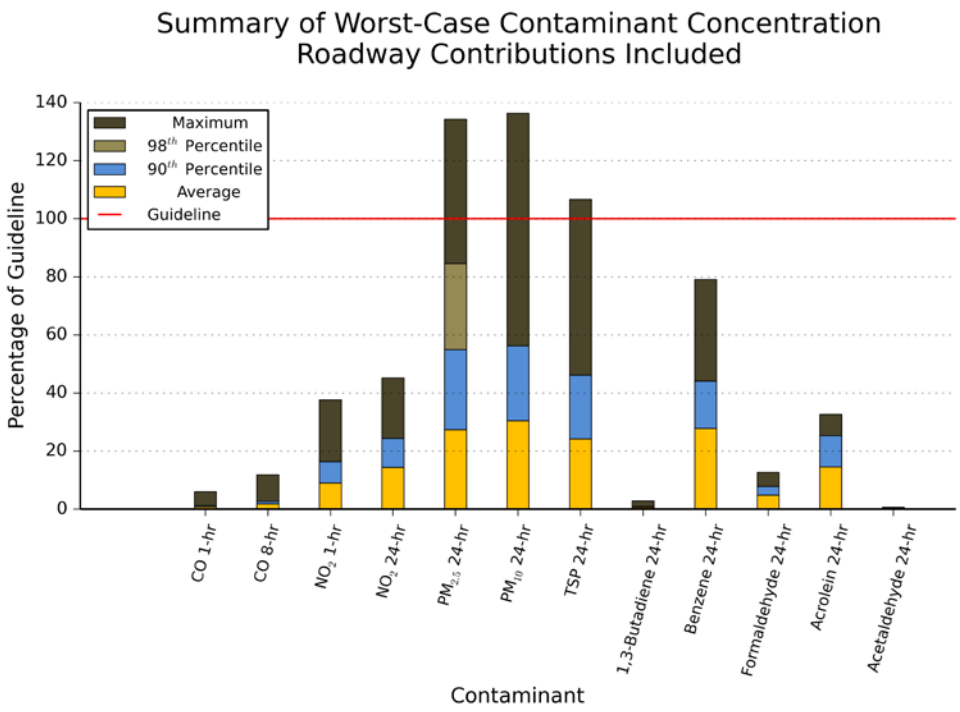
4.0 Conclusions and Recommendations

The potential effects of the proposed project infrastructure on local air quality have been assessed and are summarized in **Table 35**. The following conclusions and recommendations are a result of this assessment.

- *The maximum combined concentrations for the future build scenario were all below their respective MOECC guidelines or CWS, with the exception of PM_{10}, and TSP.*
- *Frequency Analysis determined that the project exceeded the PM_{10} guideline 6 additional days over the 5 year period. The TSP guideline was exceeded 1 additional day over the 5 year period. For both contaminants this equates to additional exceedances less than 1% of the time.*
- *Mitigation measures are not warranted, due to the small number of additional days which are expected to exceed the guideline.*

Table 35: Summary of Existing and 2031 Future Build Results

5 Year Statistical Summary	% of Guideline
	2031 Future Build
NO_2 (1-hr)	38%
NO_2 (24-hr)	45%
CO (1-hr)	6%
CO (8-hr)	12%
$PM_{2.5}$ (See Note)	85%
PM_{10}	136%
TSP	107%
Acetaldehyde	1%
Acrolein	33%
Benzene	79%
1,3-Butadiene	3%
Formaldehyde	13%



Note: The $PM_{2.5}$ results are in compliance with the CWS. The highest 3 year rolling average of the yearly 98th percentile combined concentrations was calculated to be 22.8 µg/m3 (years 2010 to 2012) or 85% of the CWS.

5.0 References

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for 2-sided printing purposes

Appendix A

Receptor Specific Modelling Results

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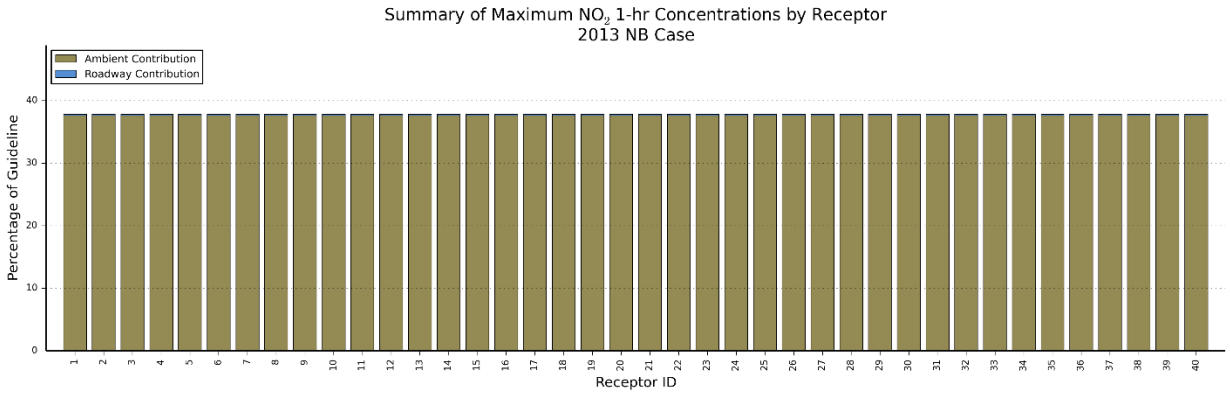
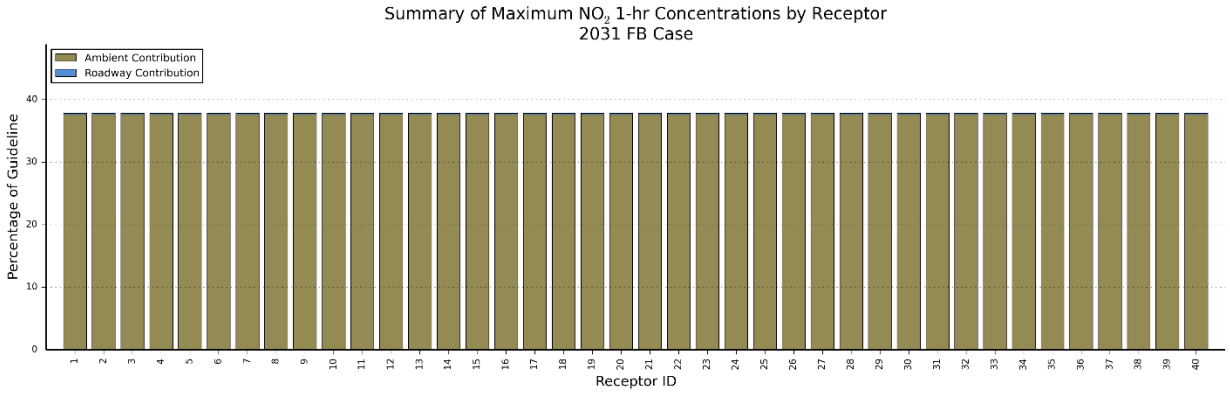
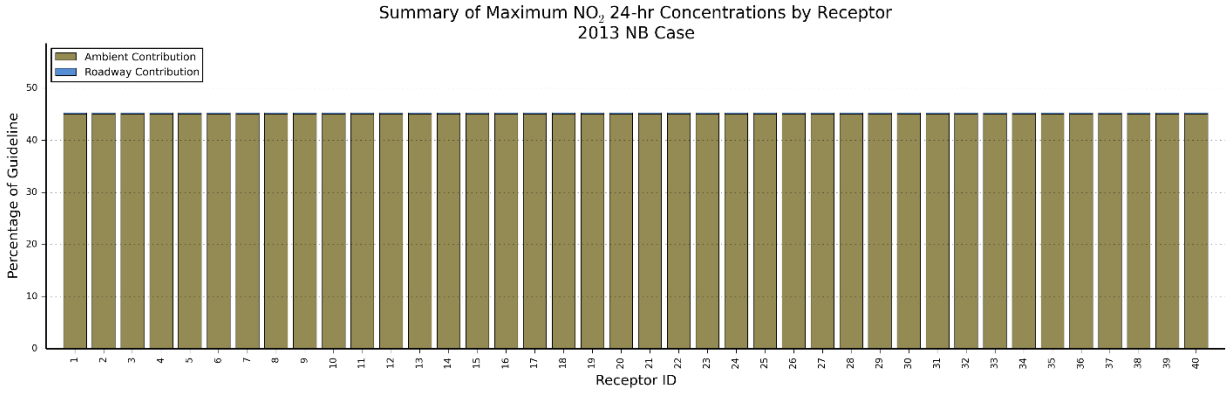
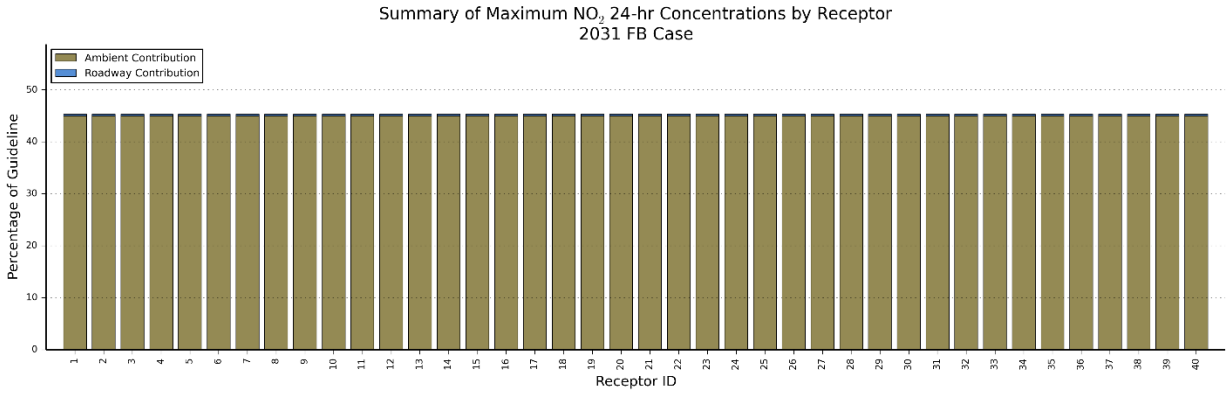
for 2-sided printing purposes

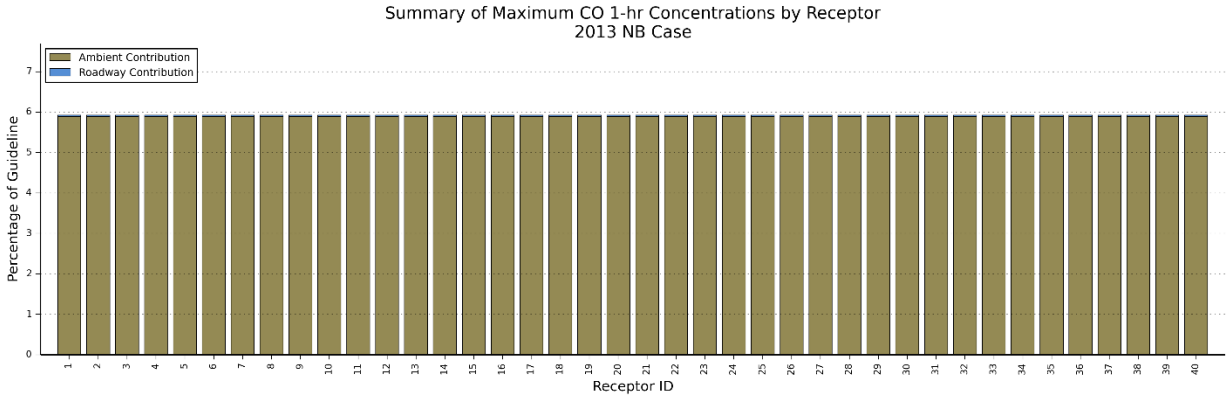
This section shows the maximum results predicted by the air dispersion modelling at each receptor within the study area for the 2013, and 2031 scenarios. **Figures 8** through **11** in the main body of the report show the location of the receptors within the study area.








Summary of Maximum NO2 24-hr Concentrations by Receptor
2031 FB Case
Ambient Contribution
Roadway Contribution
Percentage of Guideline
Receptor ID


Summary of Maximum CO 1-hr Concentrations by Receptor
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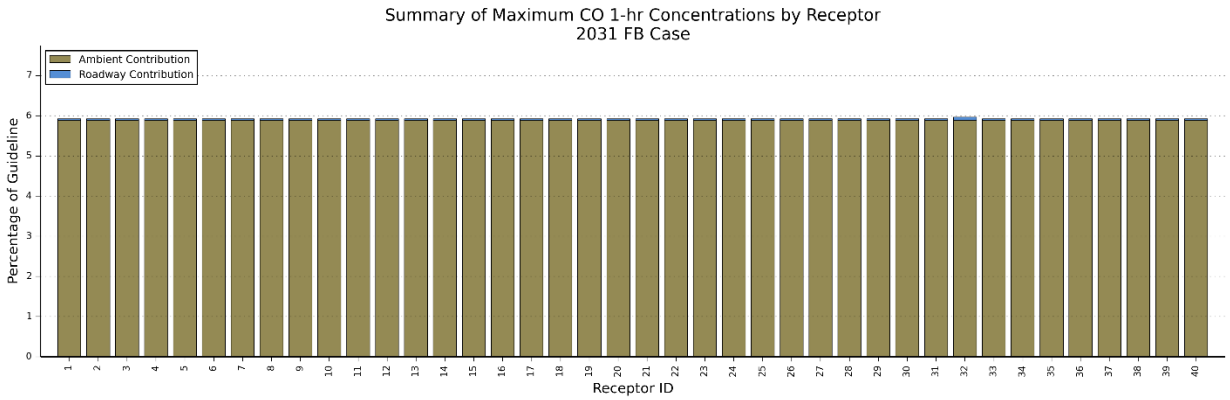
Ambient Contribution
Roadway Contribution
Percentage of Guideline
Receptor ID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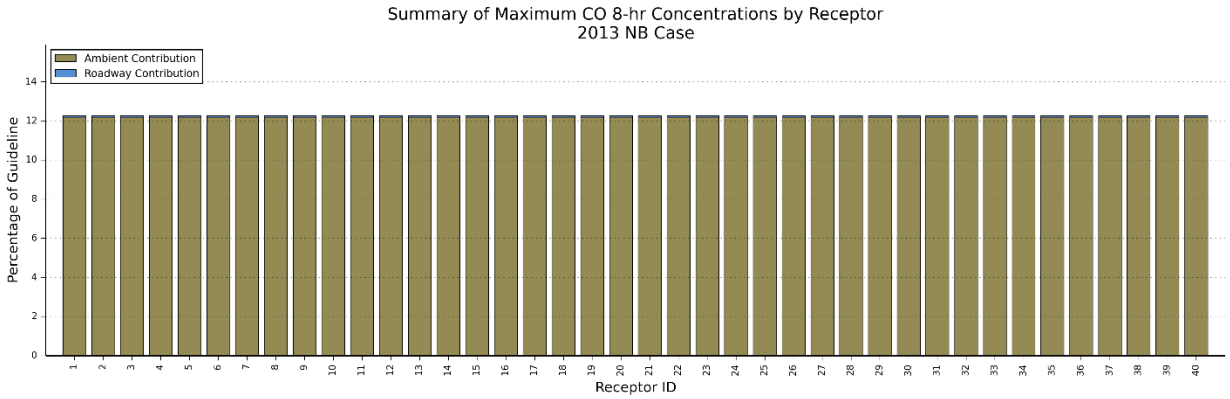
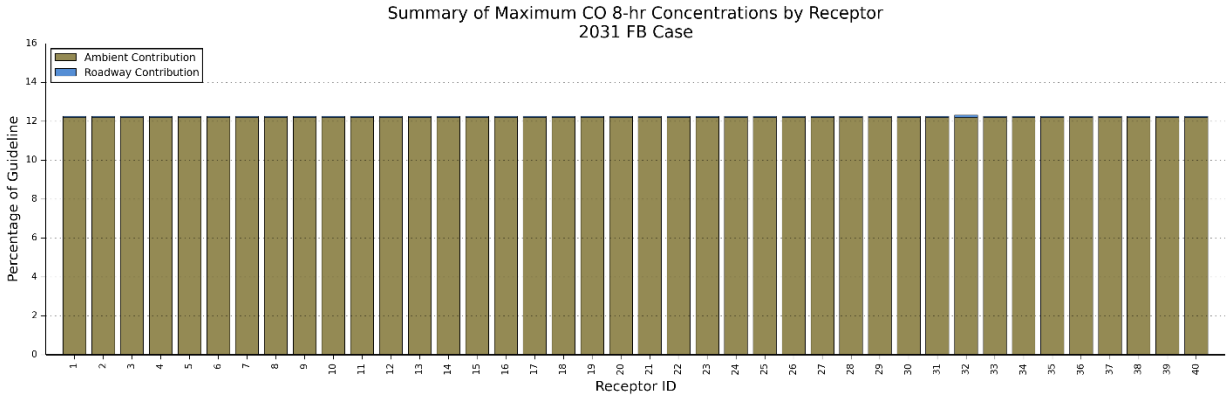
Receptor ID


Summary of Maximum CO 8-hr Concentrations by Receptor
2013 NB Case
Ambient Contribution
Roadway Contribution
Percentage of Guideline
Receptor ID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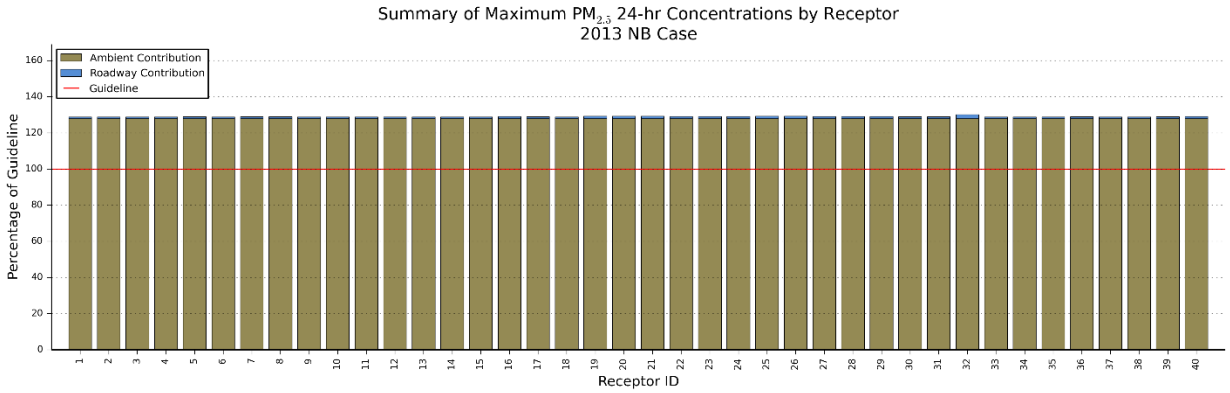
Roadway Contribution
Percentage of Guideline
Receptor ID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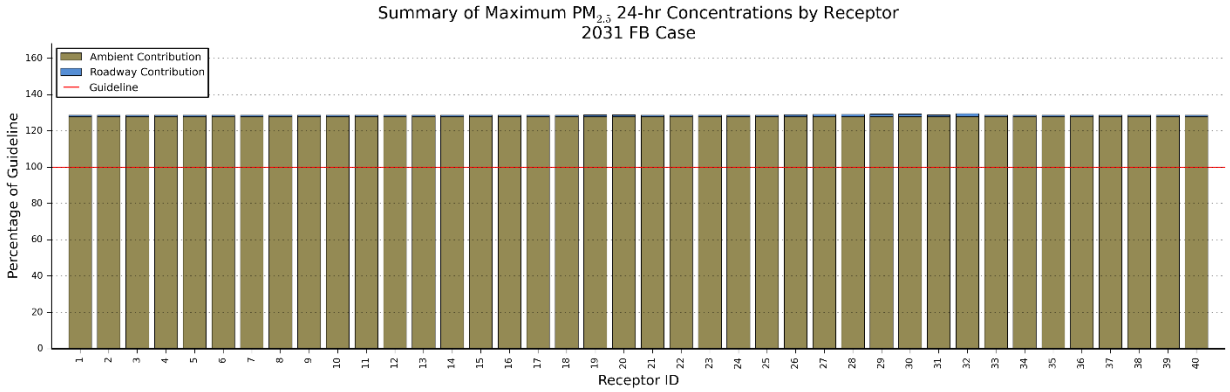
Roadway Contribution
Guideline
Percentage of Guideline
Receptor ID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Roadway Contribution
Guideline
Percentage of Guideline
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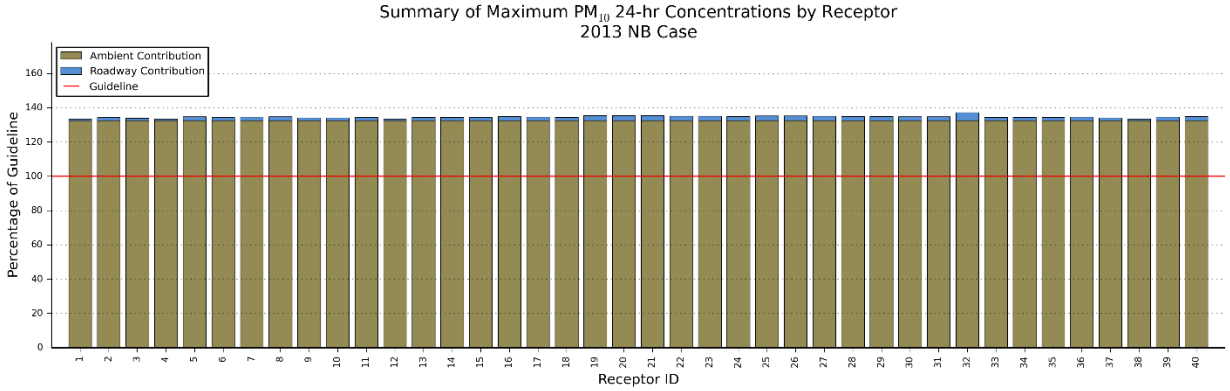
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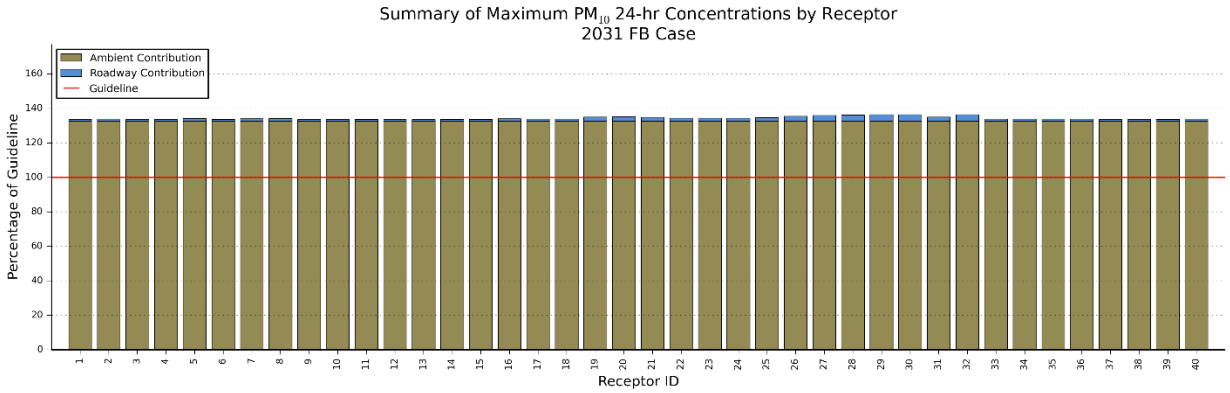
Guideline
Percentage of Guideline
Receptor ID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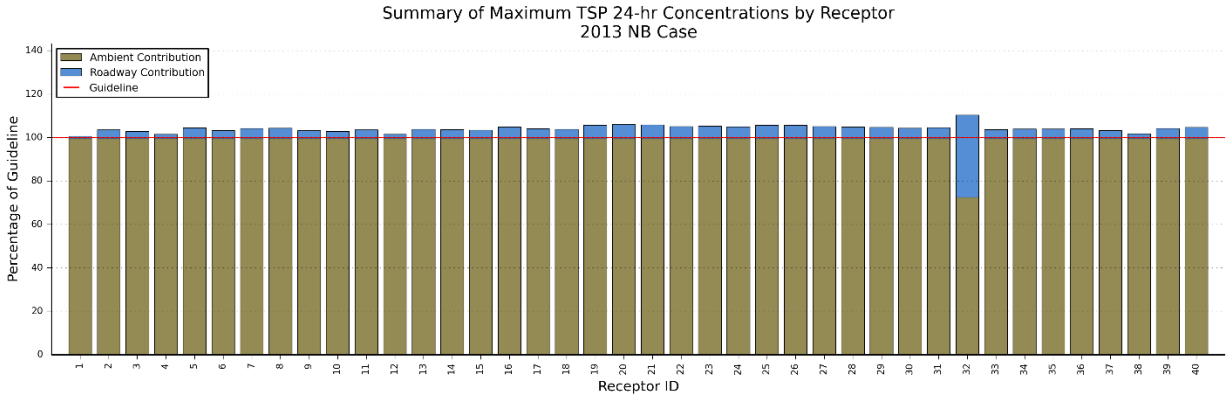
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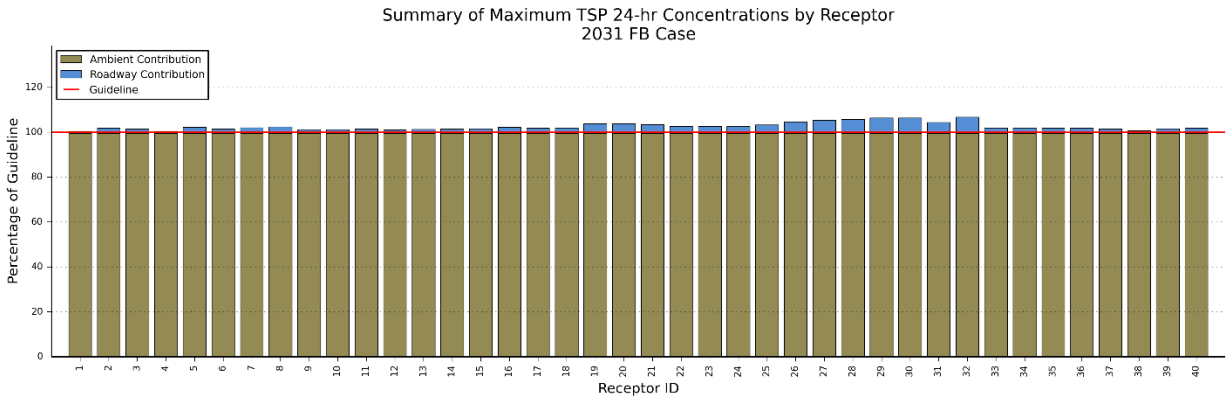
Roadway Contribution
Guideline
Percentage of Guideline
Receptor ID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Guideline
Percentage of Guideline
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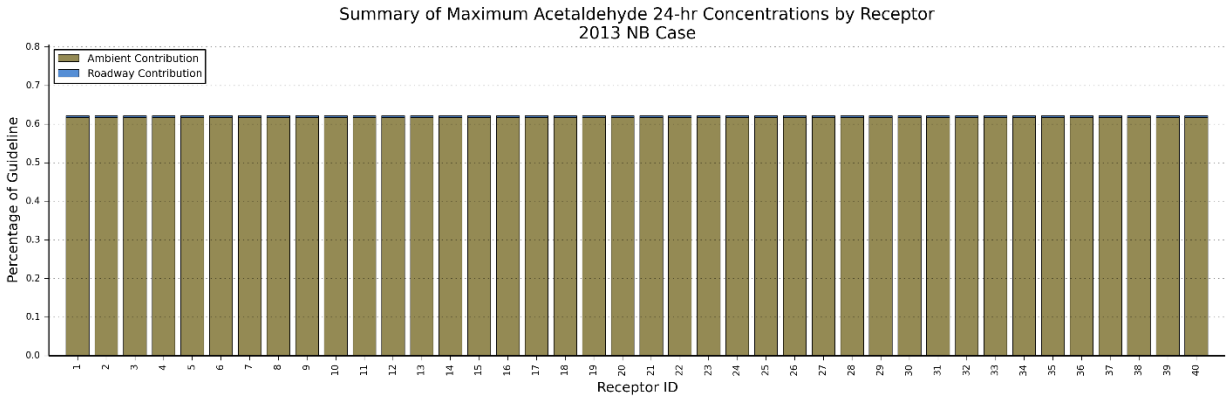
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Percentage of Guideline
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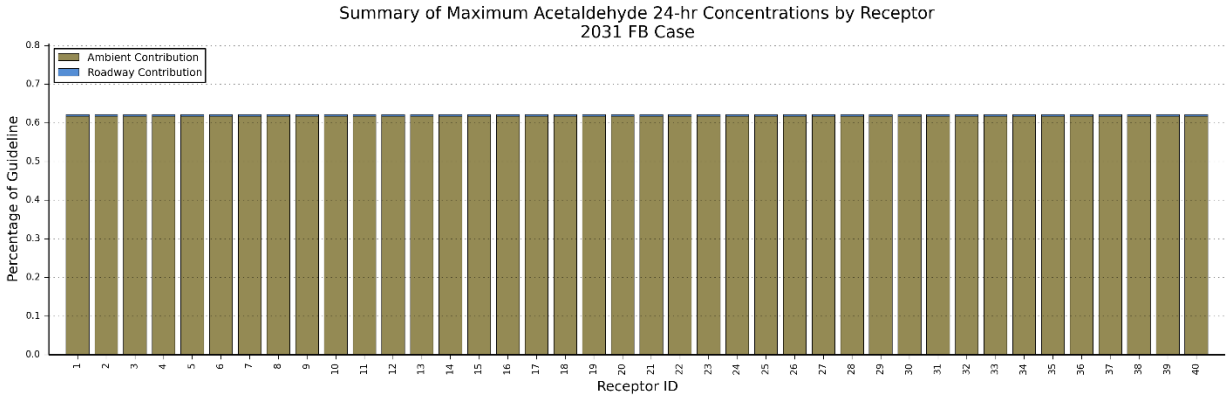
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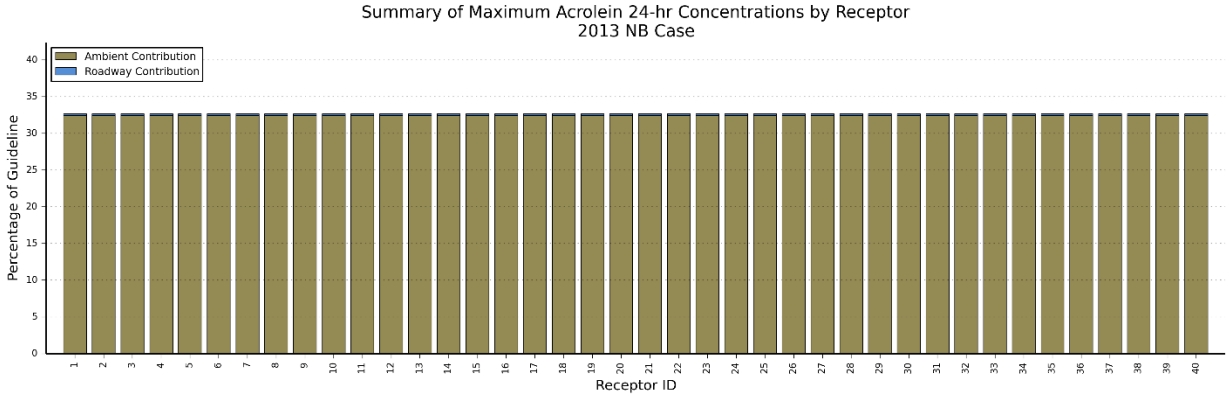
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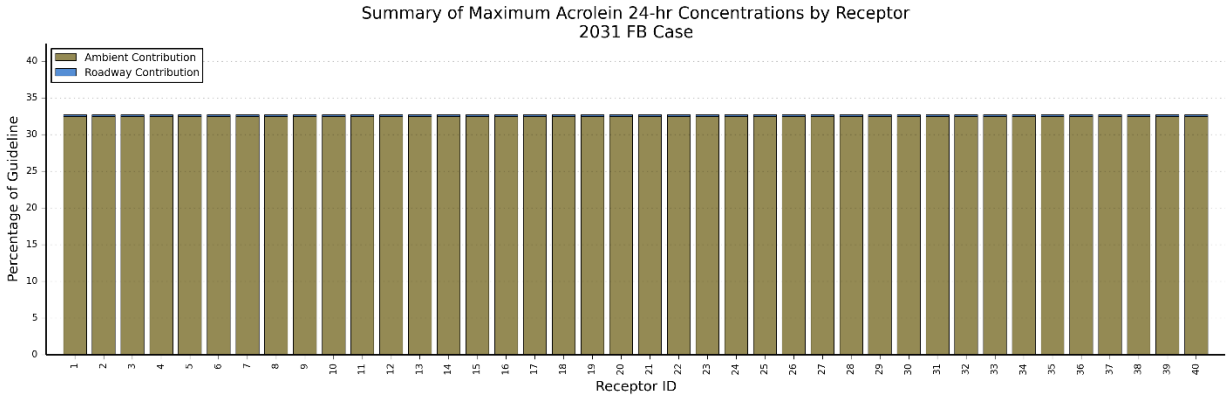
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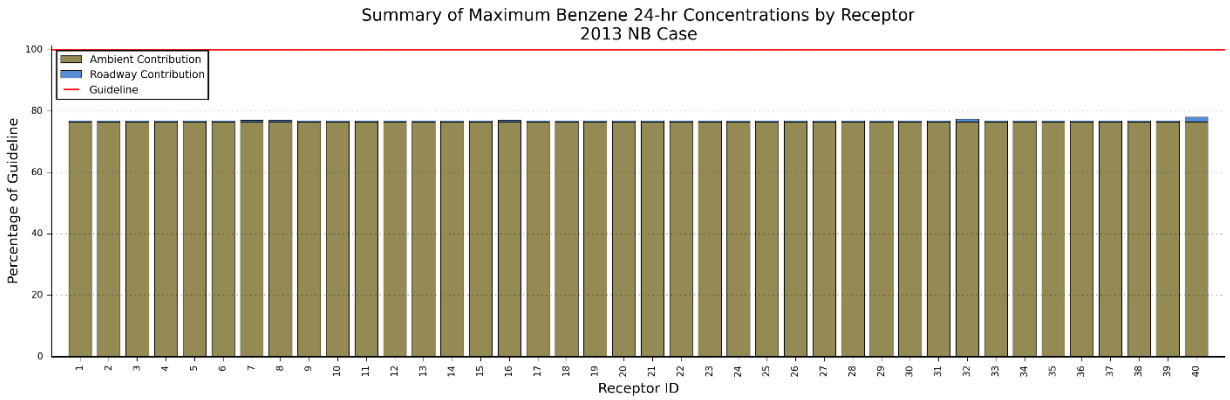
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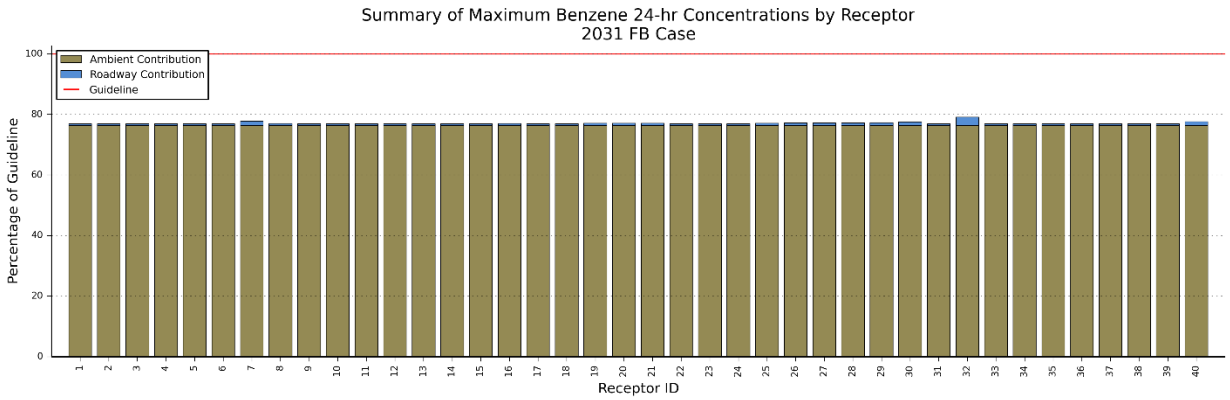
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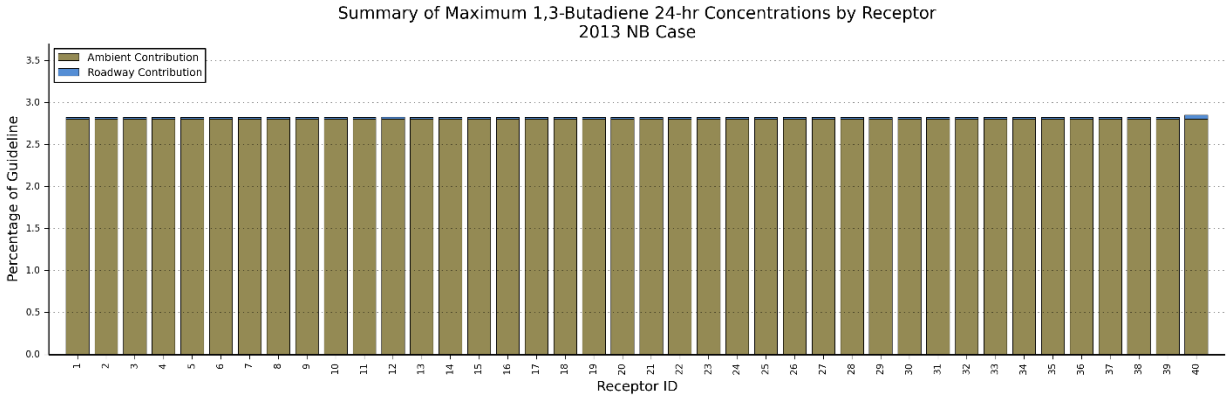
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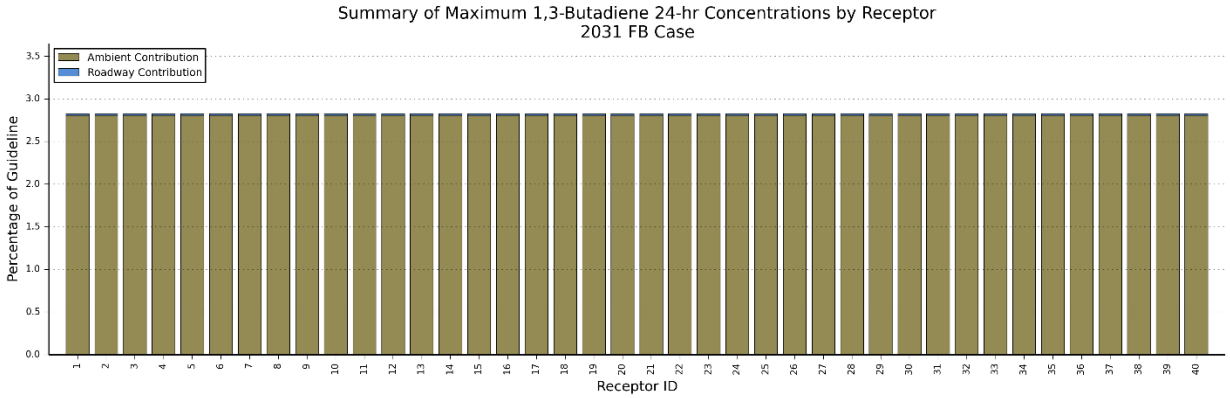
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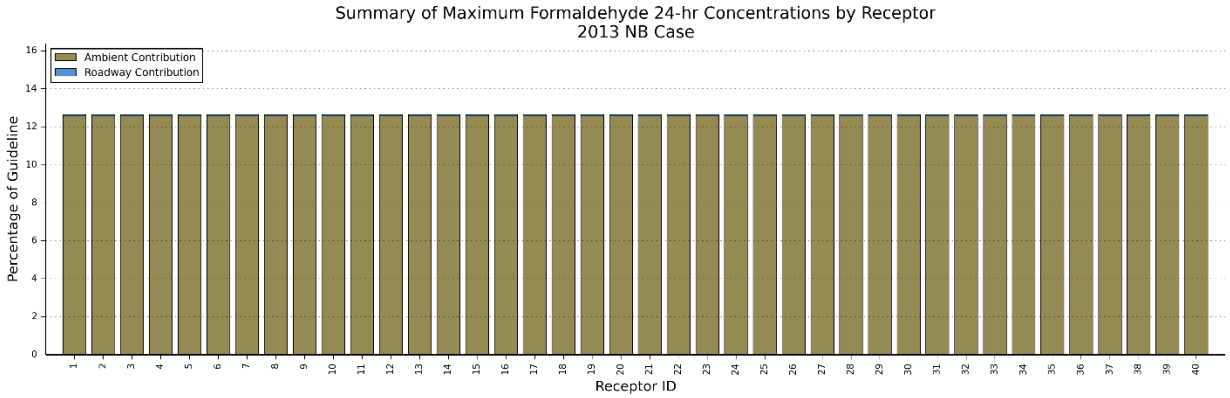
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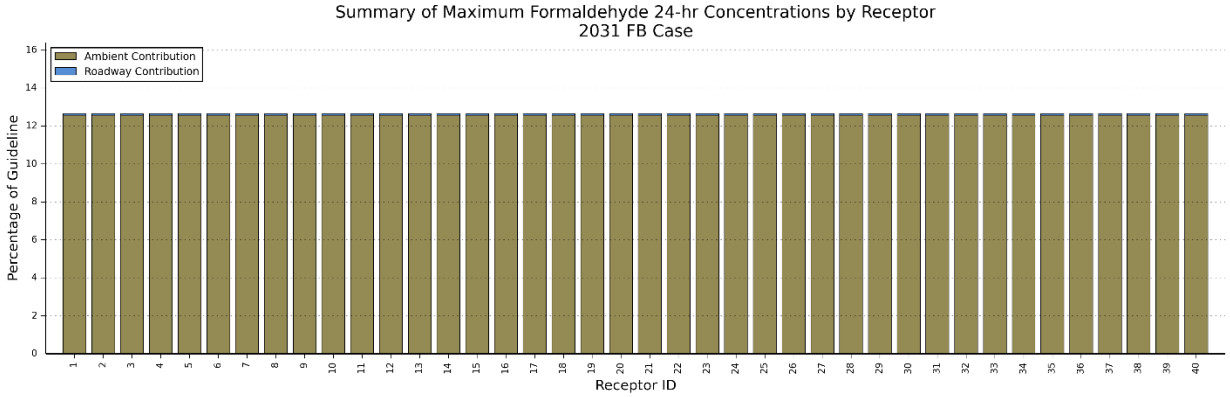
Summary of Maximum Formaldehyde 24-hr Concentrations by Receptor
2031 FB Case
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Percentage of Guideline
Receptor ID

N TECHNICAL ADVISORY COMMITTEE

TECHNICAL ADVISORY COMMITTEE

1. Kick-Off Meeting
2. TAC#1 and TAC#2
3. Roundabout Review
4. Correspondence with Utilities and Developers

1

Region of Peel
Working for you

Environmental Assessment Technical Advisory Meeting Mayfield Road – Chinguacousy Road to Winston Churchill Boulevard - Kick Off Meeting		
Location	**Date**	**Time**
Chinguacousy Ski Chalet, 1st Floor Meeting Room, 9050 Bramalea Road, Brampton	October 17, 2013	9:00 a.m. – 10:00 a.m.

Meeting Minutes

Introduction

- Neal Smith welcomed all the participants.
- The Project Team was introduced:
  - Steve Ganesh, Manager, Infrastructure Programming & Studies
  - Asha Saddi, Technical Analyst, support to the project
  - Laverne Soodeen, in-house designer, and,
  - Gene Chartier, Hatch Mott MacDonald, providing the technical studies for the project
- The purpose of the meeting was to receive comments and suggestions on the boards that will be presented to the public at PIC #1 on November 27, 2013 at the Police Association Building, 10675 Mississauga Road, Brampton.

Study Area

- Project background information:
  - Study area is from Chinguacousy Road to Winston Churchill Boulevard
  - Mayfield Road is an east-west arterial road that divides the City of Brampton and the Town of Caledon; Town of Halton Hills is to the west of Winston Churchill Boulevard
- Project schedule:
  - PIC # 1 - November 27, 2013
  - PIC # 2 - October 2014
  - Draft ESR - January 2015
  - Project completion - May 2015

EA Process and the LRTP Overview

- This project is a Schedule "C" Class EA and is based on the Region of Peel's updated 2012 Long Range Transportation Plan (LRTP). It is the first project to use the LRTP since it has been endorsed by Council.
- The LRTP is also a transportation master plan for the Region and was conducted under the Municipal Class EA process in compliance with Ontario's Environmental Assessment Act. It identifies the transportation challenges anticipated in the Region over the next 20 years and a road improvement plan to address those challenges.
- This project addresses Phases 1 and 2 of the EA process and involves:
  - Defining the problem;
  - Identifying alternative solutions, and,
  - Selecting a preferred solution in consultation with the public and key stakeholders

- The LRTP identified the Mayfield Road widening from 2 to 6 lanes between Chinguacousy Road and the proposed GTA West Transportation Corridor and from 2 to 4 lanes between GTA West and Winston Churchill Boulevard by 2031.

Problem and Opportunity

- Improvements are needed along the Mayfield Road study area to address / accommodate:
  1. traffic demands due to future planned development
  2. pedestrian and cyclist movements through the study area
  3. access control
  4. goods movement

Planning and Policy Context

- This project is supportive of numerous policies from Provincial, Peel / Halton Regions and secondary plans and EAs from our partnering cities.

- The Ministry of Transportation staff has been involved throughout this study to ensure coordination with the ongoing GTA West Corridor Environmental Assessment.

Supporting Studies (Hatch Mott MacDonald (HMM))

- The following studies are being provided by HMM:
  - Archaeological and Cultural
  - Built Heritage Assessments
  - Transportation and Traffic
  - Contaminated Soil Screening
  - Geotechnical Investigation and pavement Design
  - Natural Environmental Assessment
  - Existing Natural Environment
  - Air Quality
  - Noise Study

- John Nemeth advised that it would also be helpful to contact the CVC to get an understanding of their position on the road construction.

- Gene Chartier confirmed that the Transportation and Traffic study found that the widening of Mayfield Road to 4 lanes by 2021 and widening to 6 lanes by 2031 between Chinguacousy Road and proposed GTA West Transportation corridor is justified and therefore confirms the analysis and recommendation of the LRTP; expected population and employment growth in the study area will place significant travel demand on the existing transportation infrastructure leading to increased congestion.

- It should be noted that for geometric purposes the widening to 6 lanes should be extended to Winston Churchill Boulevard.

- Roundabouts are being considered at:
  1. Heritage Road and Mayfield Road
  2. Winston Churchill Boulevard and Mayfield Road

- There are no identified ANSI or environmental sensitive areas in the study area.

- Runoff from Mayfield Road is to roadside ditches leading to Huttonville Creek and Fletcher's Creek directly and/or via local storm trunks / sewers.

- Stage 1 Archaeological Assessment determined there are many areas that have not been previously disturbed and require Stage 2 Archaeological Assessment.

- There are 17 Cultural Heritage Resources.

Preliminary Evaluation Criteria

- The preliminary evaluation criteria includes traffic and operations safety, natural environment, socio-economic environment, economic environment, and how the alternative complies / supports regional and municipal official plans and policies.

Design Considerations

- The design criteria will take in to consideration the:
  - Home United Church
  - Alloa Public School
  - Hydro One Networks
  - Roundabouts, and,
  - the addition of multi-use trails to implement the Region of Peel's Active Transportation Plan

- Kant Chawla informed the Committee that on September 3, 2013 the Town of Caledon endorsed the plan for Mayfield West and that the will have an impact the initial design.

2

Region of Peel
Working for you

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Technical Advisory Committee (TAC) Meeting Agenda

Mayfield Road Environmental Assessment TAC Meeting

Project Name	Mayfield Road Environmental Assessment - from Chinguacousy Road to Winston Churchill Boulevard	
Project Number	**Prepared By**	**Date**
12-4390	Neal Smith	October 16, 2013

Meeting Information		
Location	**Date**	**Time**
Chinguacousy Ski Chalet, 1st floor Meeting Room, 9050 Bramalea Road, Brampton	October 17, 2013	9 a.m. – 10 a.m.

Attendees*:*

Hatch Mott McDonald	Gene Chartier
Town of Caledon	Kant Chawla, John Hasselbacher, Tim Manley
Halton Hills	Matt Roj, Chris Mills
City of Brampton	Compton Bobb, Henrik Zbogar, Marta Roias, John Allison, Shane Beirnes
Halton Region	Maureen VanRavens, Patrick Monaghan
Peel District School Board	Dave Dundas
CVC	Jakub Kilis, Liam Marray, Dawn Renfrew, Jason Elliott, Lynn Heather, Scott Sampson
MNR	Mark Heaton, Melinda Thompson-Black
MOE	Marinha Antunes
MTO	Jin Wang, Bob Stephenson
Hydro One Brampton	Robert Agostini, Robert Evangelista
Hydro One Networks	Maurice Williams
Halton Hills Hydro	Chris Hale
Bell	Bradley Boulton, Chris Seaton
Cogeco Cable	Dennis Ramdass
Enbridge Gas	Jamie Comper
Accessibility Advisory Committee	Meenu Sikand
Realty	Gayle Gorman; Thomas Lee
CAD/GIS	Tod Jenkins
Transportation Program Planning	Steve Ganesh, Neal Smith, Asha Saddi, Laverne Soodeen, John Nemeth
Roads Operations	Len Gardiner, Mark Crawford
Water Program Planning	Martin Pendlebury, Imran Motala, Lynn Germaine
Wastewater Program Planning	
Peel Public Health	Sharon Williams
Transportation Planning/ Goods Movement/LRTP/RCS	Eric Chan, Sabbir Saiyed, Tina Detaramani
Active Transportation	Margie Chung
Roads Capital	Bob Nieuwenhuysen/Jose Montouto
Traffic Operations	Imre Tot
Traffic Development	Sean Carrick
Traffic Safety	Mina Zare
Traffic Signals	Michael Fang
Development Services	Ramona Mirtorabi, Junior Mohammed
Development Planning	Andrea Warren, Christina Marzo, Ryan Vandenburg,

Technical Advisory Committee (TAC) Meeting Agenda

Environmental Assessment: **Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard**	**Speaker**
Opening Remarks (5 mins.)	Neal Smith
Participant Introductions (5 mins.)	All – Round Table
Project Overview (30 mins.) • Introduction • Study Area • EA Process and LRTP Overview • Problem and Opportunity Statement • Planning and Policy Context • Supporting Studies • Preliminary Evaluation Criteria • Design Considerations	Neal Smith / Gene Chartier
General discussion on other issues and identification of key stakeholders (10 mins.)	All
Wrap-up and Next Steps (5 mins.)	Neal Smith

SIGN-IN SHEET

TAC#2 - MAYFIELD ROAD ENVIRONMENTAL ASSESSMENT - CHINGUACOUSY TO WCB

	NAME	COMPANY/AFFILIATION	EMAIL/TELEPHONE
1	DARRYL YOUNG	HALTON REGION	darryl.young@halton.ca
2	Christopher Hale	Halton Hills Hydro Inc.	chrish@haltonhillshydro.com
3	John Hemingway	HMM	john.hemingway@hatchmott.com.
4	Melissa Auchinvole	"	
5	Andrea Divnar	ENBRIDGE	andrea.divnar@enbridge.com
6	Branko Vidovic	Peel District School Board	branko.vidovic@peelsb.com
7	KYLE WITNEY	ENBRIDGE	Kyle.Witney@enbridge.com.
8	DAVID BEAN	ENBRIDGE	david.bean@enbridge.com
9	DARREN TAVARES	ENBRIDGE	DARREN.TAVARES@ENBRIDGE.com
10	Rebecca Caughey	Peel	rebecca.caughey@peelregion.ca
11	Nathan Sinka	ROP	Nathan.Sinka@peelregion.ca
12	PATRICIA RITCHIE	ROGERS.	patricia.ritchie@rci.rogers.com
13	Tom Lee	Region of Peel	thomas.lee@peelregion.ca
14	Lori Ann Thomsen	Region of Peel	Lori-ann.thomsen@peelregion.ca
15	DAN RIDEWAY	TOWN OF HALTON HILLS	daniel@haltonhills.ca
16	Richa Dave	ROP - Traffic Safety	richa.dave@peelregion.ca
17	GORDON HUI	REGION OF PEEL	gordon.hui@peelregion.ca
18	Michelle Vivar	Rogers	michelle.Vivar@rci.rogers.com
19	Wayne Koethe	Region	wayne.Koethe@peelRegion.ca
20	Shad Hussain	HMM	shad.hussain@hatchmott.com
21			
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Technical Advisory Committee (TAC) Meeting Agenda

Project Name	**Mayfield Road Environmental Assessment - Chinguacousy Rd to Winston Churchill Blvd**	
Purpose	To discuss the preliminary preferred design solution for the Mayfield Road EA: Chinguacousy to WCB, and review the presentation boards for PIC#2.	
Project Number	**Contact**	**phone/email**
12-4390	Liz Brock	905-791-7800x7902 liz.brock@peelregion.ca

Meeting Information		
Location	**Date**	**Time**
10 Peel, Suite A, 1st floor, Caledon Room	Thursday, August 13, 2015	9 a.m. – 11 a.m.

Invitees*:*

Hatch Mott McDonald	Melissa Alexander, Schad
Town of Caledon	Kant Chawla, David Loveridge, Tim Manley
Halton Hills	Matt Roj, Chris Mills, Maureen VanRavens
City of Brampton	Compton Bobb, Henrik Zbogar, Andria Oliveira,
Halton Region	Patrick Monaghan
Peel District School Board	Dave Dundas
CVC	Jakub Kilis, Liam Marray,
MNR	Mark Heaton
MOE	Marinha Antunes
MTO	Jin Wang, Bob Stephenson
Hydro One Brampton	Robert Agostini, Robert Evangelista
Hydro One Networks	Maurice Williams
Halton Hills Hydro	Chris Hale
Bell	Bradley Boulton, Chris Seaton
Cogeco Cable	Dennis Ramdass
Enbridge Gas	Jamie Comper
Accessibility Advisory Committee	Meenu Sikand
Realty	Gayle Gorman; Thomas Lee
CAD/GIS	Tod Jenkins
Transportation Program Planning	Steve Ganesh, Neal Smith, Liz Brock, Sargon Sifo, John Nemeth
Roads Operations	Len Gardiner, John Kolb, Mark Crawford
Water Program Planning	Imran Motala, Lynn Germaine
Wastewater Program Planning	Ramona Mirtorabi
Health	Lorenzo Mele
Transportation Planning	Eric Chan, Sabbir Saiyed, Alejandro Cifuentes
Active Transportation	Margie Chung
Roads Capital	Bob Nieuwenhuysen/Jose Montouto
Traffic Operations	Imre Tot
Traffic Development	Sean Carrick
Traffic Safety	Mina Zare
Traffic Signals	Rick Laing
Development Services	Junior Mohammed
Development Planning	Wayne Koethe, Andrea Warren

Technical Advisory Committee (TAC) Meeting Agenda

Environmental Assessment: **Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard**	**Speaker**
Opening Remarks (5 mins.)	Neal Smith
Participant Introductions (5 mins.)	All – Round Table
Project Overview (30 mins.) • Introduction • Study Area • EA Process and LRTP Overview • Problem and Opportunity Statement • Planning and Policy Context • Supporting Studies • Preliminary Evaluation Criteria • Design Considerations	Neal / Melissa
General discussion on other issues and identification of key stakeholders (10 mins.)	All
Wrap-up and Next Steps (5 mins.)	Neal Smith

3

Technical Advisory Committee (TAC) Meeting Agenda

Mayfield Road Environmental Assessment Roundabout Presentation and Discussion

Project Name	Mayfield Road Environmental Assessment - from Chinguacousy Road to Winston Churchill Boulevard	
Project Number	**Prepared By**	**Date**
12-4390	Neal Smith	February 10, 2015

Meeting Information

Location	**Date**	**Time**
10 Peel Centre Drive, Brampton Caledon Room, 1st floor Meeting Room,	February 10, 2015	9:30 a.m. – 12:30 a.m.

Attendees*:*

Hatch Mott MacDonald	Melissa Alexander
Hatch Mott MacDonald	John Hemingway
Hatch Mott MacDonald	Ben Hasemloo
Region of Peel	Liz Brock
Region of Peel	Sargon Sifo
Region of Peel	Steve Ganesh
Region of Peel	Imre Tot
Region of Peel	Chris King
Region of Peel	Bob Nieuwenhuysen
Region of Peel	Jose Montouto
Halton Region	Patrick Monaghan
Halton Region	Ben Robertson
Halton Region	Jeffrey Reid
Halton Region	Melissa Green-Battiston
Halton Hills	Daniel Ridgway
Halton Hills	Maureen VanRavens
Town of Caledon	Kant Chawla
Town of Caledon	Tim Manley
City of Brampton	Compton Bobb
City of Brampton	David Monaghan
City of Brampton	Craig Kummer
City of Brampton	Henrik Zbogar
City of Brampton	Chris Duyvestyn

Technical Advisory Committee (TAC) Meeting Agenda

Environmental Assessment: **Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard**	**Speaker**
Opening Remarks (15 mins.)	Neal Smith
Participant Introductions (15 mins.)	All – Round Table
Project Overview (30 mins.) • Introduction • Study Area • Traffic Report overview	Neal Smith / Hatch Mott MacDonald
Roundabout Presentation (30 mins.)	Hatch MacDonald
General discussion (45 mins.)	All
Wrap-up and Next Steps (15 mins.)	Neal Smith

4

Minutes

Title: Mayfield Road Environmental Assessment - Meeting with Melrose Investments and Trinistar Corporation.
Date: Monday September 22, 2014
Time: 2.00 pm. – 3.00 pm
Place: 10 Peel Centre Drive, Suite B, Rm 4-911

Present: Liz Brock; Neal Smith; Sargon Sifo; Wayne Koethe, Development Services; Thomas Lee, Property Services; Paulo DaSilva, Melrose Investments; Adam Cairns, Melrose Investments; Daniel Belli, Trinistar Corporation; Scott Gibbons, BA Group;

Copy: Ryan Vandenburg, Sean Carrick

Purpose: **To discuss proposed design alignment along Mayfield Road between Chinguacousy Road and WCB.**

#	DESCRIPTION	ACTION
1	• Introductions and overview of the EA project to date	**none**
2	• Reviewed Region's proposed design plan for Mayfield Road between Chinguacousy Road and Creditview Road (previously sent to Scott Gibbons)	**none**
3	**Discussion about Region's ROW, BILD standards and proposed alignment from EA.** • Official plan ROW is 50m mid-block. Application of BILD standards brings the ROW to 55.5 for single left turn and 59m for dual left turns at intersections (245m each side of the intersection) • Region agreed to review the proposed design and evaluate if a shift to the north between Chinguacousy and Creditview is feasible. • Accesses shown on private property plan have no status. Accesses will be reviewed through the site plan/development application process.	**Info** **Sargon/Neal** **Ryan / Wayne / Sean Carrick**

Minutes

Title: Mayfield Road & Heritage Heights Transportation Studies
Date: Monday July 14, 2013
Time: 12.30 pm. – 2.00 pm
Place: Room 3-610, Suite B

Present: Liz Brock; Steve Ganesh; Gene Chartier, HMM; Neal Smith; Marta Roias, City of Brampton; Eric Chan; Andrea Warren; Tina Detaramani; Juan Perez, HMM; Linda Wu, City of Brampton; Suzette Shiu, Cole Engineering;

Absent: Chris Duyvestyn, City of Brampton; Gary Kocialek; Jill Hogan, City of Brampton; Compton Bobb, City of Brampton; Tim Manley, Town of Caledon

Purpose: To discuss Region's position and guiding principles to successfully deliver its Mayfield Road EA as it related to traffic forecasts in the Heritage Heights Secondary Plan area.

#	DESCRIPTION	ACTION
1&2	Introductions and overview of the EA project to date	**none**
3	<u>Review of Draft Mayfield Road EA Traffic Report</u> • Region waiting to finalize its draft Traffic/Transportation Report pending further input regarding traffic forecasts from the City • Region's Traffic Report uses existing (2013) traffic counts + development volumes + traffic growth based on Region's model to come up with the 2021 numbers. Using the addition of development volumes to come up with the 2031 numbers. • Traffic forecasts from the Heritage Heights Transportation Master Plan study will impact Region's projections, which will have a bearing on the roundabout analysis, drainage, and property acquisition • Region is using current LRTP as justification for Phases 1 and 2 of the Mayfield Road EA. Draft Traffic Report confirms the LRTP conclusion. Working from the assumption that widening is required. • Both Region and City face challenges related to location of GTA West interchanges • Information to be presented to the public at PIC#2 will show that the Region is protecting for the worst case scenario, being without the GTA West transportation corridor in place • A GTA West ramp could have significant impact on intersection and midblock volumes along Mayfield Road • MTO will be providing municipalities some preliminary info on location of interchanges by end of the year • Region will document in ESR general location of GTA West interchange and Sandalwood Parkway intersection similar to Mayfield East EA (Airport to Coleraine) • Town of Caledon has not provided any comment on the City's Heritage Heights study to date	**Info**

Rogers Communications
8200 Dixie Road
Brampton, Ontario L6T 0C1

December 18, 2013

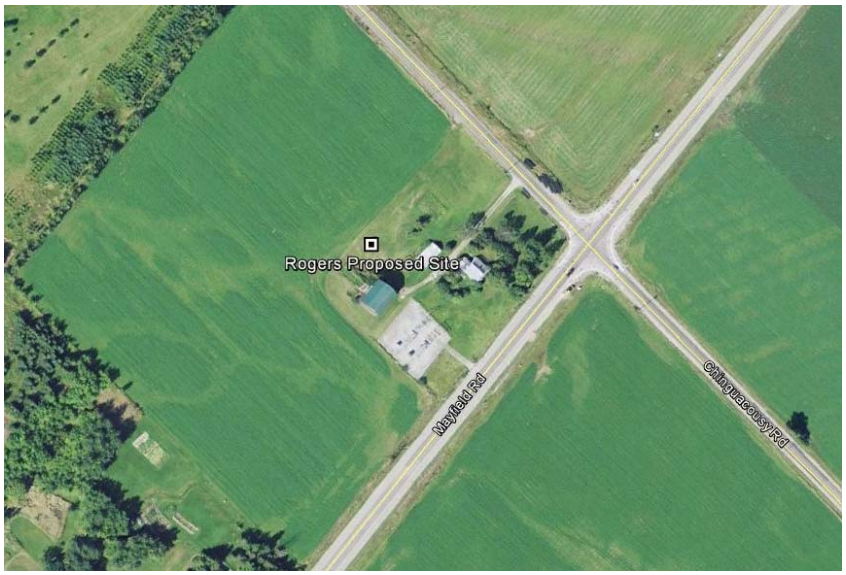
Town of Caledon
Development Section
Development Approval and Planning Policy Department
Email: premeeting@caledon.ca

Re: Pre-Consultation Request for
Proposed Wireless Telecommunication Site
12016 Chinguacousy Road, Caledon, Ontario
Rogers Site: C3386 – Chinguacousy Rd & Mayfield Rd.

On behalf of Rogers Communications Inc. ("Rogers"), please find enclosed documentation for municipal consultation concerning a proposed wireless telecommunication site located at 12016 Chinguacousy Road, Caledon.

The proposed telecommunication site is located within a 0.9 ha agricultural property located at the south west intersection of Chinguacousy Road and Mayfield Road. The telecommunication site will be located near the properties' back portion opposite to both the right-of-way of Chinguacousy Road and Mayfield Road, with setbacks from each of at least 80m.

This installation consists of a 30 metre high shrouded monopole and associated walk-in equipment cabinet, all within a secured compound area approximately 8m x 10m with a 1.8-metre high chain link fence. This site is situated and designed to have minimal impact on surrounding land uses.



Legal Description: Part of Lot 18, Concession 3 West of Hurontario Street, Town of Caledon, Regional Municipality of Peel.

PIN: 14252-0034

Contact Information:

Owner: 2201411 Ontario Inc. Attn: Ahmet Topyurek 114 Regent Street, Toronto ON M3H 1H4 Phone: (416) 274-1679	Applicant: Rogers Communications Inc. Attn: Michelle Vivar – Municipal Relations 8200 Dixie Rd., Brampton ON L6T 0C1 Phone (647) 747-7261 Email : michelle.vivar@rci.rogers.com

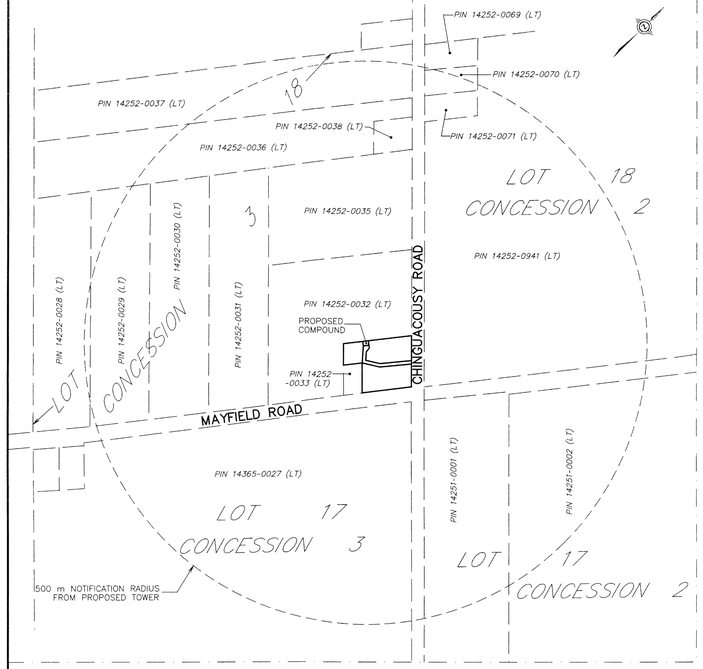
Please note that while this request for pre-consultation is being submitted through the Town of Caledon's Planning Application process, it is being done so for consultation purposes in accordance with our federal mandate. The proposed installation as a federally regulated undertaking is not subject to any requirement for a Site Plan Agreement or other municipal approvals.

Rogers looks forward to closely working with the Town of Caledon. Kindly review the information enclosed; if you require further information about this matter, please contact me at your earliest convenience at 647-747-7261 or Michelle.Vivar@rci.rogers.com.

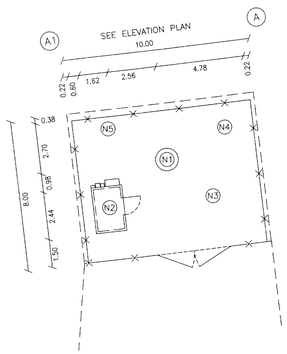
Best regards,

Michelle G. Vivar
Municipal Relations Specialist
Rogers Communications Inc.
Network Implementation

SUBJECT PROPERTY PLAN
SCALE 1:5000



PROPOSED COMPOUND LAYOUT PLAN
SCALE 1:150



NOTES

(N1) PROPOSED CIRCULAR STEEL SHROUDED MONOPOLE. PAINT COLOUR SUBJECT TO NAV CANADA REQUIREMENTS. ANTENNA NUMBER AND LOCATIONS TO BE DETERMINED. FOUNDATION DESIGN PENDING SOIL REPORT.

(N2) PROPOSED PREFABRICATED GALVANIZED STEEL WALK-IN RADIO EQUIPMENT CABINET ON CAST IN PLACE REINFORCED CONCRETE SLAB.

(N3) HYDRO CONNECTION AND ROUTING TO BE DETERMINED BY QUALIFIED PERSONNEL IN CONSULTATION WITH LOCAL AUTHORITY.

(N4) REMOVE EXISTING TOPSOIL. PROOF ROLL SUBGRADE AND PLACE 300 mm GRANULAR A ACROSS COMPOUND AREA. FINISHED GRAVEL SURFACE TO BE MIN. 150 mm ABOVE EXISTING GRADE AND SLOPED AWAY FROM SHELTER AT MIN. 1% ON ALL SIDES TO PROVIDE ADEQUATE DRAINAGE.

(N5) PROPOSED 1.8 m HIGH CHAIN LINK SECURITY FENCE TOPPED WITH BARBED WIRE SURROUNDING COMPOUND.

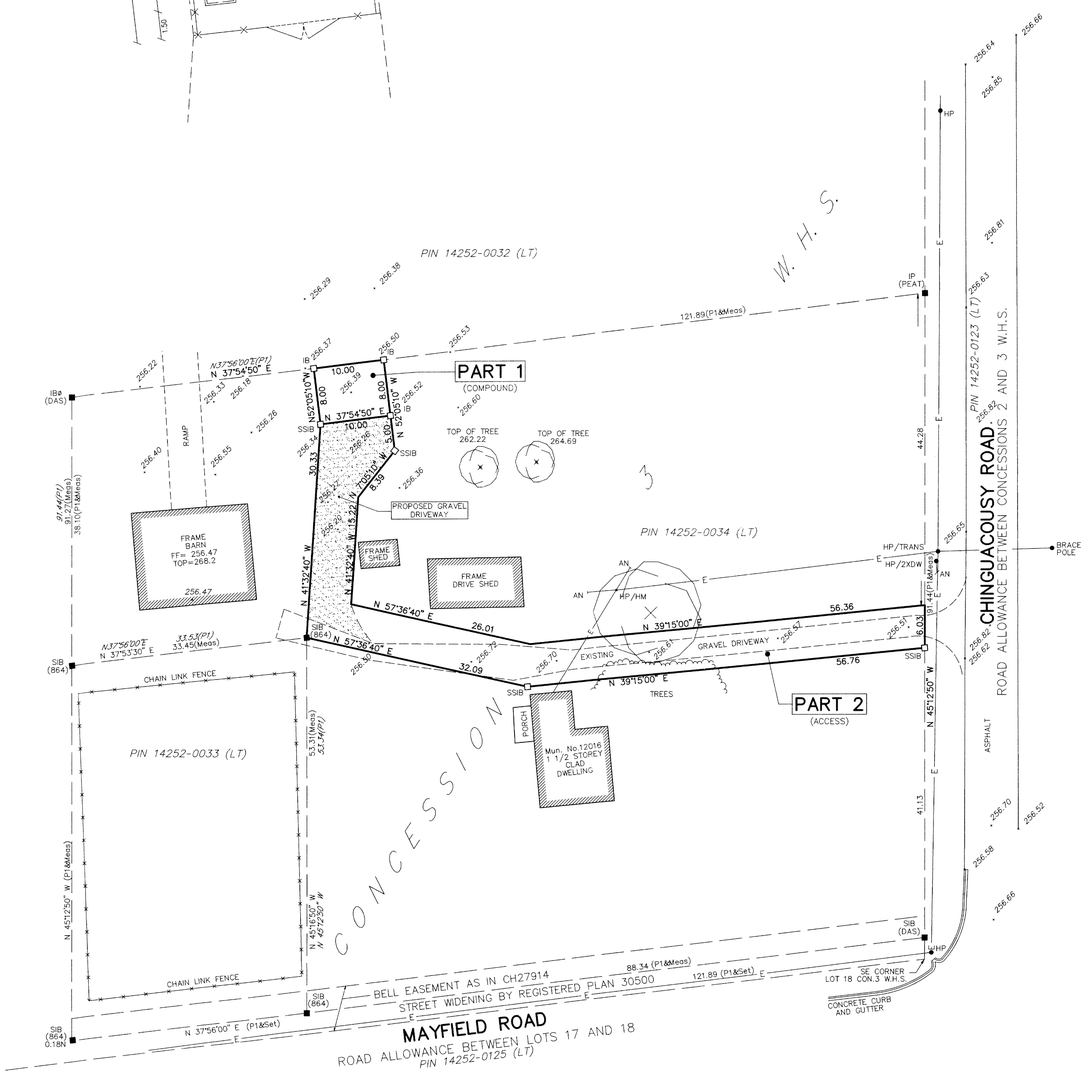
SCHEDULE

PART	LOT	CONCESSION	PIN	AREA
1	PART OF 18	3	PART OF 14252-0034 (LT)	80.0 sq m.
2				719.8 sq m.

TOPOGRAPHIC PLAN
AND SITE LAYOUT DESIGN
OF PROPOSED TELECOM TOWER INSTALLATION

PART OF LOT 18
CONCESSION 3 WEST OF HURONTARIO STREET
(GEOGRAPHIC TOWNSHIP OF CHINGUACOUSY)
TOWN OF CALEDON
REGIONAL MUNICIPALITY OF PEEL

SCALE 1 : 400
10 0 10 20 30 metres

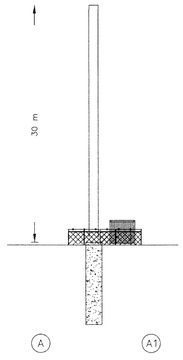


SITE DATA

	EXISTING	PROPOSED
PROPERTY AREA	0.93 ha.	
BUILDING AREA	486.17 sq.m.	4.0 sq.m.
LOT COVERAGE	5.23 %	5.27 %
AREA REQUIREMENTS		
COMPOUND (EXCLUSIVE)		80.0 sq.m.
ACCESS (NON-EXCLUSIVE)		719.8 sq.m.
HYDRO		TBD
TOTAL		799.8 sq.m.
UNITS		1 FLAGPOLE 1 CABINET
HEIGHT OF FLAGPOLE		30 m
SETBACKS (PROPOSED FLAGPOLE)		
FRONT		81.4 m
SIDE		3.0 m
REAR		39.5 m
SETBACKS (PROPOSED CABINET)		
FRONT		83.6 m
SIDE		4.1 m
REAR		35.5 m

KEY PLAN
(NOT TO SCALE)

ELEVATION PLAN
NOT TO SCALE



METRIC
DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

BEARINGS ARE GRID, DERIVED FROM OBSERVED REFERENCE POINTS (ORPs) A AND B, BY REAL TIME NETWORK OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010).

DISTANCES SHOWN ARE GROUND DISTANCES AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999705

FOR BEARING COMPARISONS, A ROTATION OF 0°48'30" COUNTER CLOCKWISE WAS APPLIED TO BEARINGS ON PLAN P1 TO CONVERT TO GRID BEARINGS.

ELEVATIONS SHOWN ON THIS PLAN ARE RELATED TO GEODETIC DATUM AND ARE DERIVED FROM MNR BENCHMARK No 010840167 HAVING A PUBLISHED ELEVATION OF 256.156 METRES.

LEGEND

□	DENOTES MONUMENT PLANTED
■	DENOTES MONUMENT FOUND
SIB	DENOTES STANDARD IRON BAR
IB	DENOTES IRON BAR
SSIB	DENOTES SHORT STANDARD IRON BAR
IP	DENOTES IRON PIPE
W.H.S.	DENOTES WEST OF HURONTARIO STREET
ø	DENOTES ROUND
(DAS)	DENOTES DUNCAN ASHWORTH SURVEYING LTD, O.L.S.
(864)	DENOTES F.V. DE CONKEY, O.L.S.
(PEAT)	DENOTES CHRISTOPHER PEAT, O.L.S.
OU	DENOTES ORIGIN UNKNOWN
WIT	DENOTES WITNESS
P1	DENOTES PLAN BY DUNCAN ASHWORTH SURVEYING LTD, O.L.S. DATED JUNE 29, 2005
HM	DENOTES HYDRO METER
HP	DENOTES HYDRO POLE
AN	DENOTES ANCHOR
—E—	DENOTES OVERHEAD WIRE
FF	DENOTES FINISHED FLOOR ELEVATION
HM	DENOTES HYDRO METER
TRANS	DENOTES TRANSFORMER
DW	DENOTES DOWN WIRE

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:
1. THE FIELD WORK WAS COMPLETED ON THE 19th DAY OF AUGUST, 2013.

DATE September 6, 2013

M.J. FISHER
ONTARIO LAND SURVEYOR

CAUTION

LOCATIONS OF ANY UNDERGROUND SERVICES ARE APPROXIMATE. OTHER BURIED UTILITIES MAY EXIST WHICH ARE NOT SHOWN BECAUSE OF INSUFFICIENT INFORMATION. CONTACT ALL POTENTIAL OWNERS OF UNDERGROUND UTILITIES PRIOR TO COMMENCEMENT OF CONSTRUCTION

ROGERS

LATITUDE	N 43°42'50.7"
LONGITUDE	W 79°50.51.9"
ELEVATION	256.4 m

SITE: C3386 CHINGUACOUSY RD & MAYFIELD RD

SEXTON McKAY LIMITED
A wholly owned subsidiary of J.D. Barnes Limited
Ontario Land Surveyors : Canada Lands Surveyor
140 RENFREW DRIVE, SUITE 100, MARKHAM, ON L3R 6B3
T: (905) 477-3600 F: (905) 477-3882 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
T.L.	M.J.F.	11-12-664-01
FILE: S:\11-12-664\01\11-12-664-01.dgn		DATED: 10/22/2013

PLOTTED: 9/6/2013

O GEOMETRIC REVIEW and PRELIMINARY ROUNDABOUT DESIGNS

Region of Peel

DESIGN CRITERIA

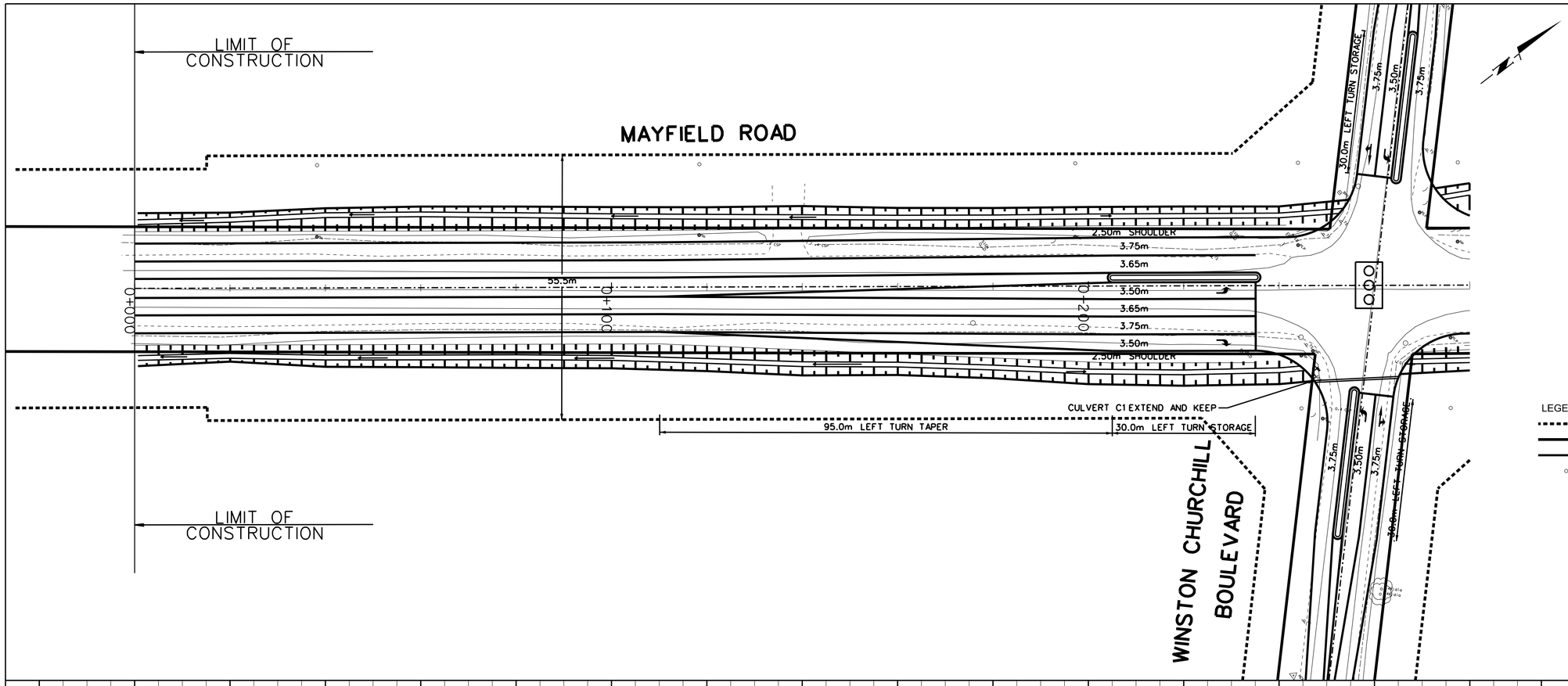
DESIGN CRITERIA			
Date: 13 07 23	**Prepared By:** Laverne Soodeen		**Revision:**
Project No.: 12-4390	**Location:** **Mayfield Rd, Town of Caledon, Region of Peel**	**Length:** 5400m	**Type of Project:** Widening and Reconstruction
Project Limits: From Chinguacousy Road to Winston Churchill Boulevard			

DESIGN PARAMETERS	PRESENT CONDITIONS	DESIGN STANDARDS / MINIMUMS		PROPOSED STANDARDS
		TAC	MTO	
Row Width	36m	20 - 45	N/A	50.5m(1)
Posted Speed	80km/hr	80 km/hr	80 km/hr	80km/hr
Design Speed (D.S.)	90km/hr	90 km/hr	90 km/hr	90km/hr
Minimum Stopping Sight Distance	-	130-170 m	160 m	160 m
Equivalent Minimum 'K' Factor for 90km/hr D.S.	n/a	30 – 40 Sag 32 – 53 Crest	40 Sag 50 Crest	40 Sag 50 Crest
Minimum Radius for 90km/hr D.S	n/a	380 m	N/A	340 m
Superelevation	n/a	e_{max}=0.04	e_{max}=0.04	e_{max}=0.04
Lane Width for 90km/hr D.S.	2 x 3.6 m	3.5 – 3.7 m	3.5 m	3.75m Curb Lanes 3.65m Inside Lanes 3.5m Turn lanes
Boulevard Width	N/A	3.0 m	3.0m	5.5m Typical

NOTE:

(1) ROW width may be greater than 50.5m based on grading and design selected at the intersections.

(2) A four lane interim condition will be considered in advance of the ultimate six lane widening

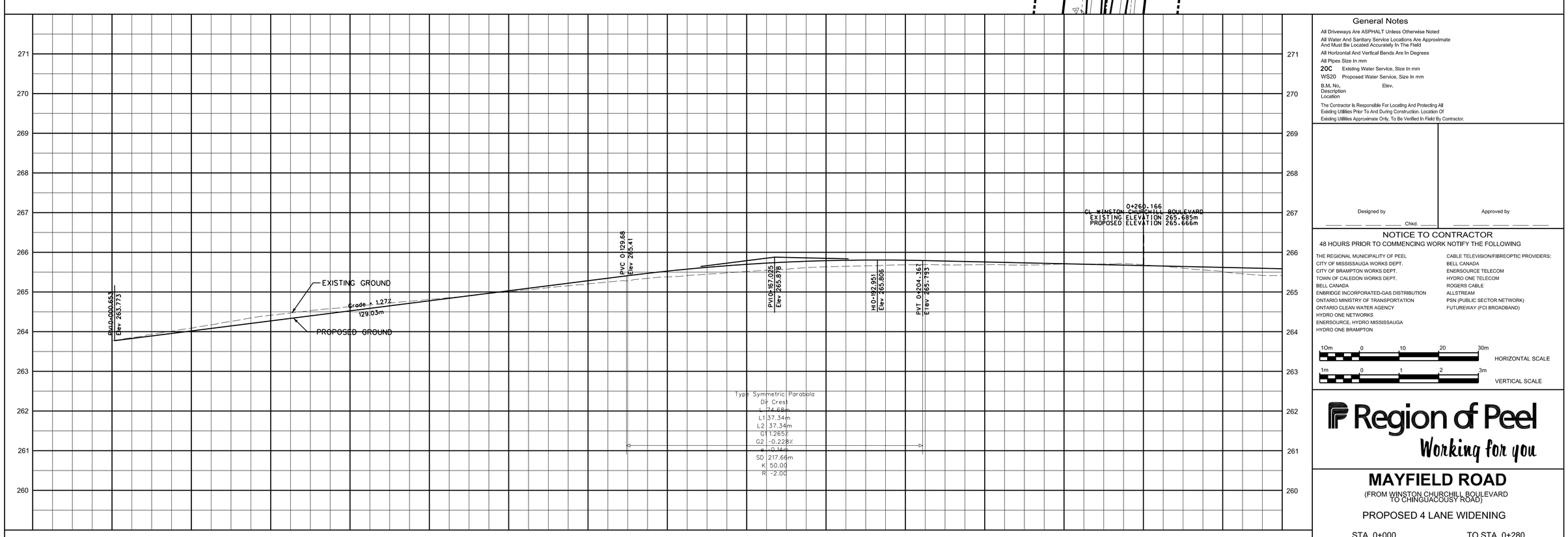


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS20 Proposed Water Service, Size In mm

B.M. No, Description Location — Elev,

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

Designed by

Chkd.

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

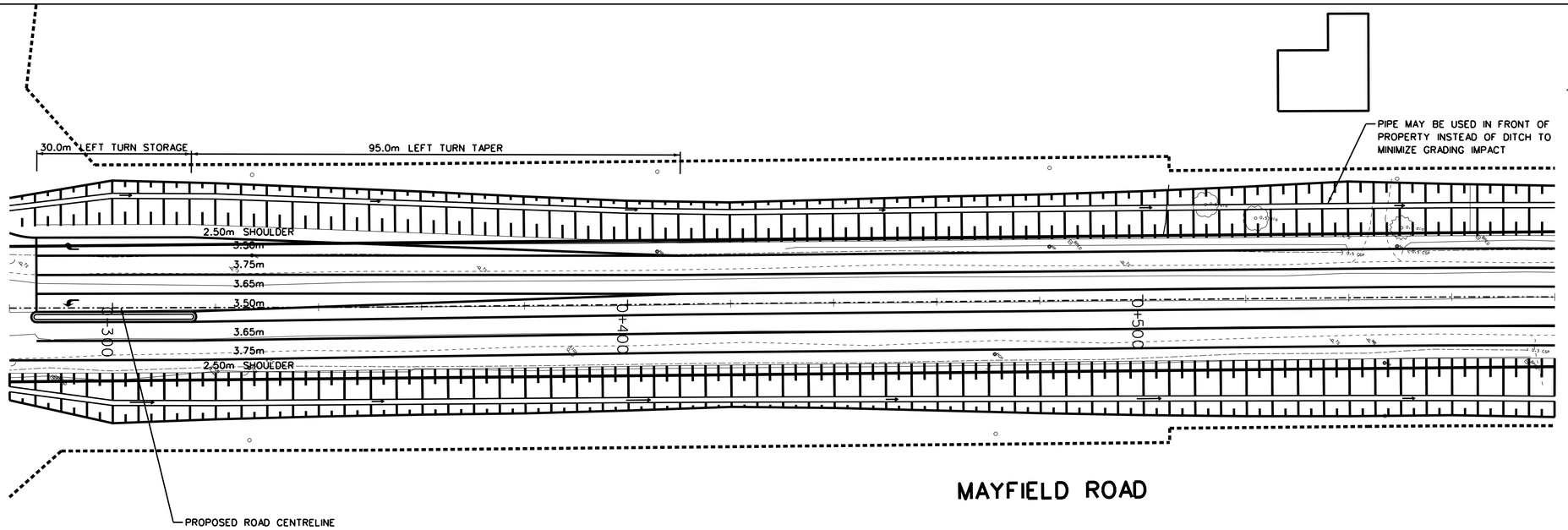
MAYFIELD ROAD

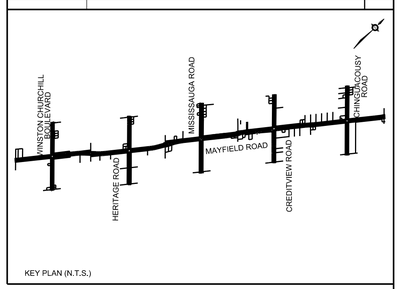
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 0+000 TO STA. 0+280

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 1 of 30	Plan No.	





SERVICE DATA

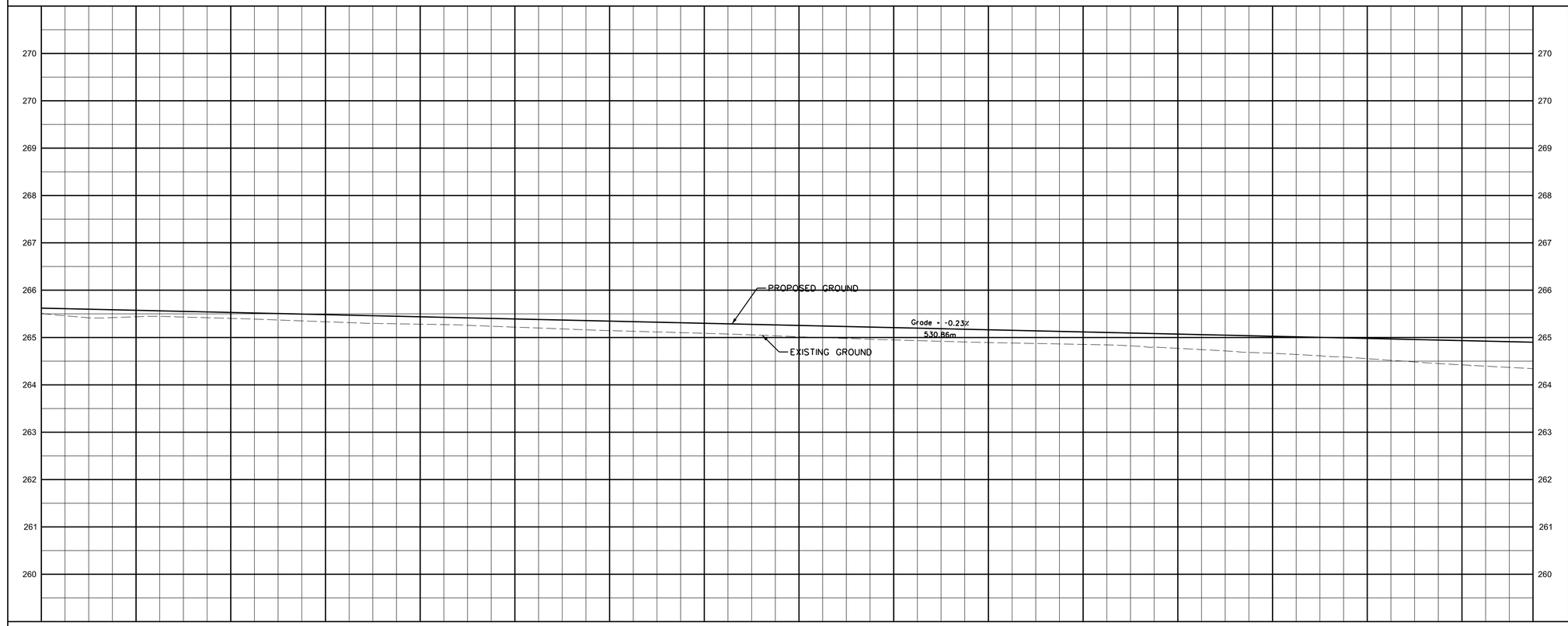
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.

LEGEND:

- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS20 Proposed Water Service, Size In mm

B.M. No.
Description
Location
Elev.

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Designed by

Approved by

Chkd.

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
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HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

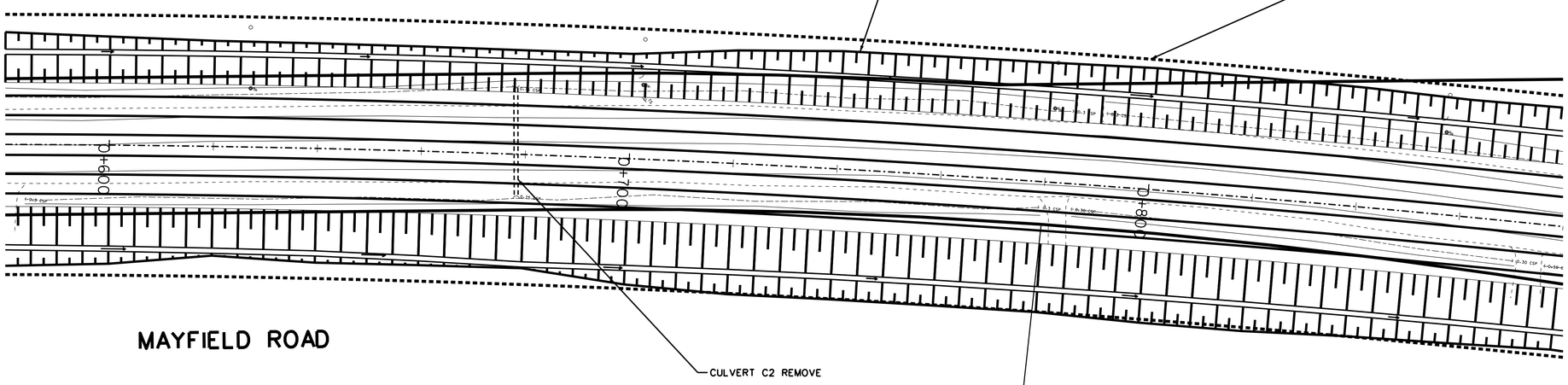
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 0+280 TO STA. 0+580

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 2 of 30	Plan No.	

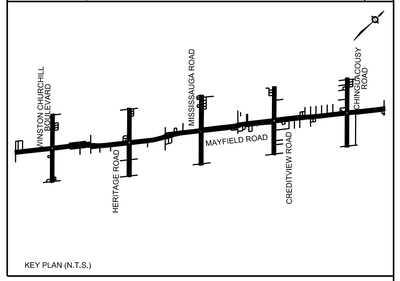


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

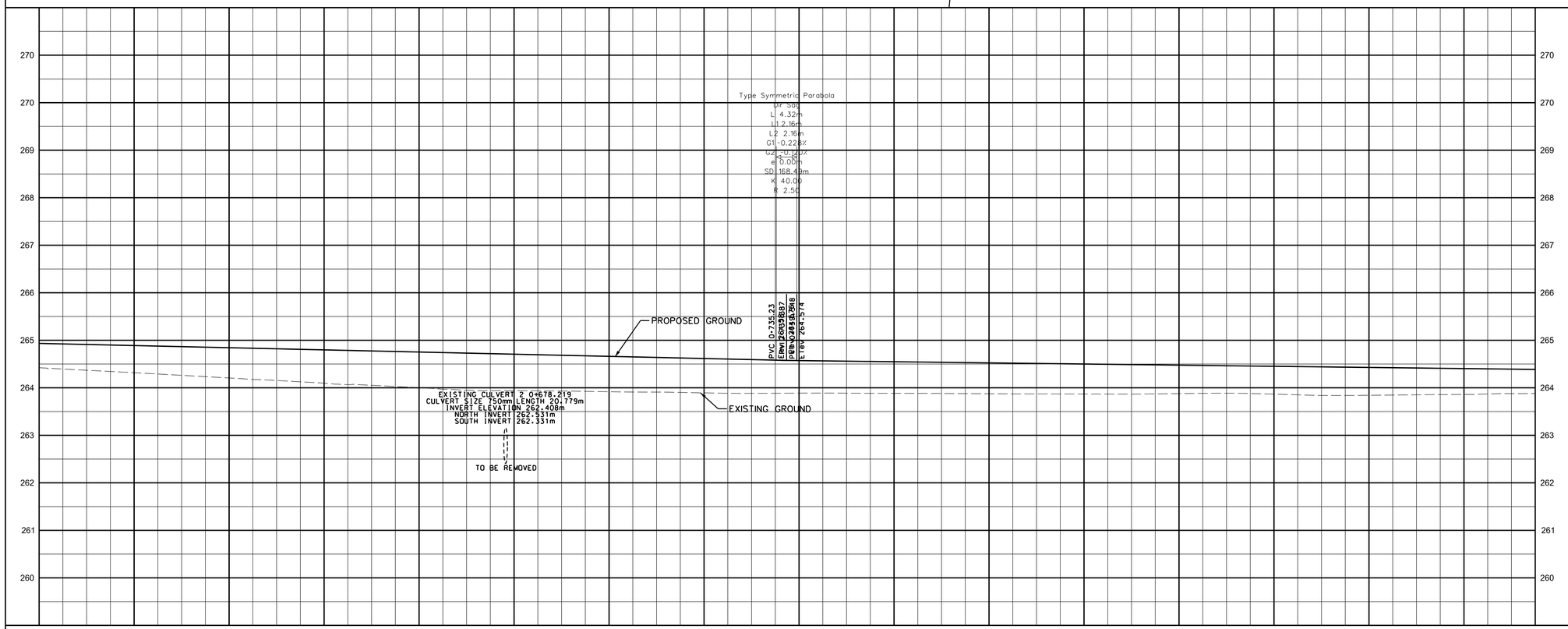
REVISIONS

DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES



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B.M. No, Description Location — Elev.

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Region of Peel
Working for you

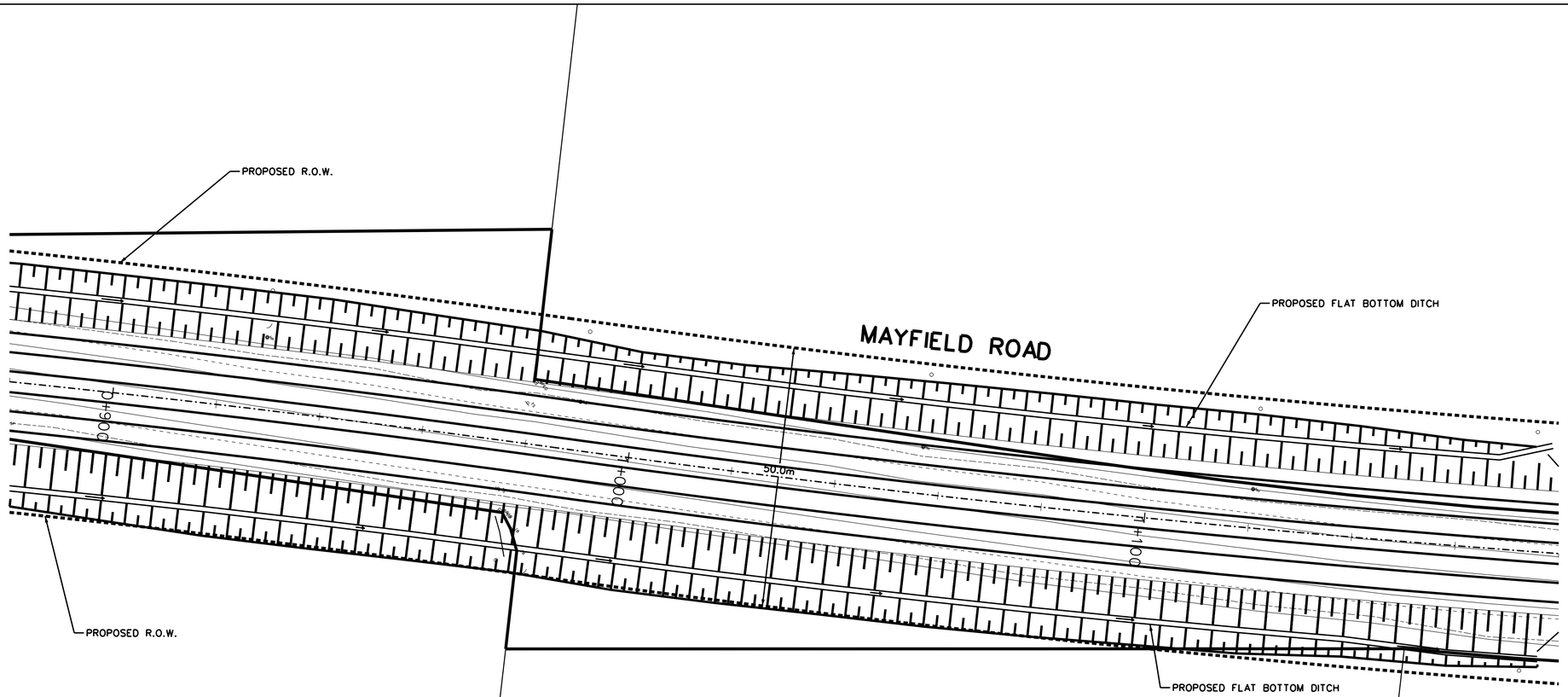
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 0+580 TO STA. 0+880

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 3 of 30	Plan No.	



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PARKS & REC.			CTV		
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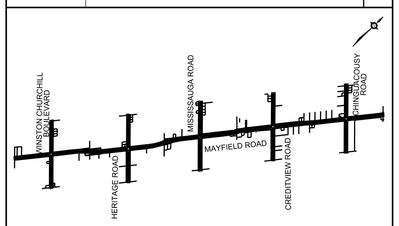
REVISIONS

DATE	DETAILS	INIT.



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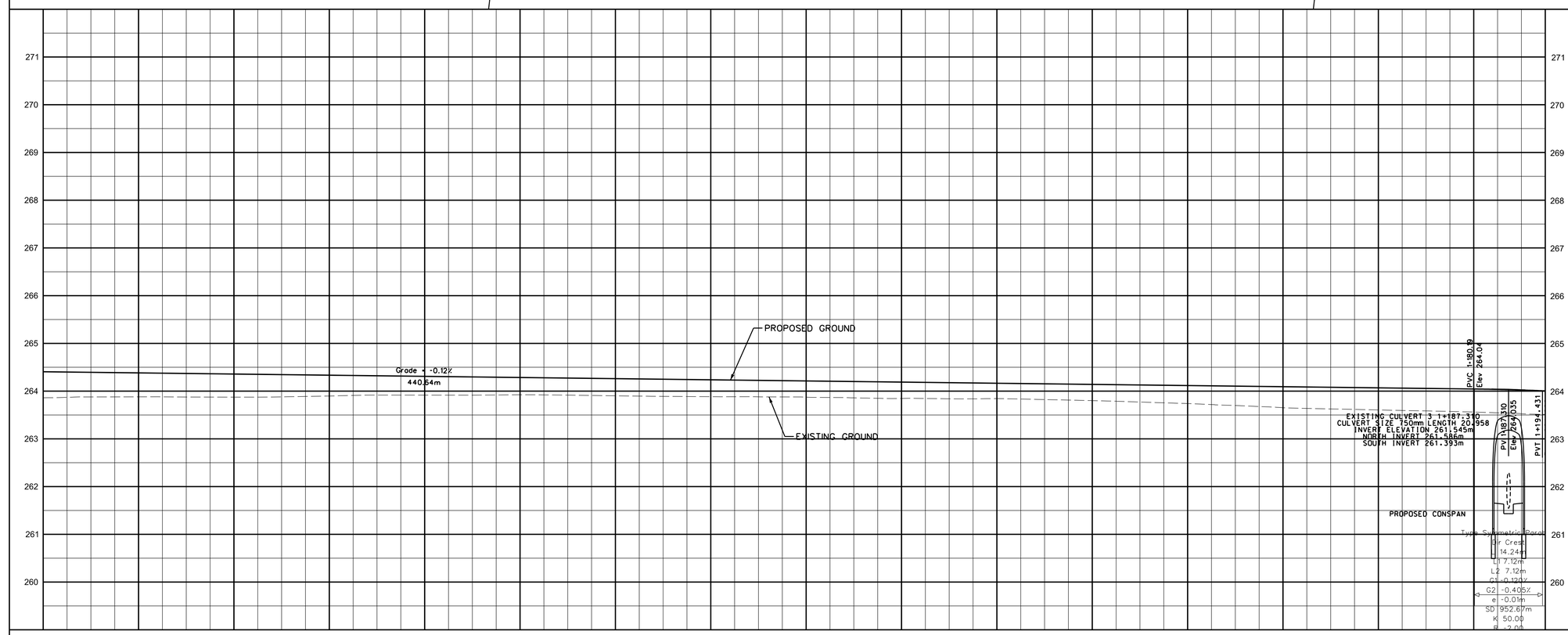

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Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 0+880 TO STA. 1+180

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 4 of 30	Plan No.	

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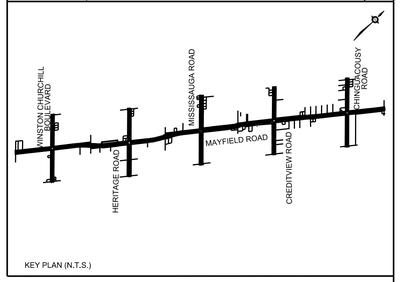
REVISIONS		
DATE	DETAILS	INIT.



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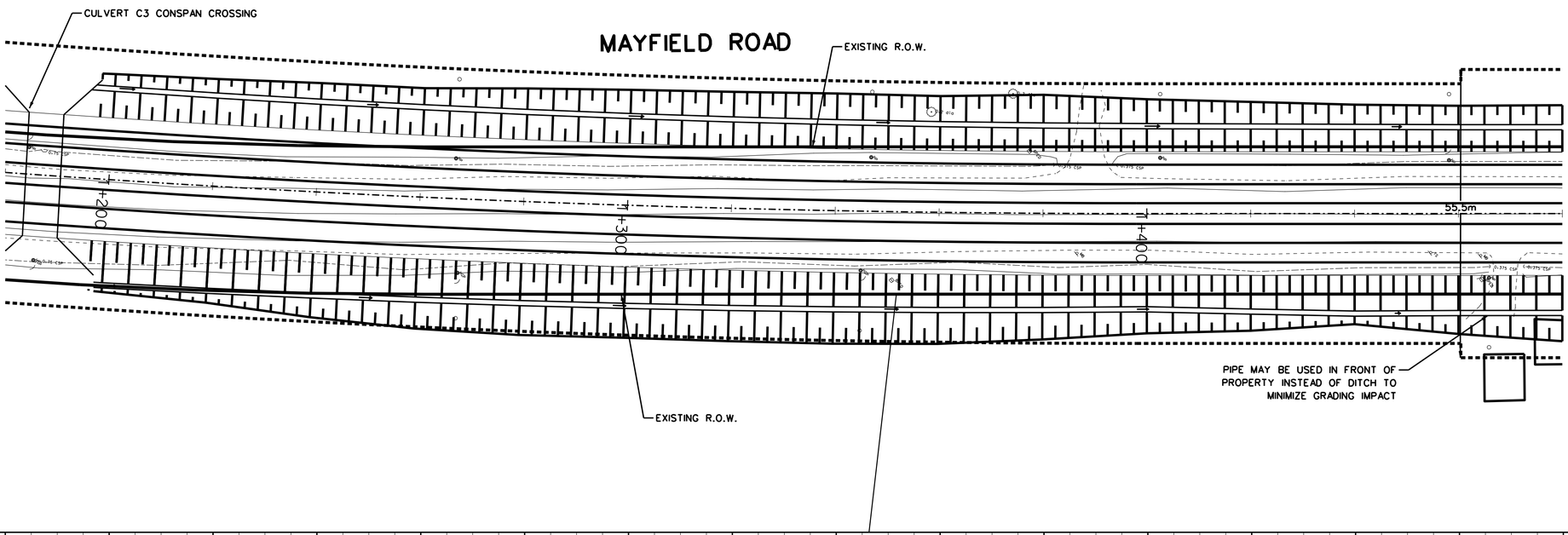

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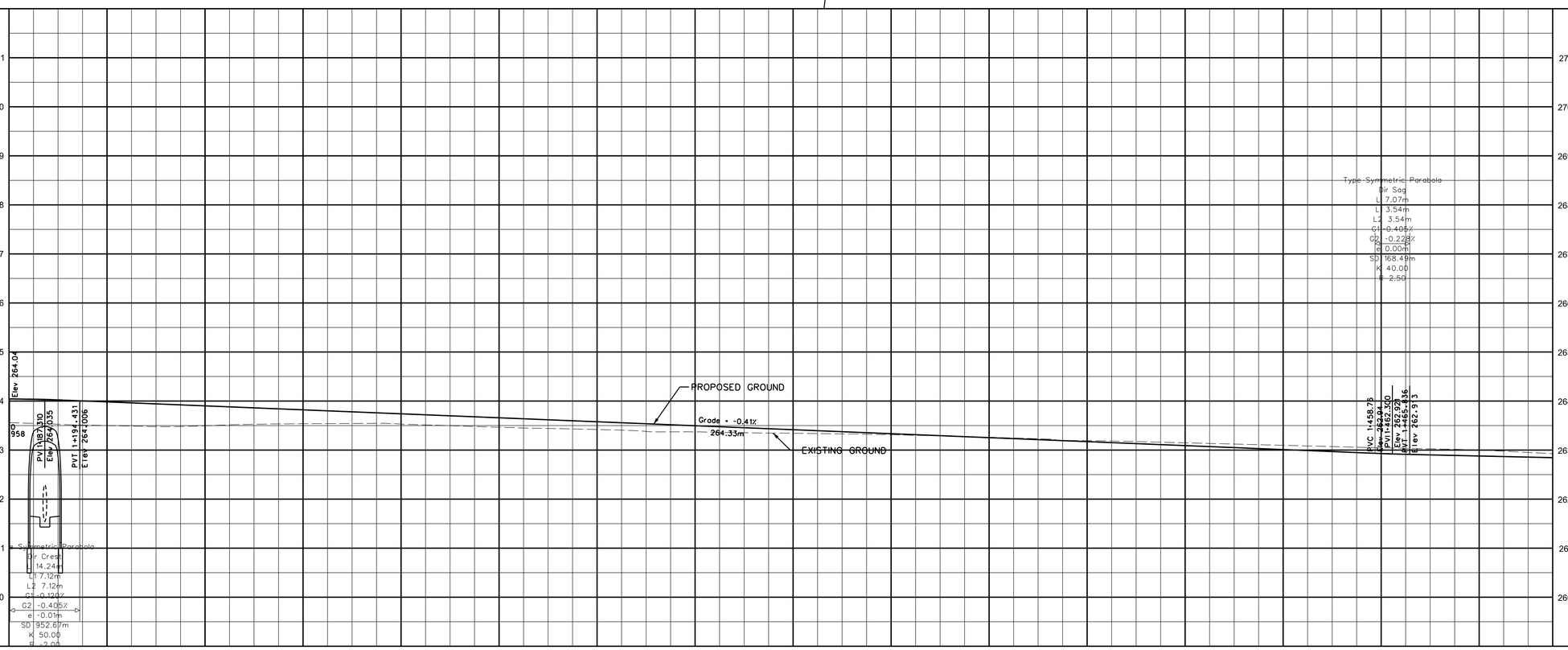

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HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
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Region of Peel
Working for you

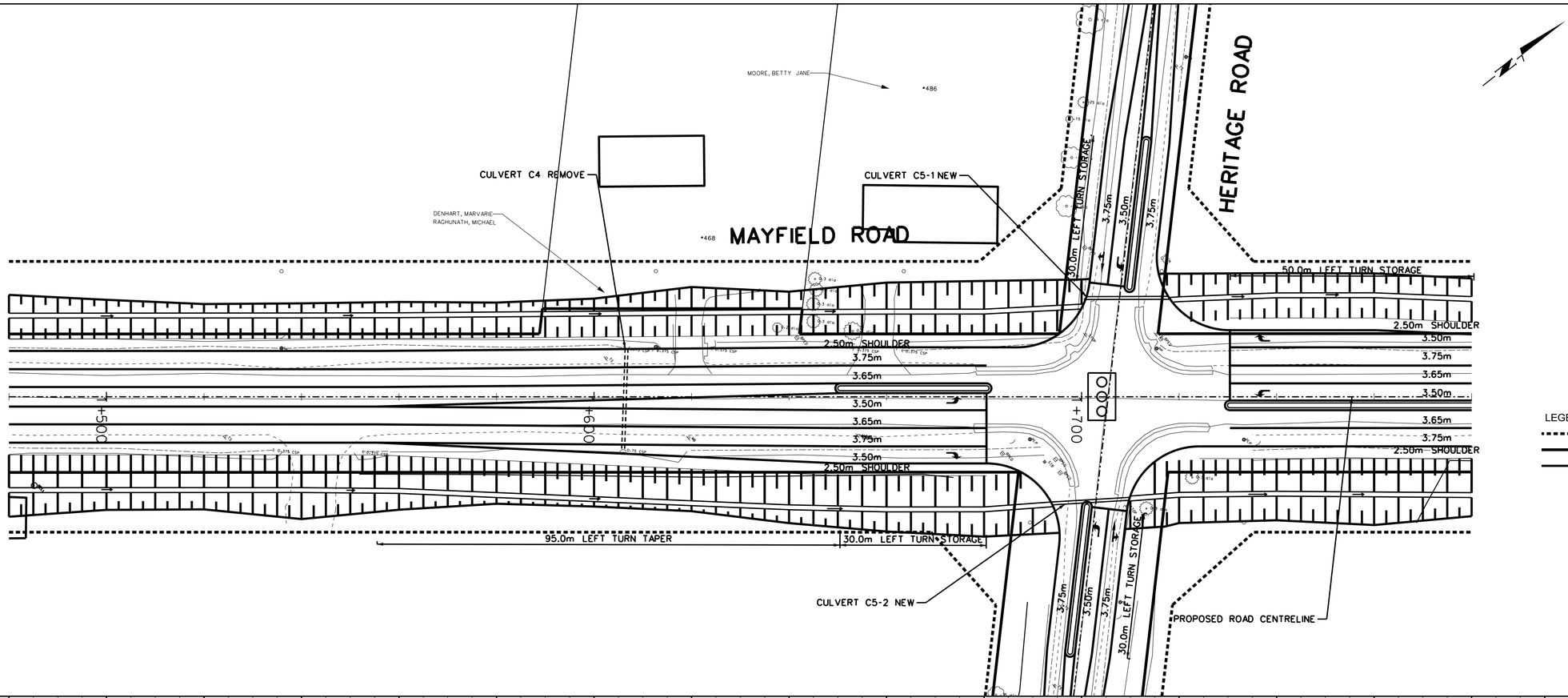
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 1+180 TO STA. 1+480

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 5 of 30	Plan No.	



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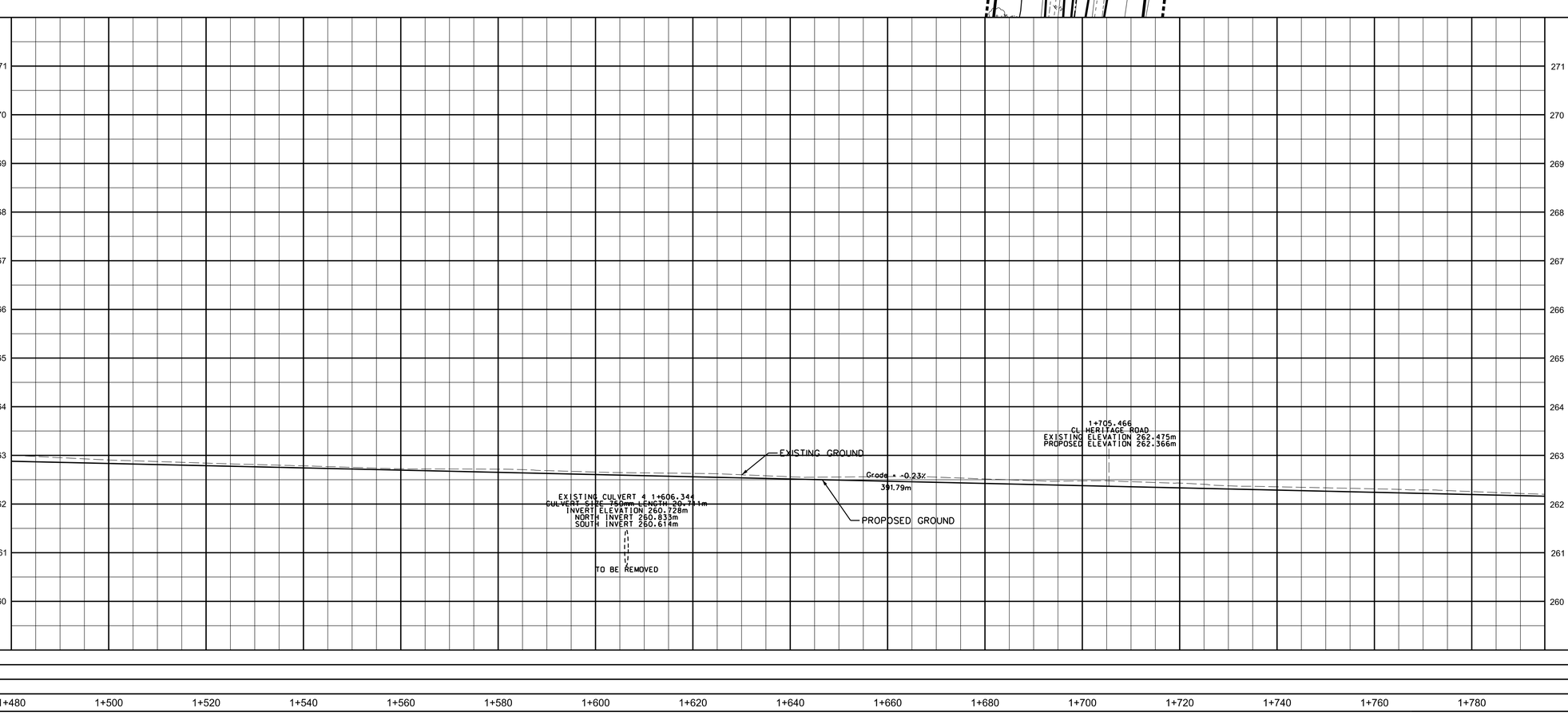
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



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B.M. No. Elev.
Description
Location

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Designed by

Chkd.

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PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

MAYFIELD ROAD

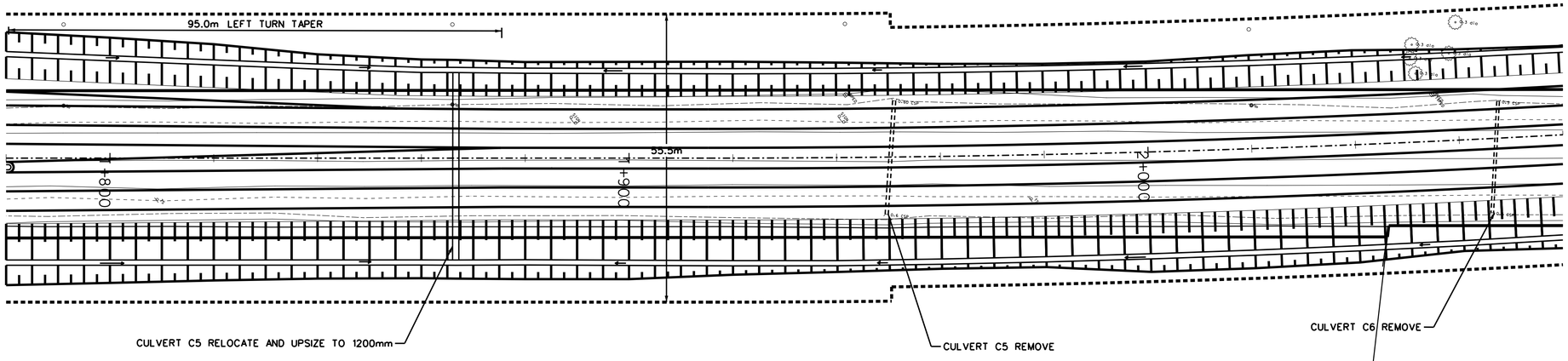
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 1+480 TO STA. 1+780

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 6 of 30	Plan No.	

MAYFIELD ROAD



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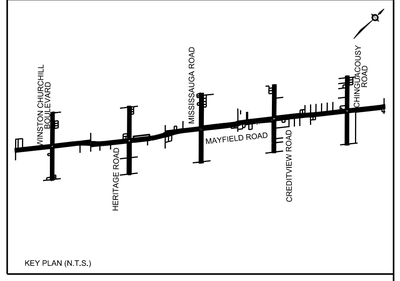
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
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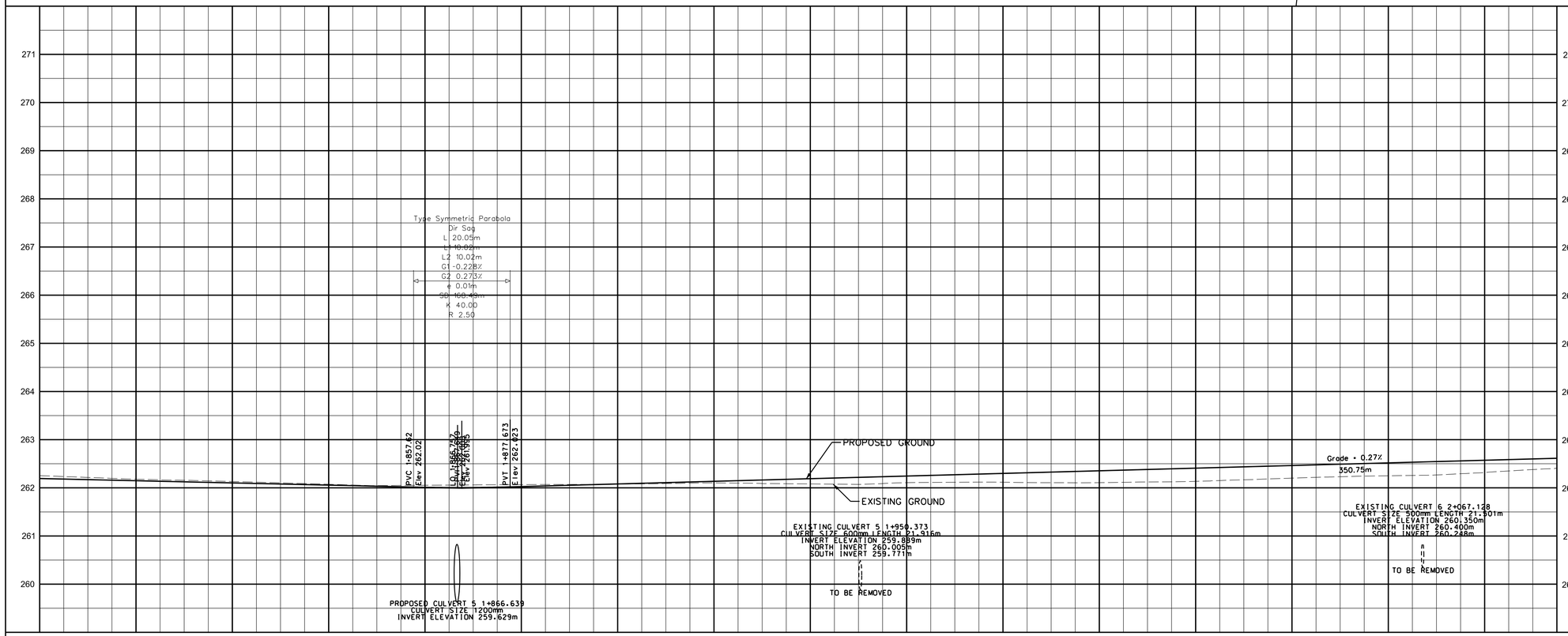
- GRADING LIMIT
- RELOCATED HYDRO POLES



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Region of Peel
Working for you

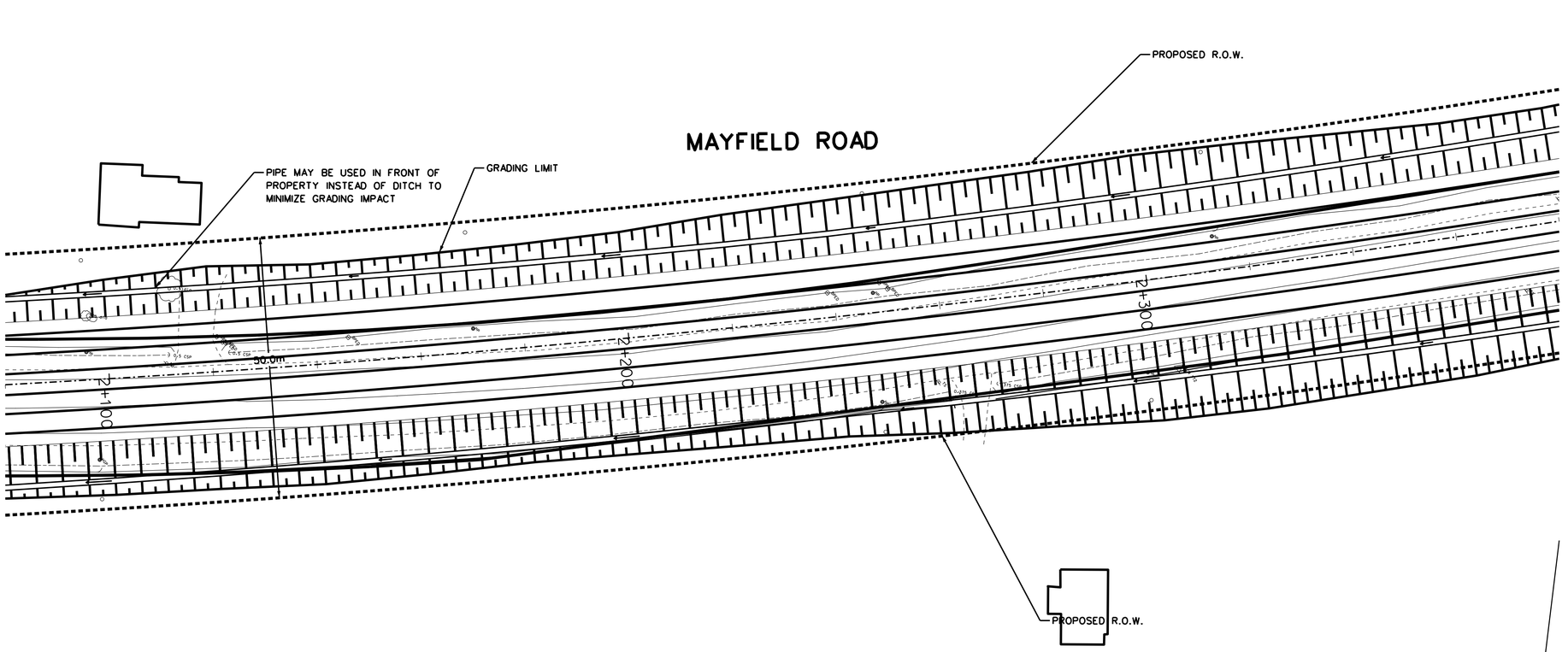
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 1+780 TO STA. 2+080

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 7 of 30	Plan No.	



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REVISIONS

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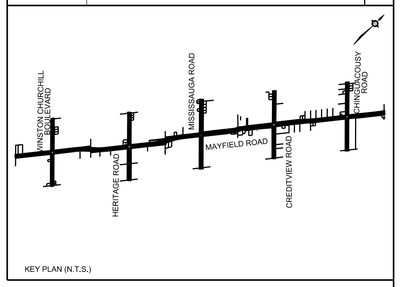

KEY PLAN (N.T.S.)

LEGEND:

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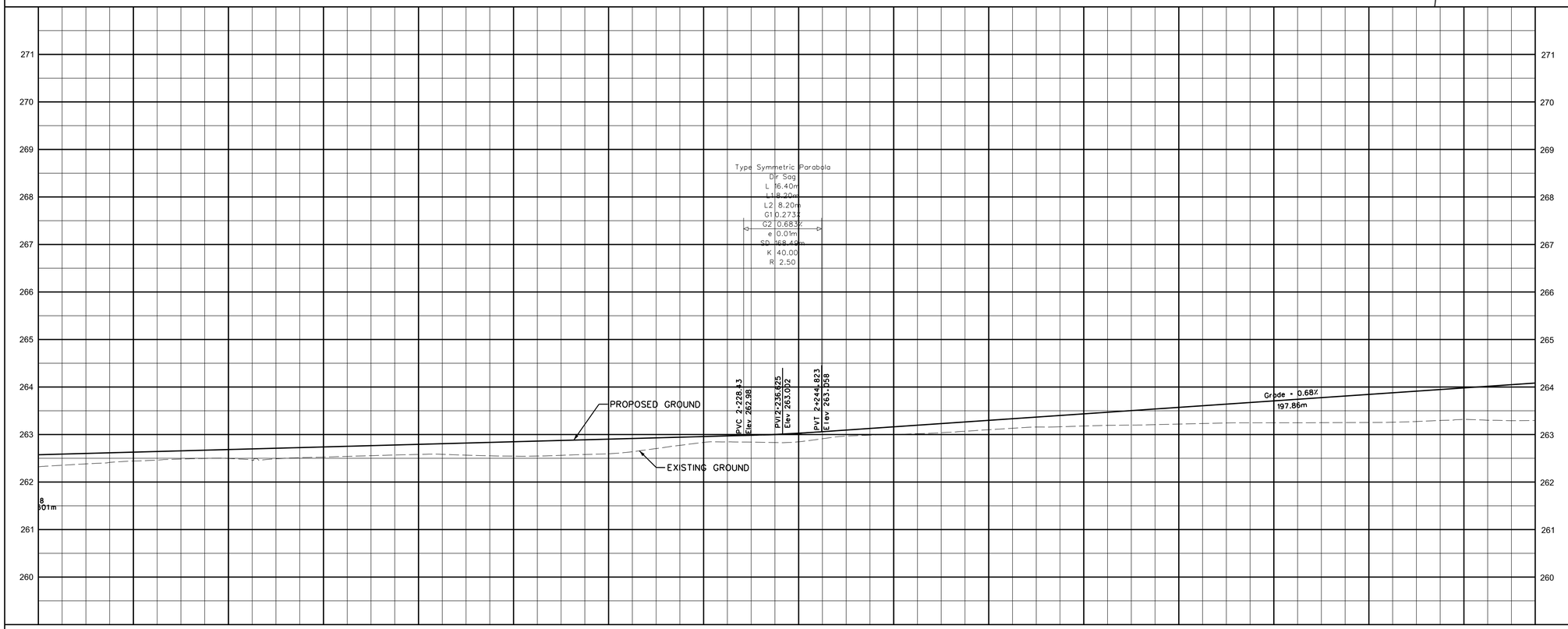

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Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 2+080 TO STA. 2+380

CAD Area	Area		Project No. 12-4390
Checked by	Drawn by S.S.		Plan No.
Date JANUARY 2015	Sheet 8 of 30		

MAYFIELD ROAD

THE REGIONAL MUNICIPALITY OF PEEL

THE REGIONAL MUNICIPALITY OF

CULVERT C7 CONSPAN CROSSING

PROPOSED FLAT BOTTOM DITCH

PROPOSED FLAT BOTTOM DITCH

PIPE MAY BE USED IN FRONT OF PROPERTY INSTEAD OF DITCH TO MINIMIZE GRADING IMPACT

2+400

2+500

2+600

SERVICE DATA					
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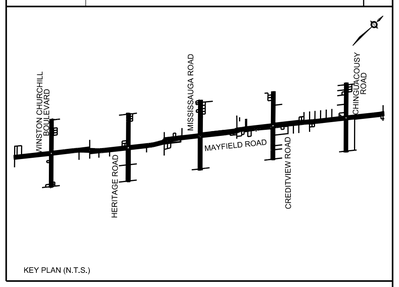
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:

- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES

PROPOSED GROUND

EXISTING GROUND

PVC 2+442.69
Elev 264.41

PVI 2+457.712
Elev 264.512

PVT 2+472.737
Elev 264.524

EXISTING CULVERT 7 2+457.712
CULVERT SIZE 750mm LENGTH 21.201m
INVERT ELEVATION 261.960m
NORTH INVERT 261.952m
SOUTH INVERT 261.889m

PROPOSED CONSPAN

Type Symmetrical Parabola
Cor Crest
L 30.05m
L1 15.03m
L2 15.03m
G1 0.68%
G2 0.082%
e 0.03m
SD 463.16m
K 50.00
R -2.00

271 270 269 268 267 266 265 264 263 262 261 260

2+380 2+400 2+420 2+440 2+460 2+480 2+500 2+520 2+540 2+560 2+580 2+600 2+620 2+640 2+660 2+680

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Designed by

Chkd.

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

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CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

MAYFIELD ROAD

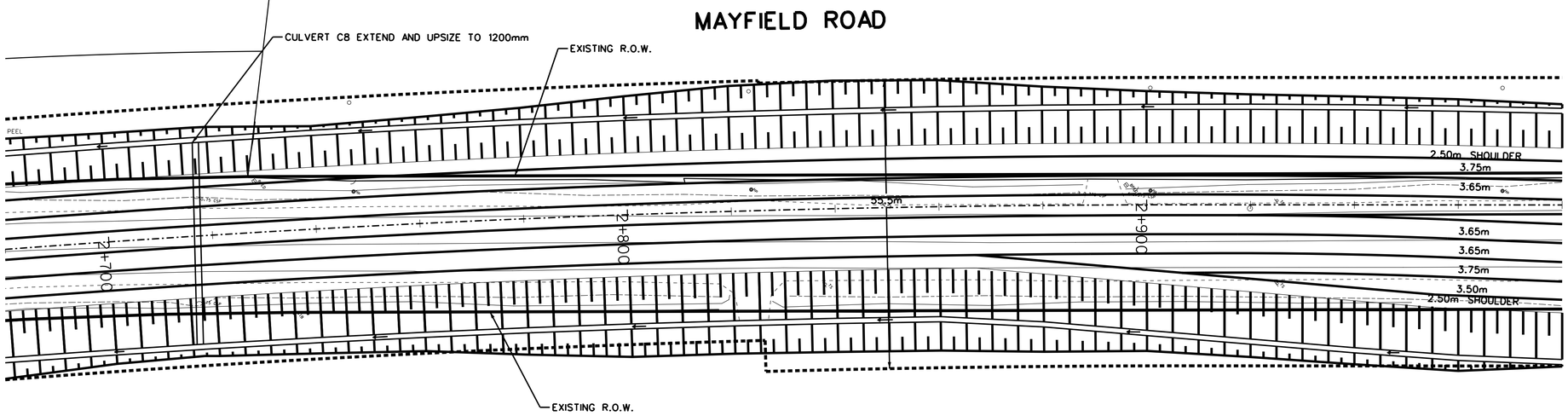
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

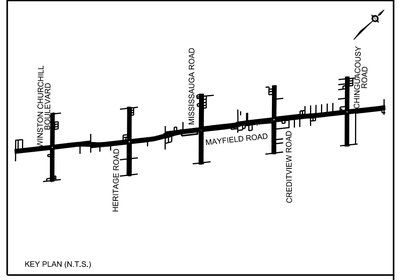
PROPOSED 4 LANE WIDENING

STA. 2+380 TO STA. 2+680

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 9 of 30	Plan No.	

MAYFIELD ROAD





SERVICE DATA

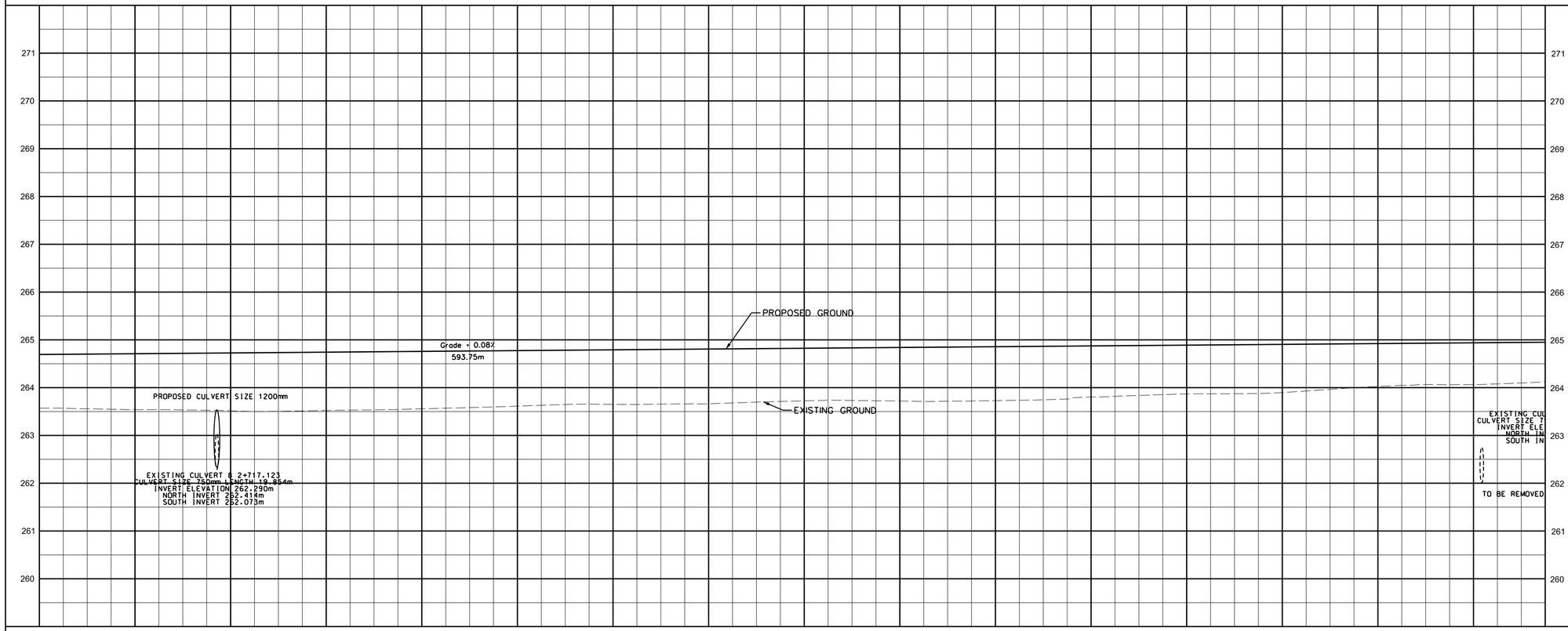
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.

LEGEND:

- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS20 Proposed Water Service, Size In mm

B.M. No, Description Location — Elev.

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Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 2+680 TO STA. 2+980

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 10 of 30	Plan No.	

POLES IN A STRAIGHT LINE

MISSISSAUGA ROAD

MAYFIELD ROAD

CULVERT C9 REMOVE

30.0m LEFT TURN STORAGE

95.0m LEFT TURN TAPER

2.0m SHOULDER
3.50m
3.75m
3.65m
3.50m
3.65m
3.65m
3.75m

3.25m 3.75m 3.65m 3.50m 3.65m 3.75m

55.5m

CH 3+000

CH 3+100

CH 3+200

*991

*1051

3.0m MULTI-USE TRAIL

*1067

*1083

*1099

6 ANCHORS

6.0m & 7.5m

35.0m LEFT TURN STORAGE

3.75m 3.65m 3.50m 3.65m 3.75m 3.25m

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

EXISTING R.O.W.

CONCRETE BUS PAD
4.0mX9.0m

OPSD 600.030
CONCRETE MOUNTABLE CURB
WITH WIDE GUTTER MODIFIED
AS PER CITY OF BRAMPTON
STD 266

EXISTING GAS LINE
POSSIBLE RELOCATION REQUIRED
TO BE DONE IN DETAIL DESIGN

CULVERT C10 REMOVE

SERVICE DATA

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STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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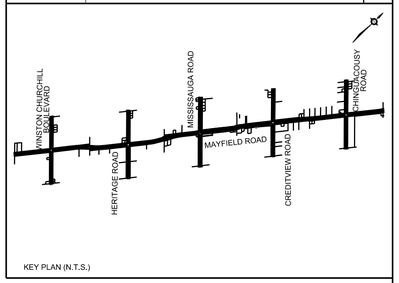

KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES
- HYDRO ONE BRAMPTON PROPOSED POLE LOCATIONS

Type Symmetric Parabola
Dir Sag
L 8.73m
L1 4.36m
L2 4.36m
G1 (1.082%)
G2 0.300%
e 0.00m
SD 168.49m
K 40.00
R 2.50

3+070.849
CL MISSISSAUGA ROAD
EXISTING ELEVATION 264.569m
PROPOSED ELEVATION 265.016m

PVC 3.066m
Elev 265.016m
Grade 1.082%
PVT 3.075m
Elev 265.049m
PVT 3.057m
Elev 265.033m

PROPOSED GROUND

Grade - 0.30%
231.77m

EXISTING CULVERT 10 3+101.374
CULVERT SIZE 750mm LENGTH 21.672m
INVERT ELEVATION 263.399m
NORTH INVERT 263.434m
SOUTH INVERT 263.233m

EXISTING GROUND

TO BE REMOVED

EXISTING CULVERT 9 2+981.740
CULVERT SIZE 750mm LENGTH 24.218m
INVERT ELEVATION 262.005m
NORTH INVERT 262.078m
SOUTH INVERT 261.680m

TO BE REMOVED

271 270 269 268 267 266 265 264 263 262 261 260

2+980 3+000 3+020 3+040 3+060 3+080 3+100 3+120 3+140 3+160 3+180 3+200 3+220 3+240 3+260 3+280

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Region of Peel
Working for you

MAYFIELD ROAD

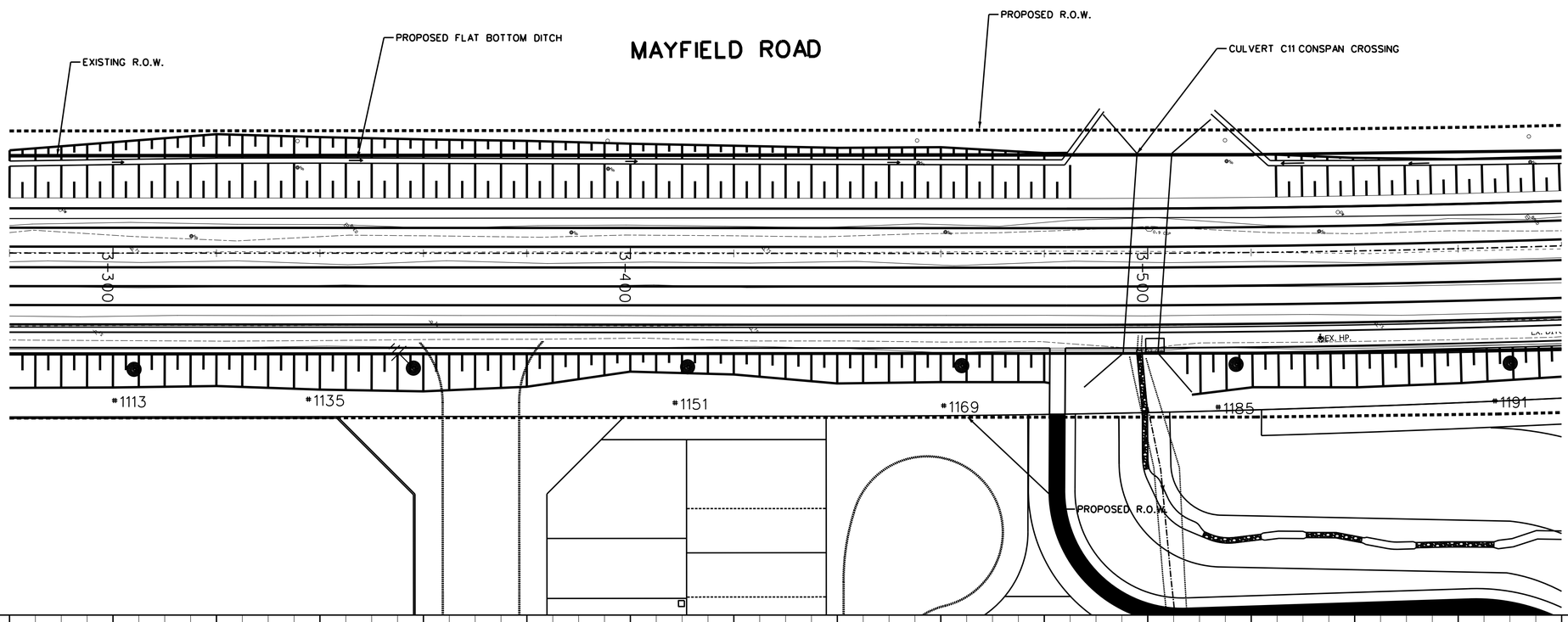
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 2+980 TO STA. 3+280

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 11 of 30	Plan No.	

POLES IN A STRAIGHT LINE



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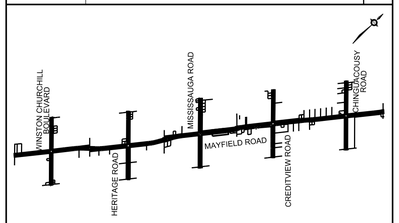
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES
- HYDRO ONE BRAMPTON PROPOSED POLE LOCATIONS

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20C Existing Water Service, Size In mm
WS20 Proposed Water Service, Size In mm
B.M. No, Elev.
Description
Location
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Chkd.
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1m 0 1 2 3m VERTICAL SCALE

Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 3+280 TO STA. 3+580

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 12 of 30	Plan No.	

PROPOSED ROAD CENTRELINE

50.0m

50.0m

MAYFIELD ROAD

*1207
2 ANCHORS
6.0m & 7.5m A/L

*1290

*1235

*1285

*1255

VAN TENT, BRENDA CHRISTINE BERNICE
VAN TENT, JOHN WILLIAM GERALD

KUMAR, KIRAN
ISAACS, ANGELA

LIMIT OF PROPERTY

EX. HP

EX. HP

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
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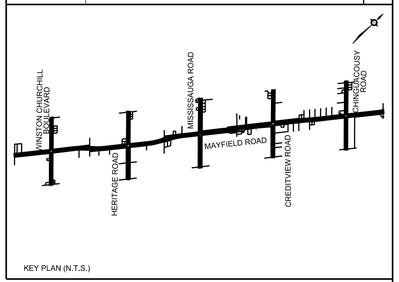
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

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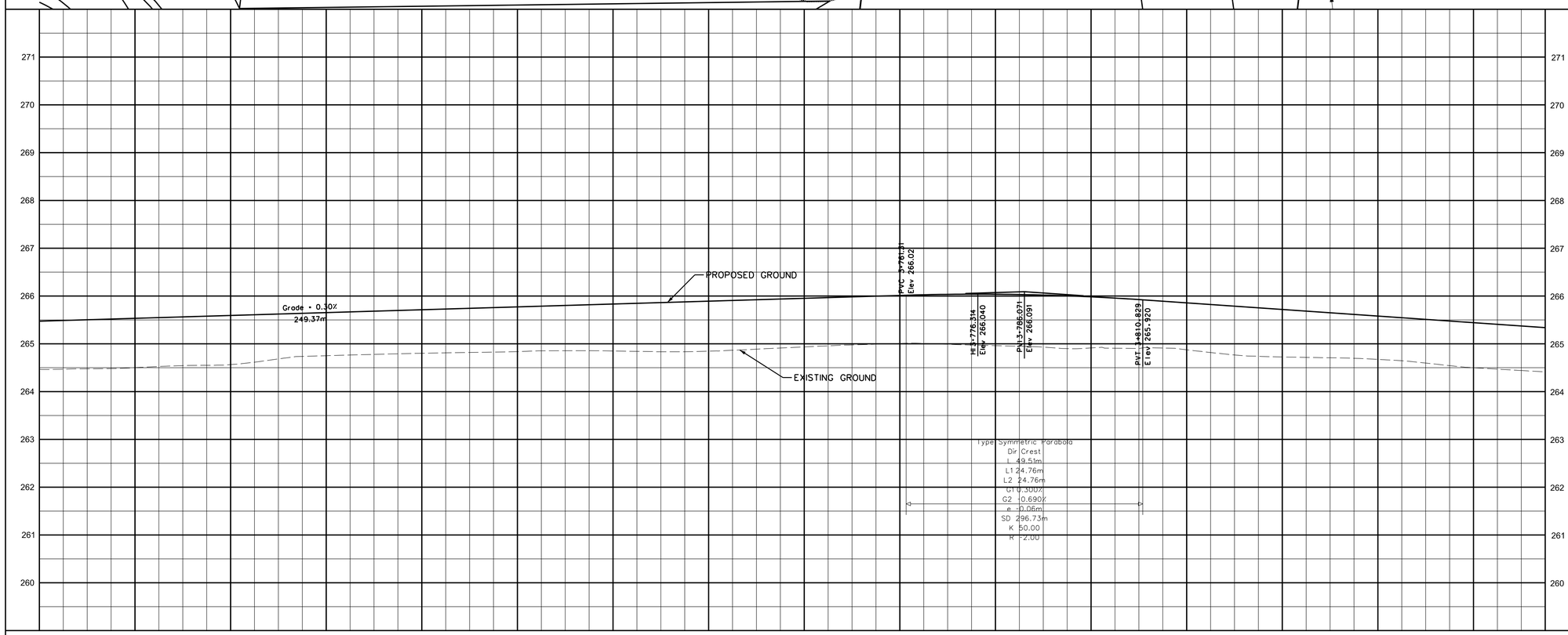
- HYDRO ONE BRAMPTON PROPOSED POLE LOCATIONS



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Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 3+580 TO STA. 3+880

CAD Area	Area	Project No.	12-4390
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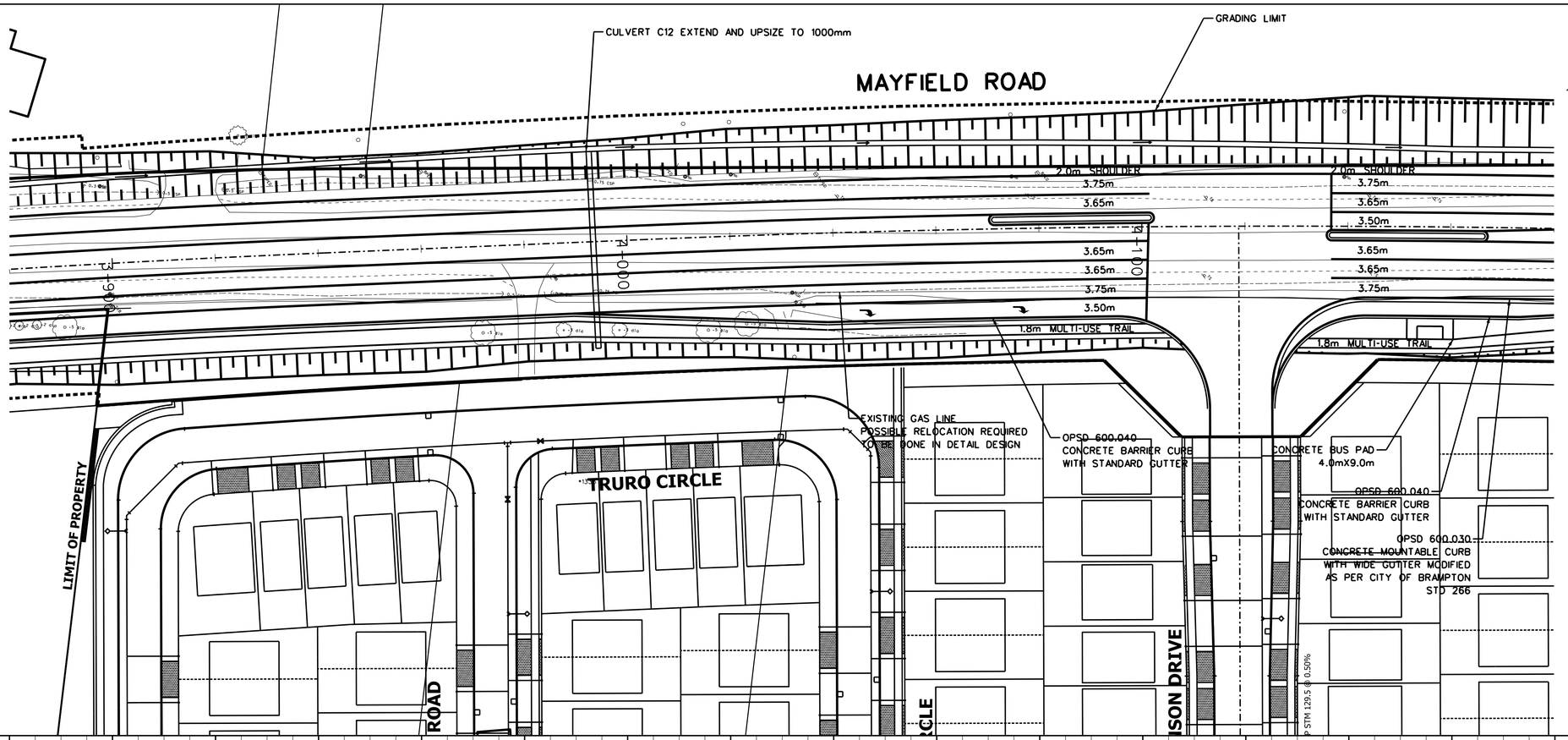
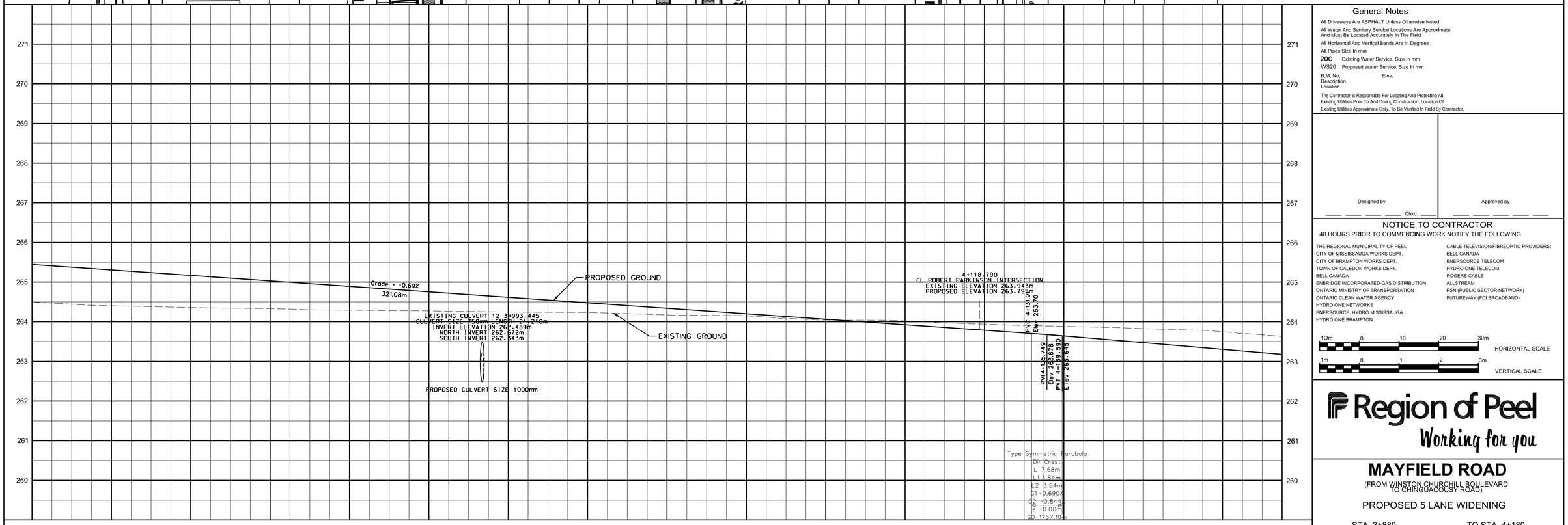
Date JANUARY 2015	Sheet 13 of 30	Plan No.	





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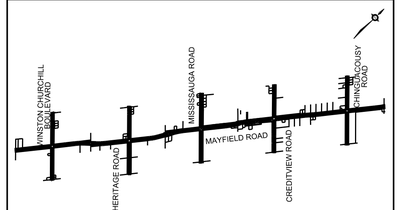

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Region of Peel
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(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 3+880 TO STA. 4+180

CAD Area	Area	Project No.	12-4390
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Date JANUARY 2015	Sheet 14 of 30	Plan No.	

EXISTING GAS LINE
POSSIBLE RELOCATION REQUIRED
TO BE DONE IN DETAIL DESIGN

CULVERT C13 EXTEND AND UPSIZE TO 1050mm

MAYFIELD ROAD

34.0m LEFT TURN STORAGE

CULVERT C13-1 KEEP
AND EXTEND
CULVERT C14 REMOVE

30.0m LEFT TURN STORAGE

2.0m SHOULDER
3.75m
3.65m
3.50m
3.65m
3.65m
3.75m
3.0m MULTI-USE TRAIL

50.48m

95.0m LEFT TURN TAPER

50.0m LEFT TURN STORAGE

CREDITVIEW ROAD

30.0m LEFT TURN STORAGE

CONCRETE BUS PAD
4.0mX9.0m

PARADISE HOMES NORTH WEST INC.

BITION CRESCENT

ITION CRESCENT

1630

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
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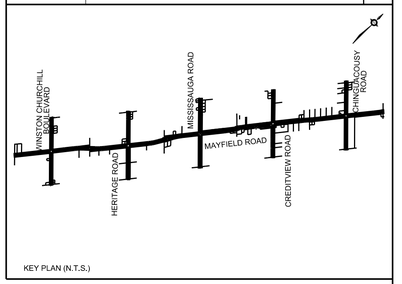

KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES

271
270
269
268
267
266
265
264
263
262
261
260

Grade = -0.84%
259.10m

EXISTING GROUND

PROPOSED GROUND

Type Symmetric Parabola
Dir Sag
L 10.45m
L1 5.22m
L2 5.22m
A1 -0.844%
A2 -0.583%
e 0.00m
SD 168.49m
K 40.00
R 2.50

PVC 4+398.69
Elev. 261.46
PVI 4+403.914
Elev. 261.414
PVT 4+409.137
Elev. 261.384

EXISTING CULVERT 13 4+397.098
CULVERT SIZE 500mm LENGTH 21.249m
INVERT ELEVATION 259.848m
NORTH INVERT 259.914m
SOUTH INVERT 259.837m

PROPOSED CULVERT SIZE 1050mm

4+434.545
CL CREDITVIEW ROAD
EXISTING ELEVATION 261.021m
PROPOSED ELEVATION 261.236m

CULVERT SIZE 500mm LENGTH 24.406m
ELEVATION 255.905m
NORTH INVERT 260.131m
SOUTH INVERT 259.858m

TO BE REMOVED

4+180 4+200 4+220 4+240 4+260 4+280 4+300 4+320 4+340 4+360 4+380 4+400 4+420 4+440 4+460 4+480

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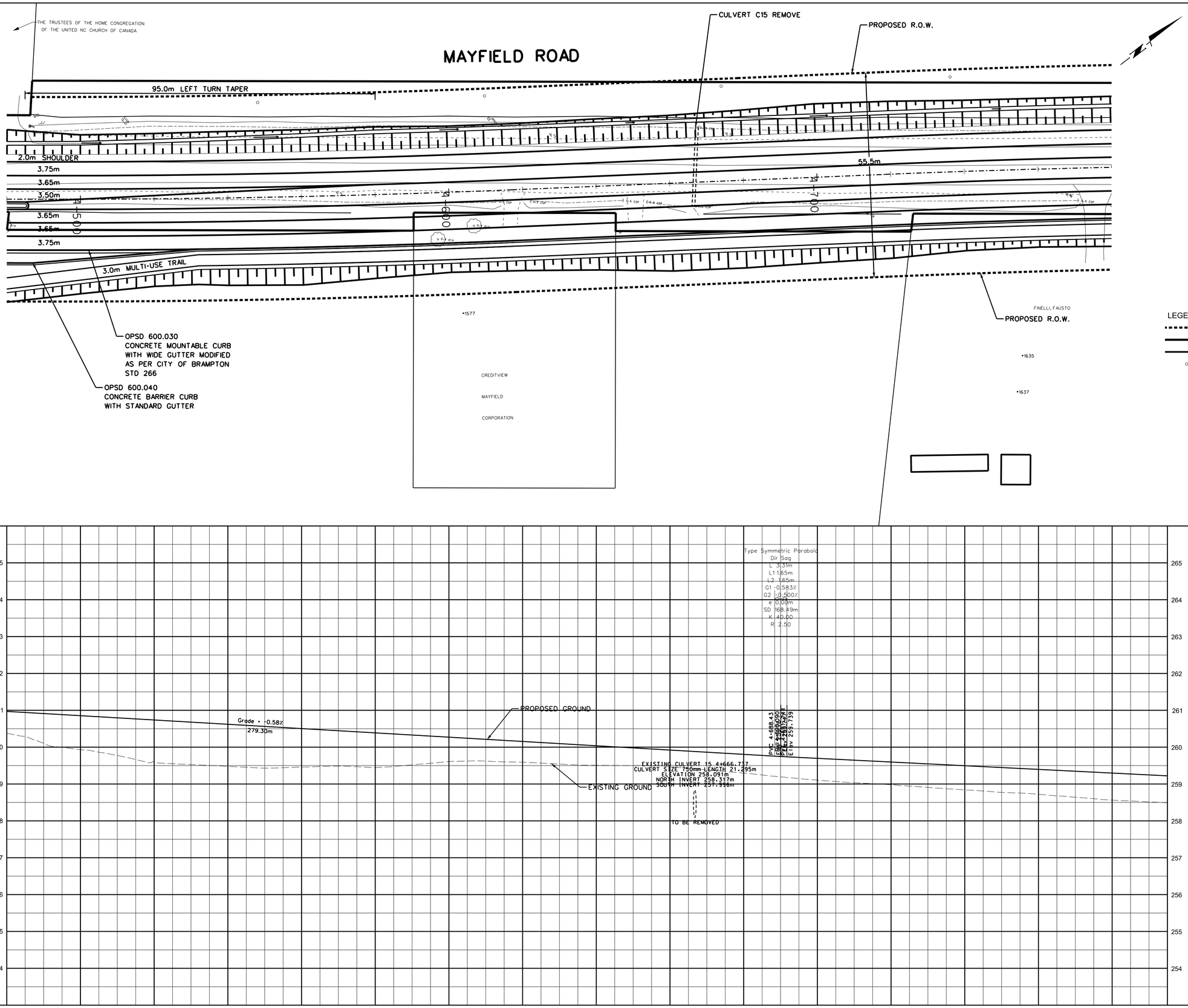
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 4+180 TO STA. 4+480

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 15 of 30	Plan No.	

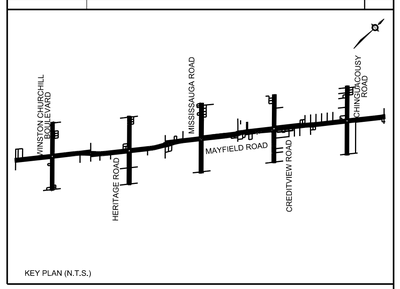


SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



LEGEND:

- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES

General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS20 Proposed Water Service, Size In mm

B.M. No, Description Location — Elev.

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Designed by

Approved by

Chkd.

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

- THE REGIONAL MUNICIPALITY OF PEEL
- CITY OF MISSISSAUGA WORKS DEPT.
- CITY OF BRAMPTON WORKS DEPT.
- TOWN OF CALEDON WORKS DEPT.
- BELL CANADA
- ENBRIDGE INCORPORATED-GAS DISTRIBUTION
- ONTARIO MINISTRY OF TRANSPORTATION
- ONTARIO CLEAN WATER AGENCY
- HYDRO ONE NETWORKS
- ENERSOURCE, HYDRO MISSISSAUGA
- HYDRO ONE BRAMPTON
- CABLE TELEVISION/FIBREOPTIC PROVIDERS:
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- ENERSOURCE TELECOM
- HYDRO ONE TELECOM
- ROGERS CABLE
- ALLSTREAM
- PSN (PUBLIC SECTOR NETWORK)
- FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

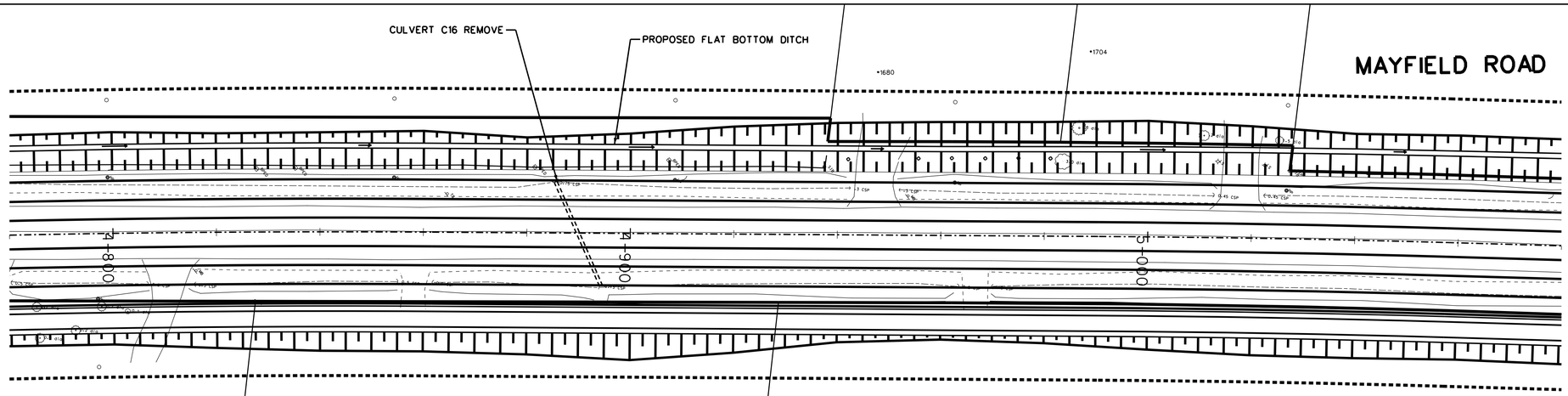
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 4+480 TO STA. 4+780

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 16 of 30	Plan No.	



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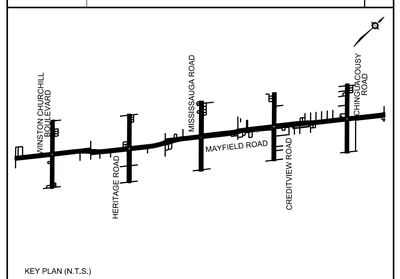
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
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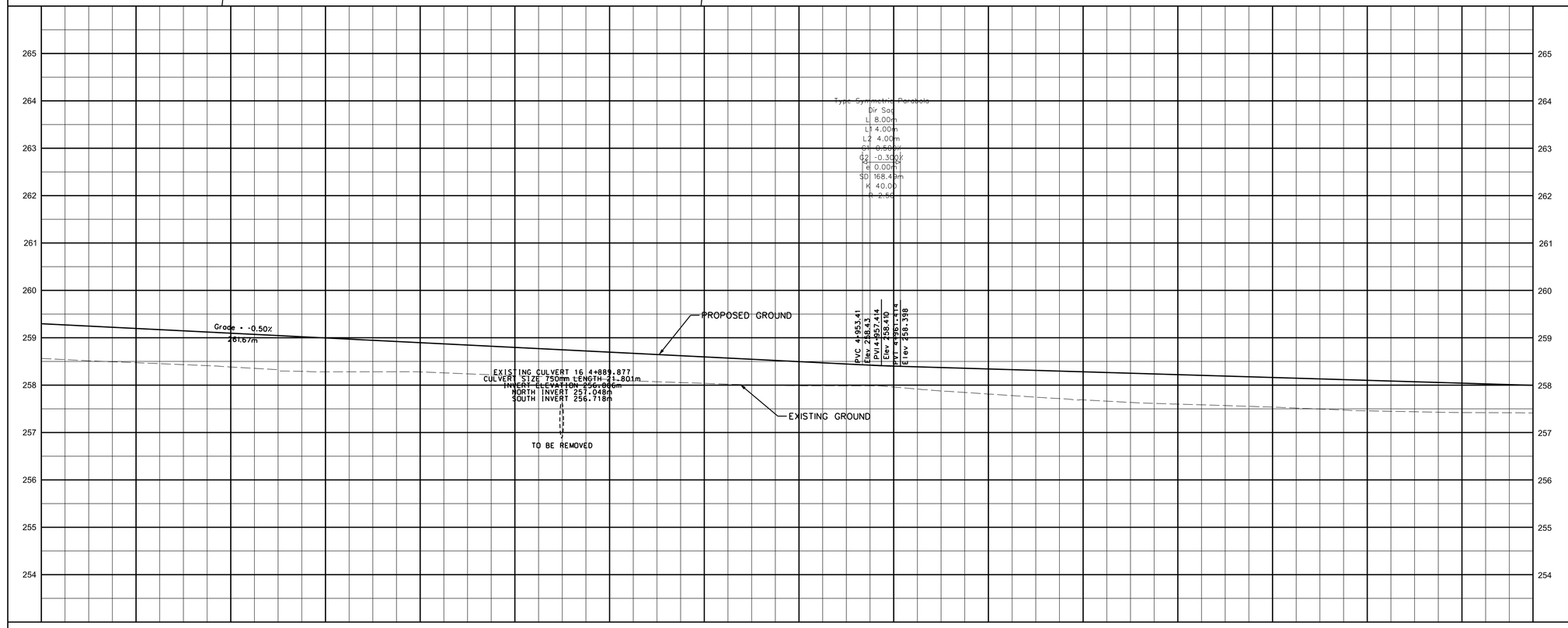
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES



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1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

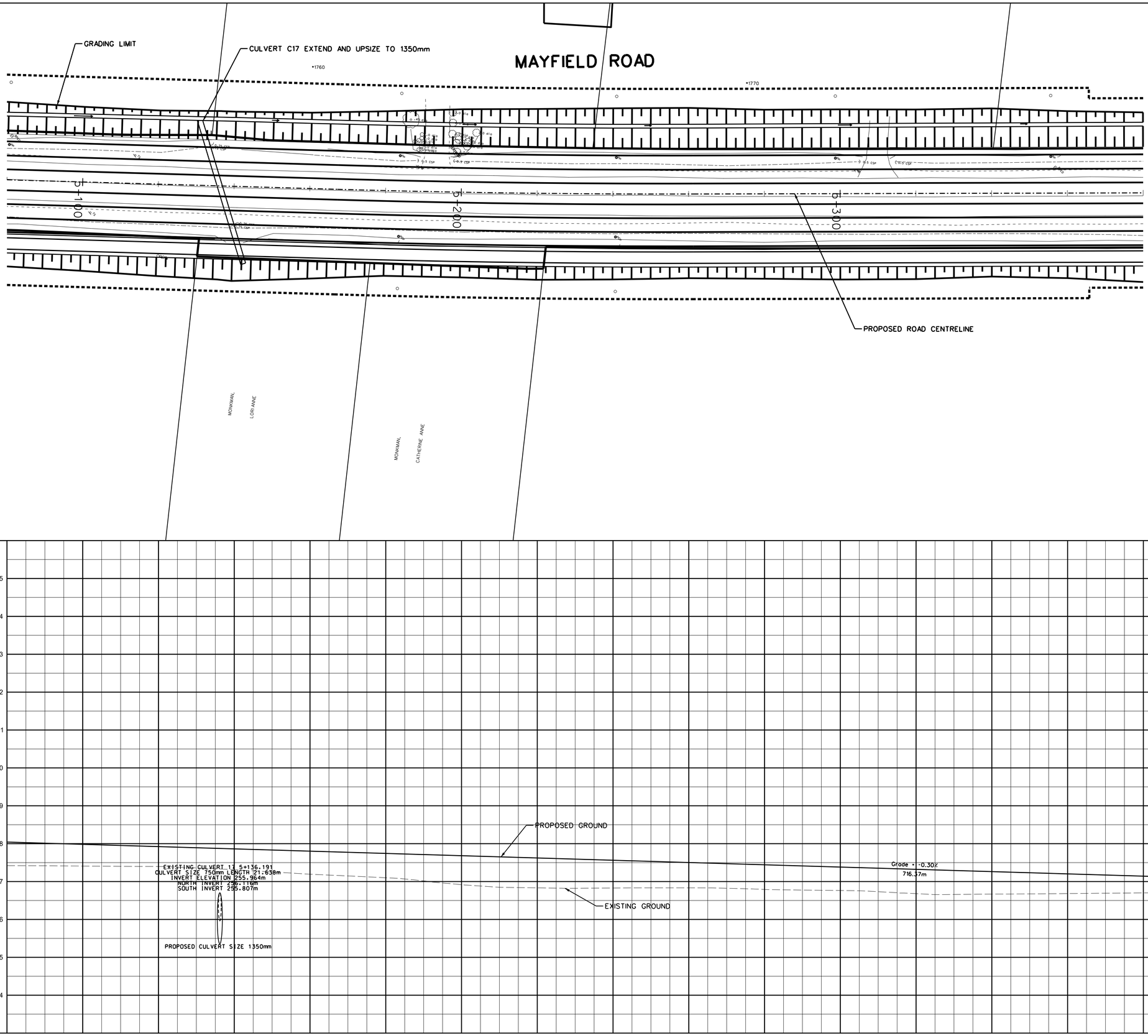
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 4+780 TO STA. 5+080

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 17 of 30	Plan No.	



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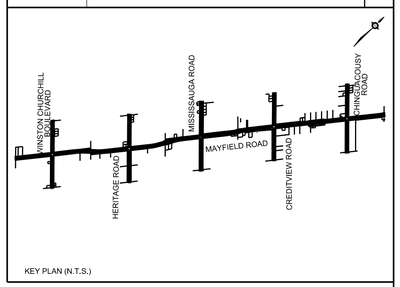
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



LEGEND:

- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES

General Notes

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WS20 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

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Designed by

Chkd.

Approved by

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Region of Peel
Working for you

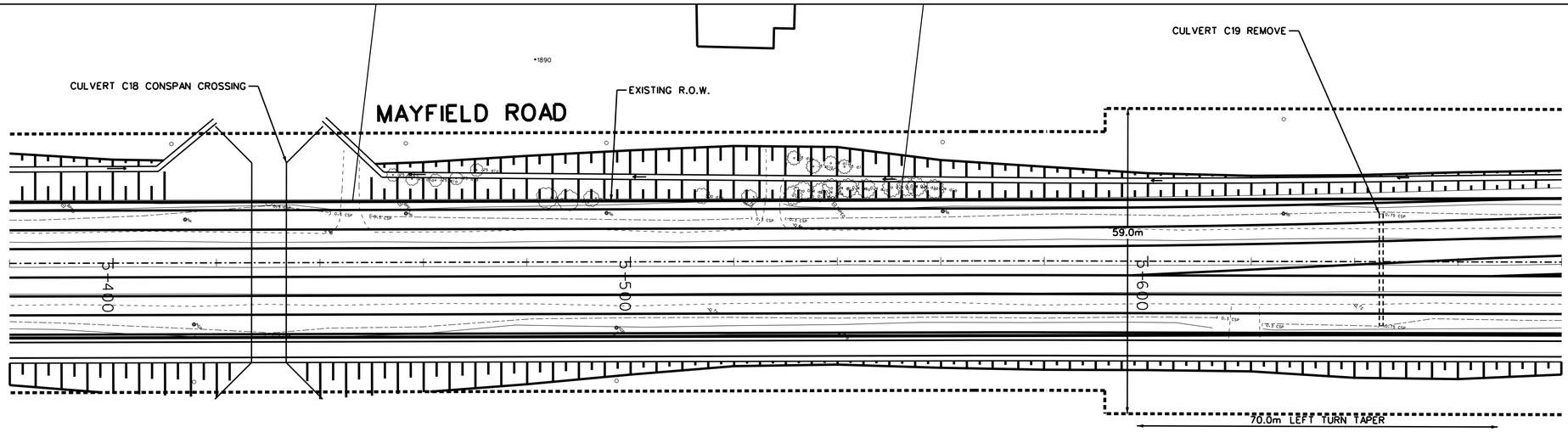
MAYFIELD ROAD

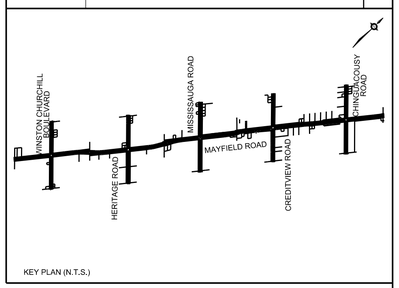
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 5+080 TO STA. 5+380

CAD Area	Area	Project No. 12-4390
Checked by	Drawn by S.S.	
Date JANUARY 2015	Sheet 18 of 30	Plan No.





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ONT. CLEAN WATER			COMMUNIC. CABLES		

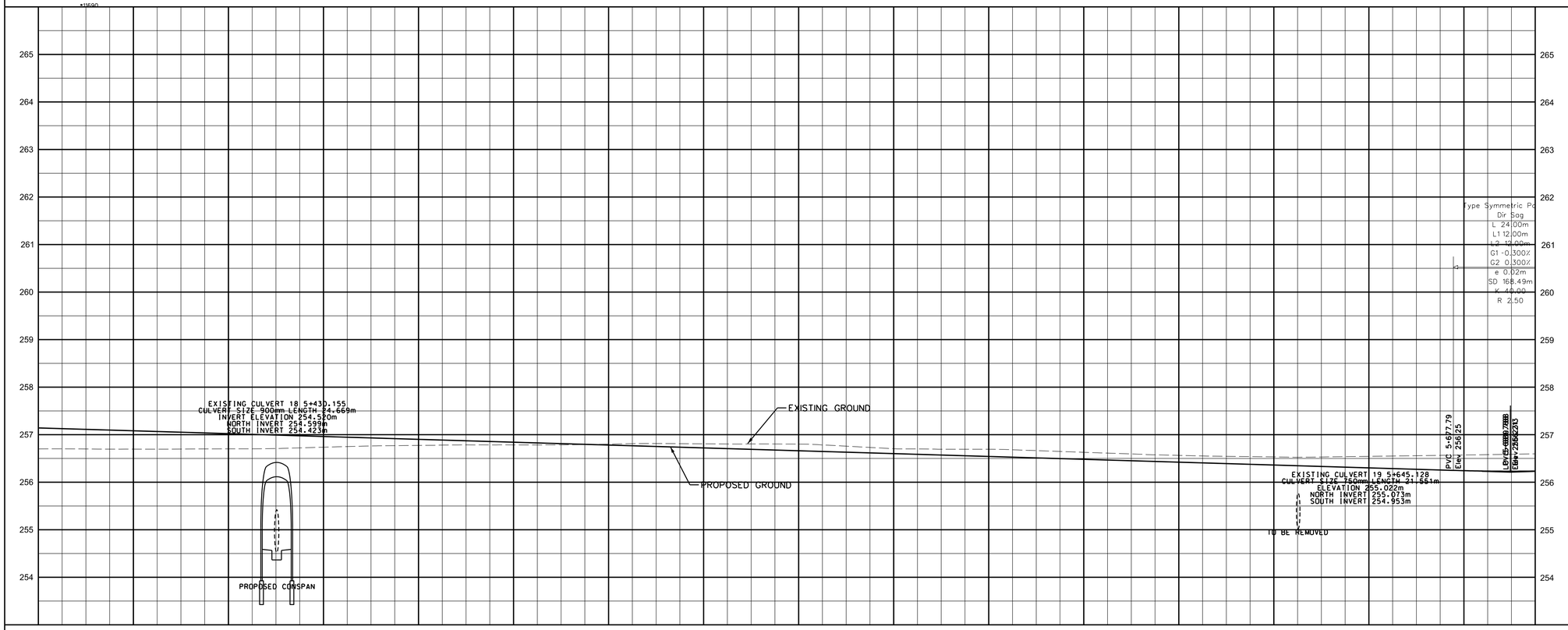
REVISIONS

DATE	DETAILS	INIT.

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES

MONKMAN, KEITH MAXWELL

MONKMAN, NEIL CLAYTON



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Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 5+380 TO STA. 5+680

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 19 of 30	Plan No.	

LIMIT OF CONSTRUCTION

LIMIT OF CONSTRUCTION

MCCLURE,

JOHANNA WAUTERINE

2.0m SHOULDER
3.75m
3.65m
3.50m
3.65m
3.65m
3.75m
3.0m MULTI-USE TRAIL

5+700

5+812

60.00m LEFT TURN STORAGE

2.0m SHOULDER
3.75m
3.65m
3.50m
3.50m
3.65m
3.65m
3.75m
3.0m MULTI-USE TRAIL

35.00m LEFT TURN STORAGE

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

3.75m
3.75m
3.50m
3.75m
3.75m

CONCRETE BUS PAD
4.0mX9.0m

50.00m LEFT TURN STORAGE

CONCRETE BUS PAD
4.0mX9.0m

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

PL VENTURES LIMITED

•11687

SERVICE DATA

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PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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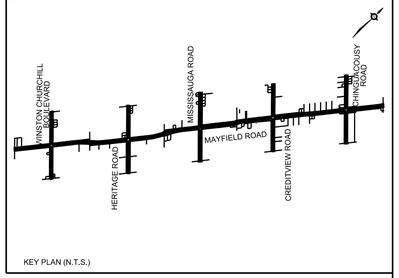

KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES

265 264 263 262 261 260 259 258 257 256 255 254

Type Symmetric Parabola
Dir Sag
L 24.00m
L1 12.00m
L2 12.00m
G1 -0.300%
G2 0.300%
e 0.02m
SD 168.49m
K 40.00
R 2.50

PVI 5+820.000
Elev 258.658

PVI 5+820.000
Elev 256.804

LDV 5+788.788
Elev 256.623

PVI 5+791.788
Elev 255.249

EXISTING GROUND

Grade - 0.30%
118.21m

PROPOSED GROUND

5+680 5+700 5+720 5+740 5+760 5+780 5+800

General Notes

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B.M. No. Elev.
Description
Location

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Designed by

Chkd.

Approved by

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Region of Peel
Working for you

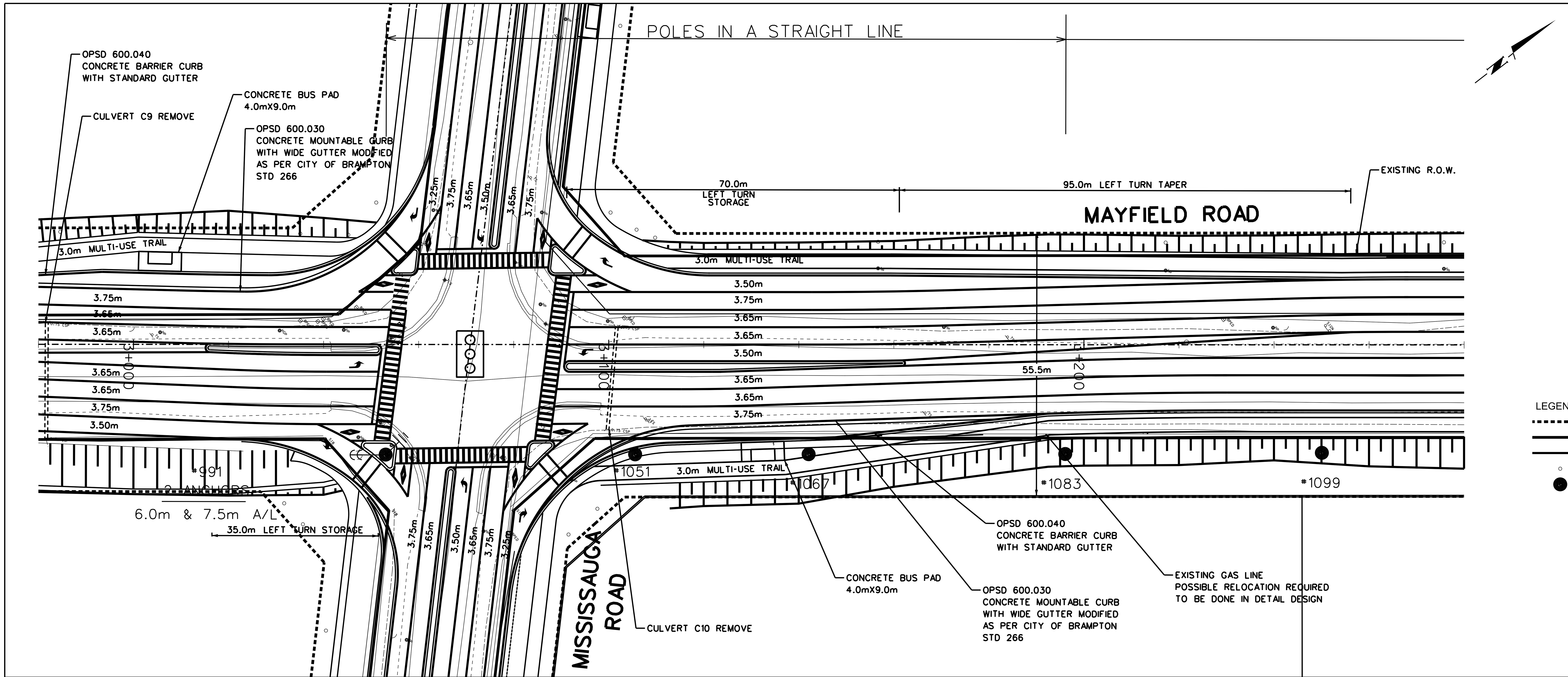
MAYFIELD ROAD

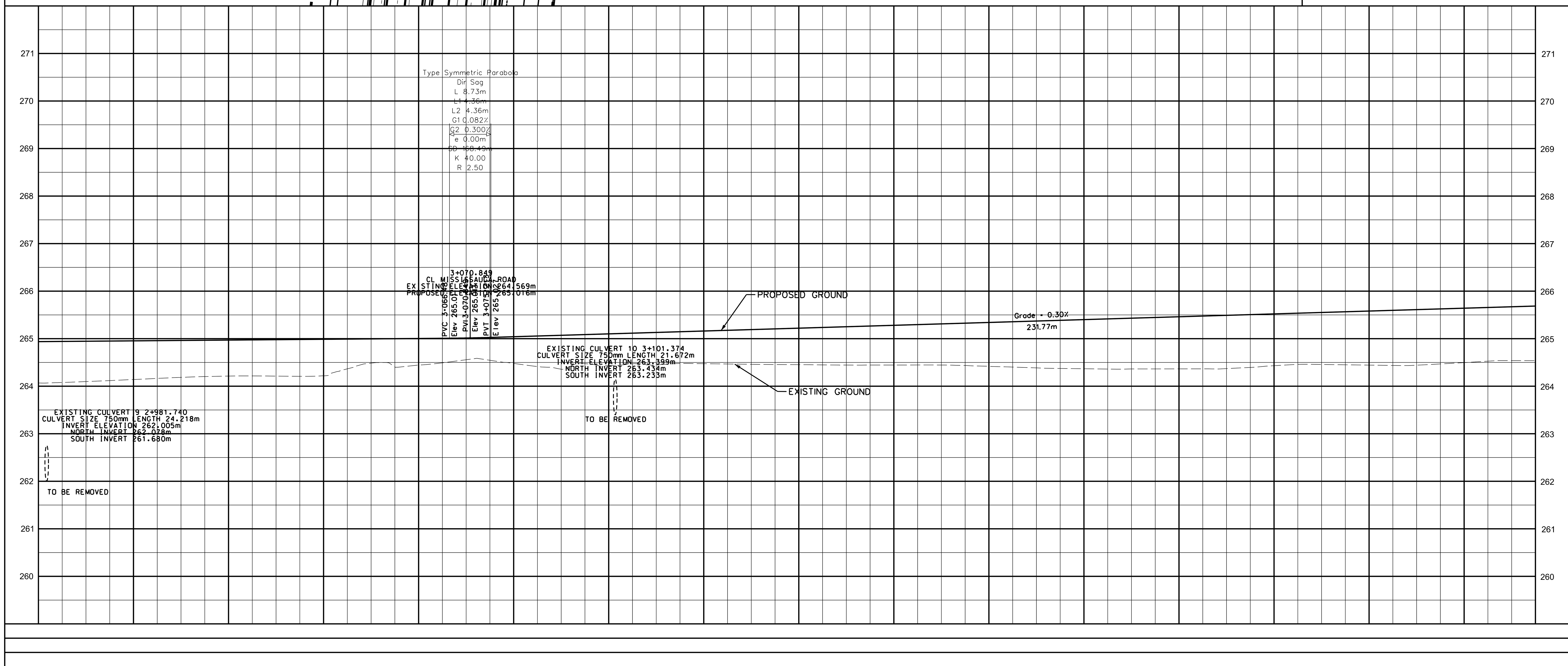
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 5+680 TO STA. 5+812

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 20 of 30	Plan No.	





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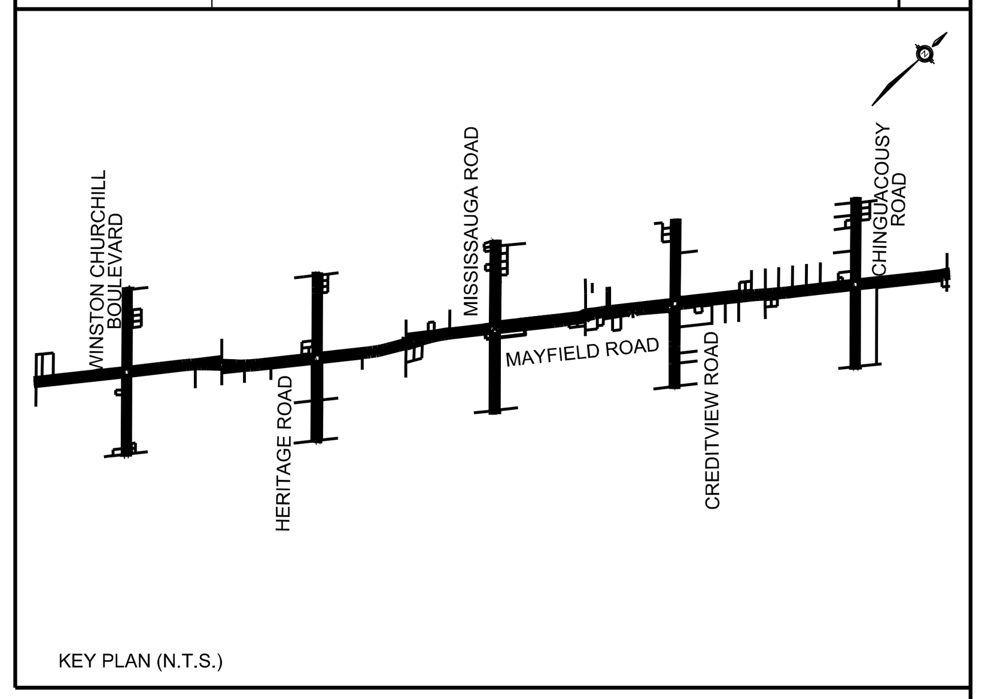

KEY PLAN (N.T.S.)

LEGEND:
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- RELOCATED HYDRO POLES
- HYDRO ONE BRAMPTON PROPOSED POLE LOCATIONS

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Designed by ____ Chkd. ____ Approved by ____

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Region of Peel
Working for you

MAYFIELD ROAD
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 2+980 TO STA. 3+280

CAD Area	Area	Project No.	12-4390
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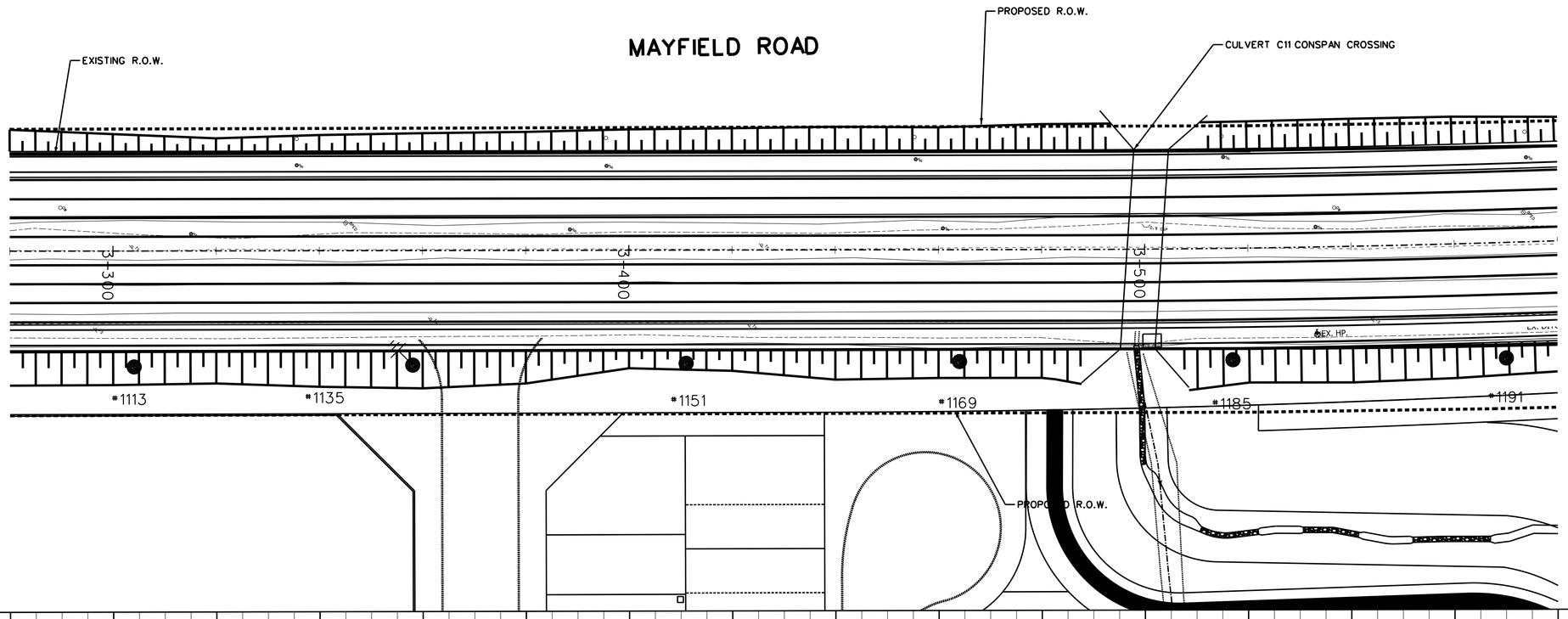
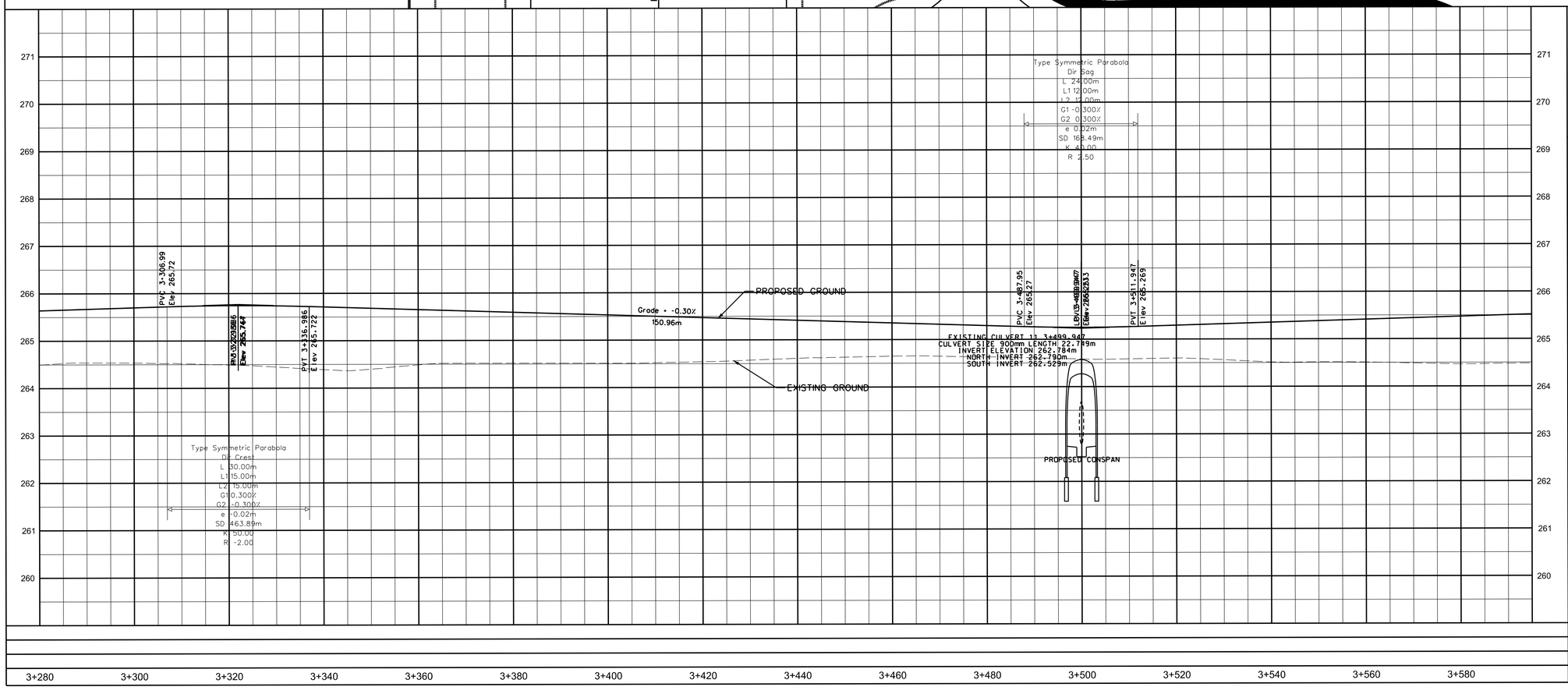
Date JANUARY 2015	Sheet 21 of 30	Plan No.	

POLES IN A STRAIGHT LINE





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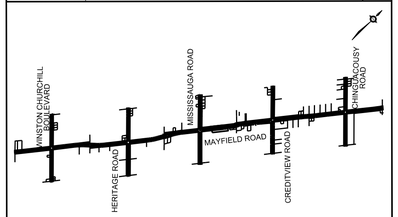

LEGEND:
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Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 3+280 TO STA. 3+580

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 22 of 30	Plan No.	

PROPOSED ROAD CENTRELINE

50.0m

50.0m

MAYFIELD ROAD

EX. HP

*1207

2 ANCHORS

6.0m & 7.5m A/L

*1290

*1235

*1285

*1255

VAN TENT, BRENDA CHRISTINE BERNICE
VAN TENT, JOHN WILLIAM GERALD

KUMAR, KIRAN
ISAACS, ANGELA

LIMIT OF PROPERTY

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
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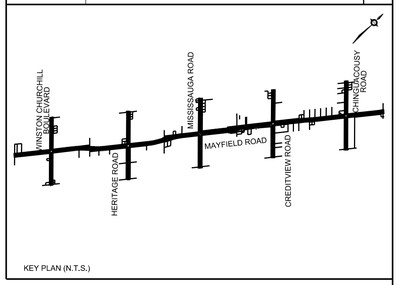
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

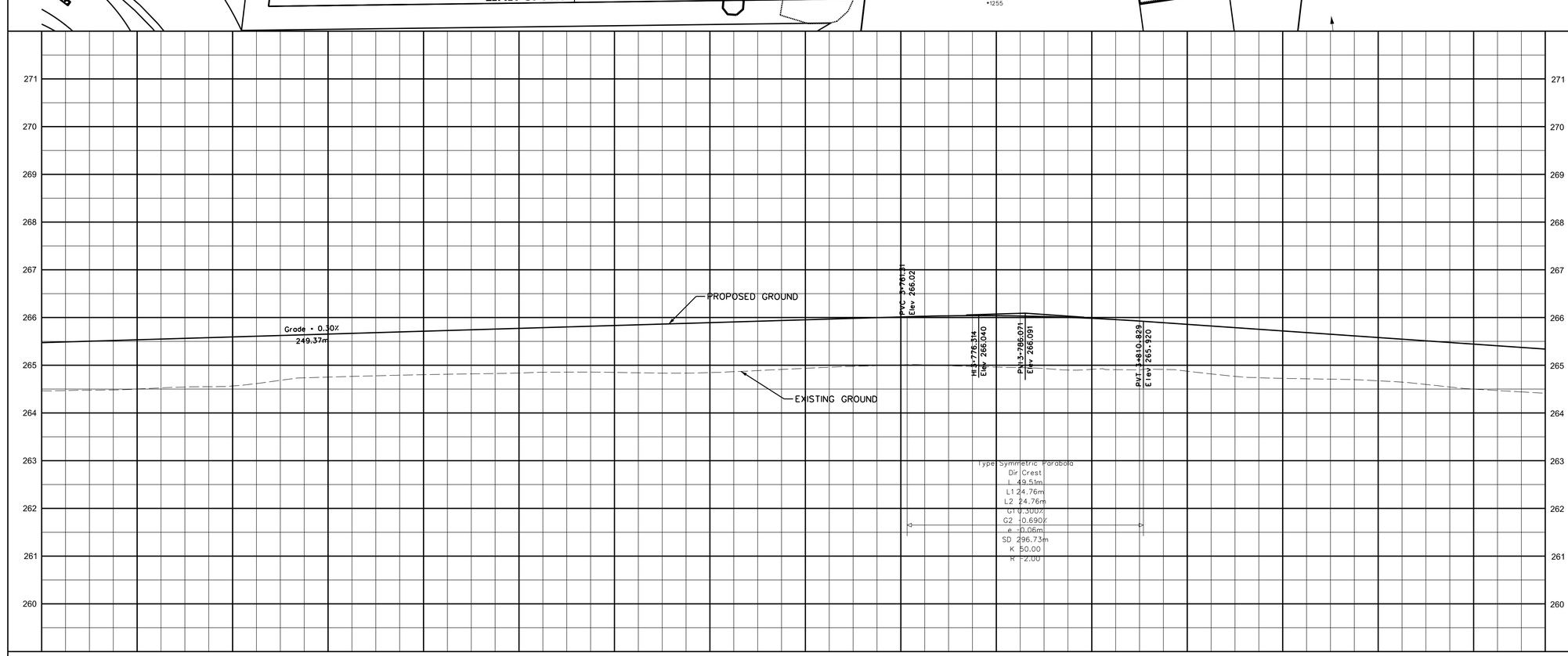
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:

- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES
- HYDRO ONE BRAMPTON PROPOSED POLE LOCATIONS



General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

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All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS20 Proposed Water Service, Size In mm

B.M. No, Description Location Elev.

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Designed by

Chkd.

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10Om 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 3+580 TO STA. 3+880

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 23 of 30	Plan No.	

CULVERT C12 EXTEND AND UPSIZE TO 1000mm

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

GRADING LIMIT

MAYFIELD ROAD

3.0m MULTI-USE TRAIL
3.75m
3.65m
3.65m
3.65m
3.50m
1.8m MULTI-USE TRAIL

3.0m MULTI-USE TRAIL
3.75m
3.65m
3.65m
3.50m
3.65m
3.65m
3.75m
1.8m MULTI-USE TRAIL

EXISTING GAS LINE
POSSIBLE RELOCATION REQUIRED
TO BE DONE IN DETAIL DESIGN

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

CONCRETE BUS PAD
4.0mX9.0m

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

OPSD 600.030
CONCRETE MOUNTABLE CURB
WITH WIDE GUTTER MODIFIED
AS PER CITY OF BRAMPTON
STD 266

LIMIT OF PROPERTY

TRURO CIRCLE

ROAD

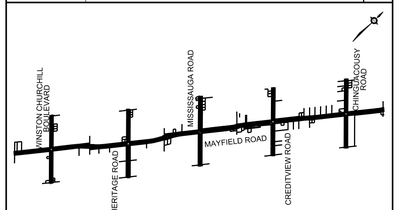
CIRCLE

ISON DRIVE

P STM 129.5 @ 0.50%

SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES

271
270
269
268
267
266
265
264
263
262
261
260

Grade = -0.69%
321.08m

PROPOSED GROUND

EXISTING GROUND

EXISTING CULVERT 12 3+993.445
CULVERT SIZE 750mm LENGTH 34.210m
INVERT ELEVATION 262.489m
NORTH INVERT 262.672m
SOUTH INVERT 262.543m

PROPOSED CULVERT SIZE 1000mm

4+118.790
CL ROBERT PARKINSON INTERSECTION
EXISTING ELEVATION 263.943m
PROPOSED ELEVATION 263.755m

PVI 4+139.99
Elev 263.770

PVI 4+115.749
Elev 263.678
PVT 4+159.590
ELEV 263.645

Type Symmetric Parabola
Dir Crest
L 7.68m
L1 3.84m
L2 3.84m
G1 -0.690%
G2 -0.844%
a -0.00m
e -0.00m
SD 1757.10m

3+880 3+900 3+920 3+940 3+960 3+980 4+000 4+020 4+040 4+060 4+080 4+100 4+120 4+140 4+160 4+180

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WS20 Proposed Water Service, Size In mm
B.M. No, Description Location Elev.

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Designed by
Chkd.
Approved by

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Region of Peel
Working for you

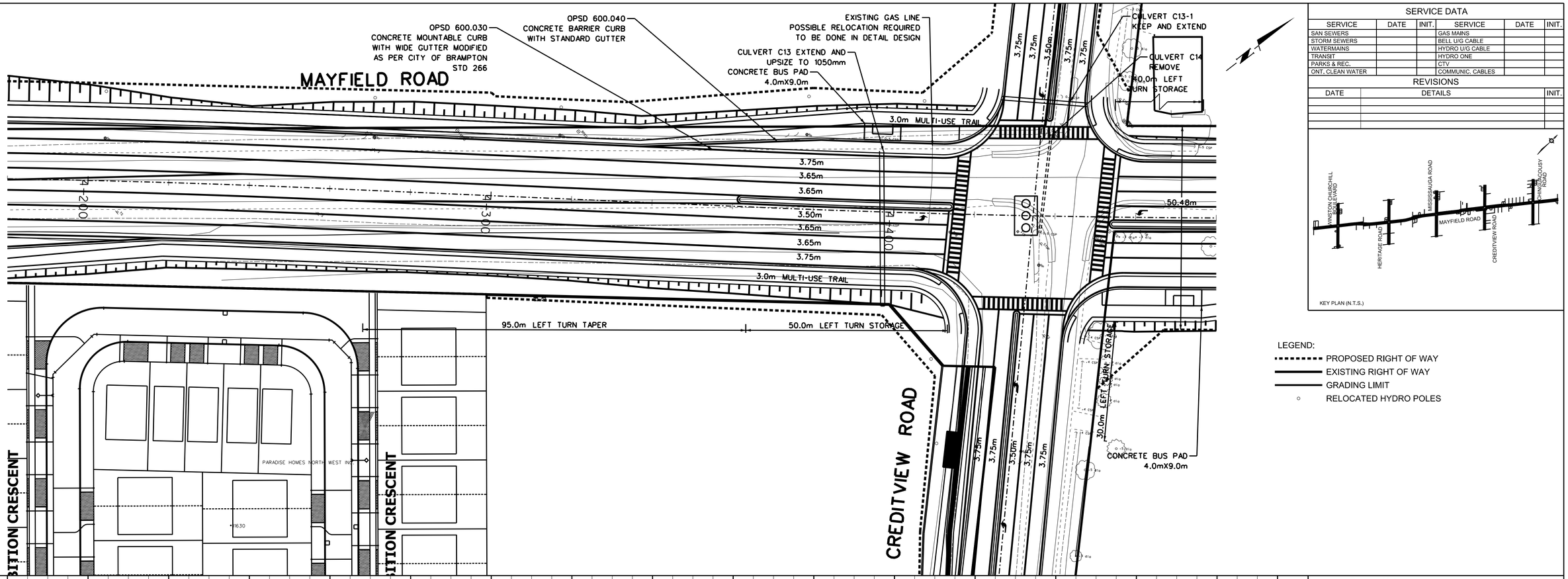
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 3+880 TO STA. 4+180

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 24 of 30	Plan No.	



SERVICE DATA

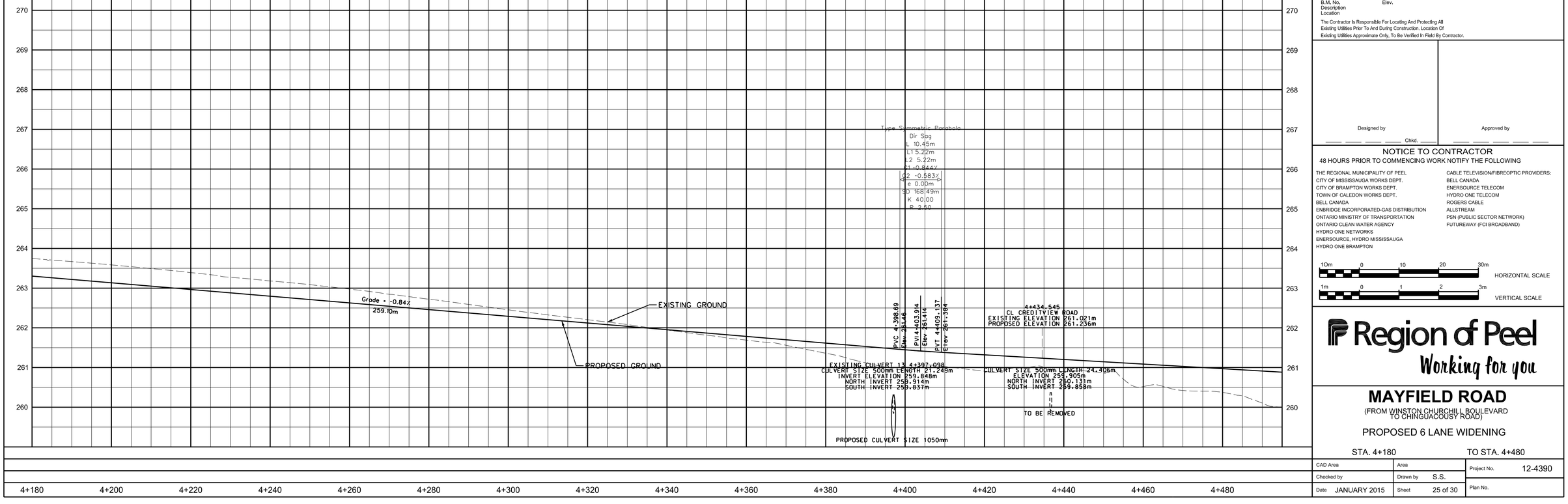
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.

LEGEND:

- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES



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Designed by

Approved by

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10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 4+180 TO STA. 4+480

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 25 of 30	Plan No.	

THE TRUSTEES OF THE HOME CONGREGATION OF THE UNITED NC CHURCH OF CANADA

MAYFIELD ROAD

CULVERT C15 REMOVE

PROPOSED R.O.W.

40.0m LEFT TURN STORAGE

95.0m LEFT TURN TAPER

3.0m MULTI-USE TRAIL

3.75m
3.65m
3.65m
3.50m
3.65m
3.65m
3.75m

3.0m MULTI-USE TRAIL

55.5m

OPSD 600.030
CONCRETE MOUNTABLE CURB
WITH WIDE GUTTER MODIFIED
AS PER CITY OF BRAMPTON
STD 266

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

•1577

CREDITVIEW
MAYFIELD
CORPORATION

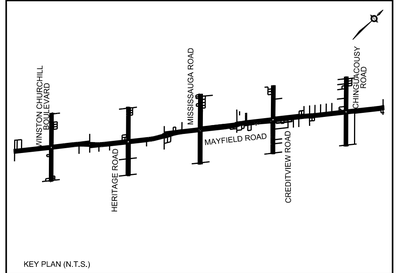
FINELLI, FAUSTO

PROPOSED R.O.W.

•1635

•1637

KEY PLAN (N.T.S.)



LEGEND:
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- EXISTING RIGHT OF WAY
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- ○ RELOCATED HYDRO POLES

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
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STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.

Type Symmetric Parabola
Dir Sag
L 3.31m
L1 1.65m
L2 1.65m
G1 -0.583%
G2 -0.500%
e 0.00m
SD 168.49m
K 40.00
R 2.50

PVC 4+668.43
PVI 4+670.08
PVT 4+671.74
Elev 259.739

Grade = -0.58%
279.30m

PROPOSED GROUND

EXISTING CULVERT 15 4+666.737
CULVERT SIZE 750mm-LENGTH 21.295m
ELEVATION 258.091m
NORTH INVERT 258.317m
SOUTH INVERT 257.936m

EXISTING GROUND

TO BE REMOVED

265 264 263 262 261 260 259 258 257 256 255 254

4+480 4+500 4+520 4+540 4+560 4+580 4+600 4+620 4+640 4+660 4+680 4+700 4+720 4+740 4+760 4+780

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Approved by
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10m 0 10 20 30m — HORIZONTAL SCALE
1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 4+480 TO STA. 4+780

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 26 of 30	Plan No.	

MAYFIELD ROAD

CULVERT C16 REMOVE

•1680

•1704

N 8+800

N 8+900

N 9+000

WALNESS

DEVELOPMENTS INC.

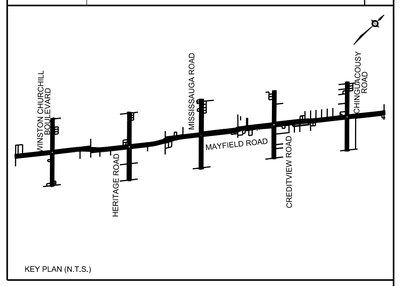
1367933 ONTARIO INC.

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:

- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES

Type: Symmetric Parabola
Dir: Sag
L: 8.00m
L1: 4.00m
L2: 4.00m
G1: 0.500%
G2: -0.300%
S: 0.00%
e: 0.00m
SD: 168.49m
K: 40.00
A: 2.50

PVC 4+953.41
Elev 258.43
PVI 4+957.414
Elev 258.400
PVT 4+961.414
Elev 258.398

Grade = -0.50%
261.67m

PROPOSED GROUND

EXISTING CULVERT 16 4+889.877
CULVERT SIZE 750mm LENGTH 21.801m
INVERT ELEVATION 256.986m
NORTH INVERT 257.048m
SOUTH INVERT 256.718m

EXISTING GROUND

TO BE REMOVED

265 264 263 262 261 260 259 258 257 256 255 254

4+780 4+800 4+820 4+840 4+860 4+880 4+900 4+920 4+940 4+960 4+980 5+000 5+020 5+040 5+060 5+080

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Region of Peel
Working for you

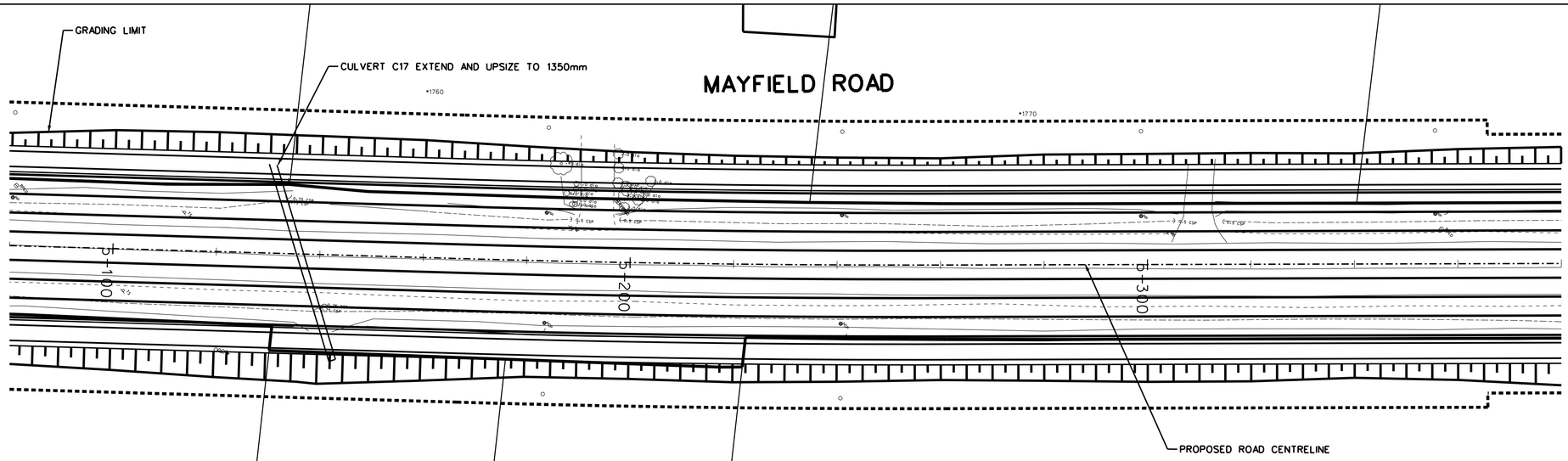
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 4+780 TO STA. 5+080

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 27 of 30	Plan No.	



SERVICE DATA					
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WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
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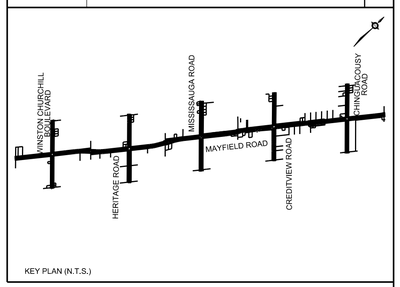
REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
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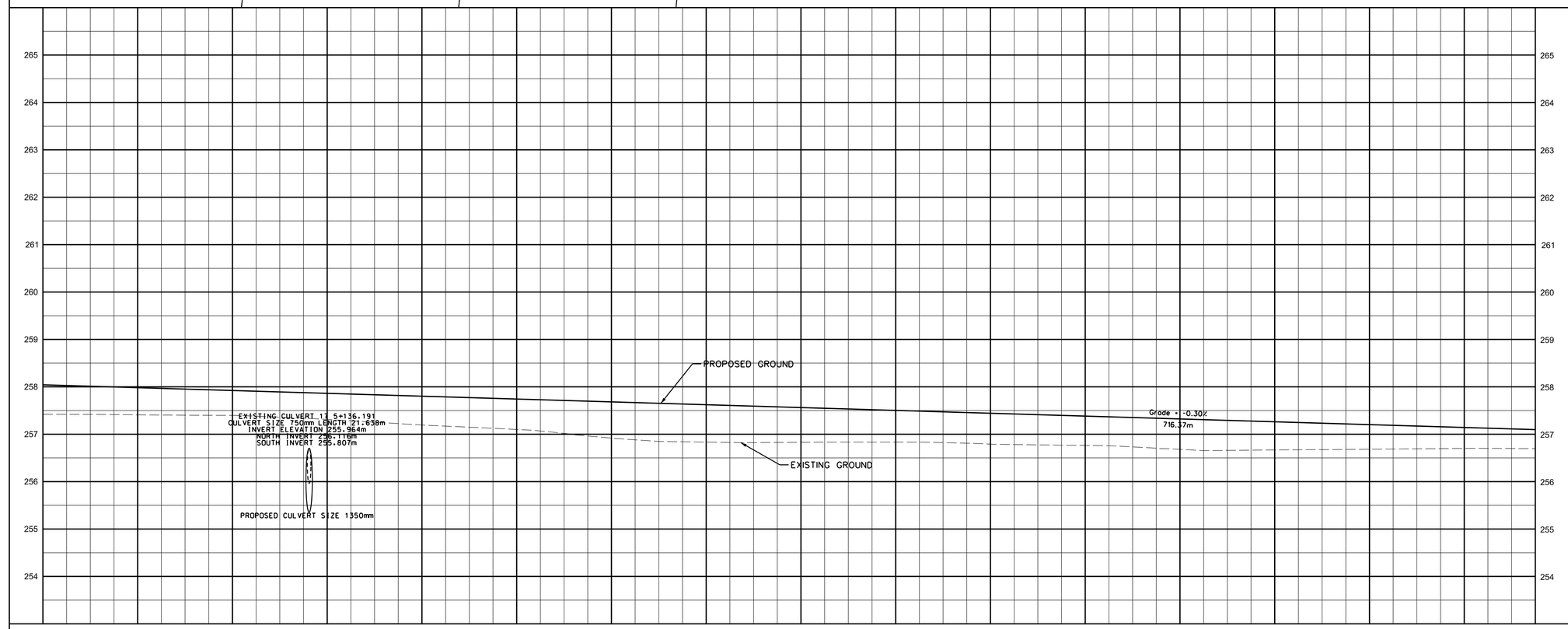

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B.M. No. Elev.
Description
Location

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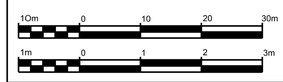

Region of Peel
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PROPOSED 6 LANE WIDENING

STA. 5+080 TO STA. 5+380

CAD Area	Area	Project No. 12-4390
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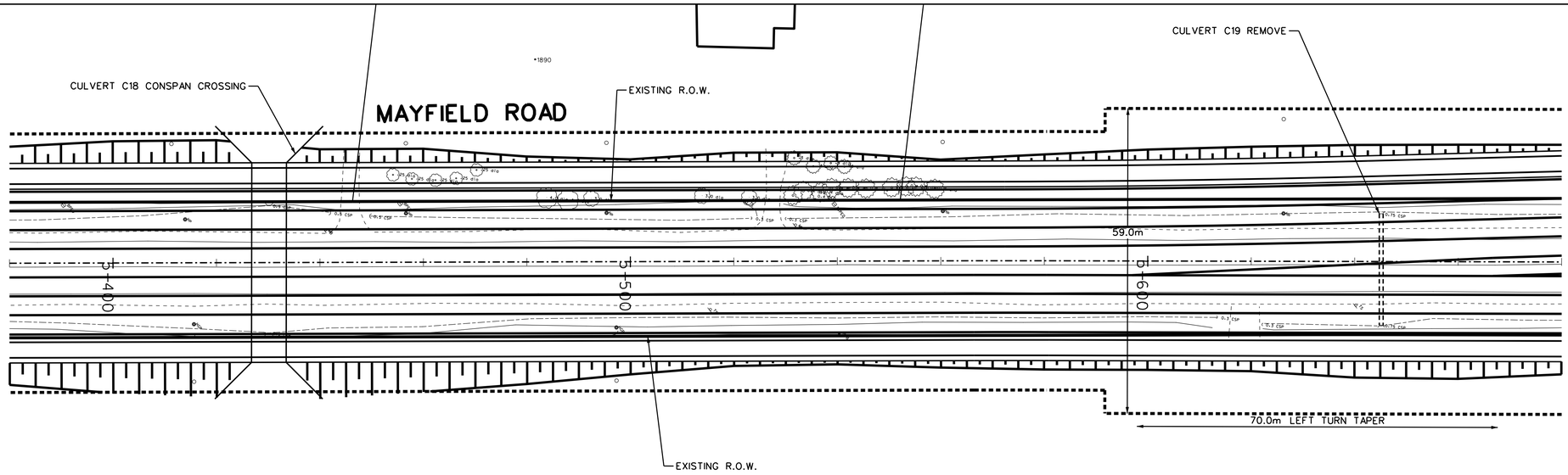
Date JANUARY 2015	Sheet 28 of 30	Plan No.



MONKMAN, KEITH MAXWELL

MONKMAN, NEIL CLAYTON

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STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
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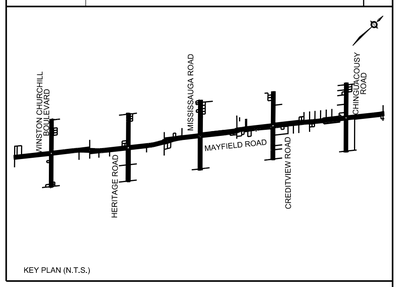

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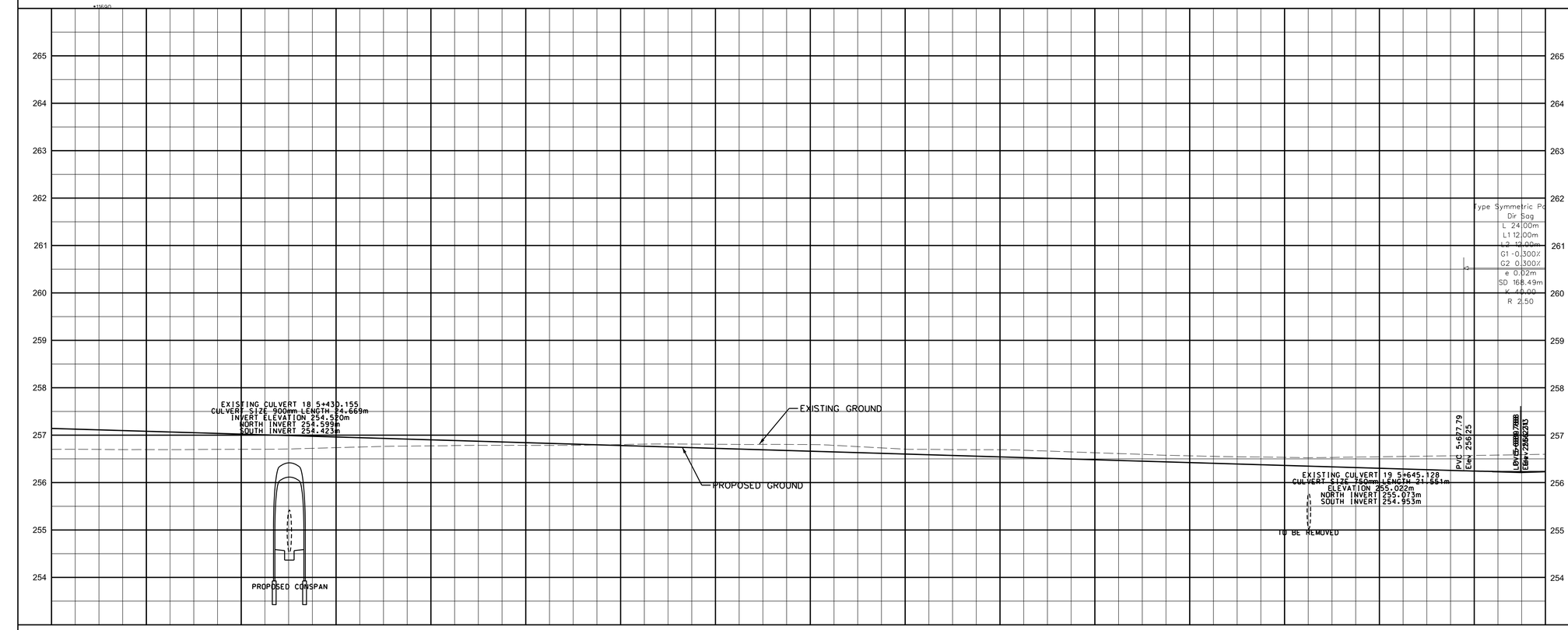
- ○ RELOCATED HYDRO POLES



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Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
ONTARIO MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
HYDRO ONE BRAMPTON

CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
ROGERS CABLE
ALLSTREAM
PSN (PUBLIC SECTOR NETWORK)
FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 5+380 TO STA. 5+680

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 29 of 30	Plan No.	

LIMIT OF CONSTRUCTION

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

CONCRETE BUS PAD
4.0mX9.0m

MCCLURE,

JOHANNA WAUTERINE

3.0m MULTI-USE TRAIL

3.75m
3.65m
3.65m
3.50m
3.65m
3.65m
3.75m

3.75m
3.50m
3.75m

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

120.0m LEFT TURN STORAGE

3.0m MULTI-USE TRAIL

3.75m
3.65m
3.65m
3.50m
3.50m
3.65m
3.65m
3.75m

3.0m MULTI-USE TRAIL

5+806

CONCRETE BUS PAD
4.0mX9.0m

CONCRETE BUS PAD
4.0mX9.0m

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

35.00m
LEFT TURN
STORAGE

3.75m
3.75m
3.50m
3.75m
3.75m

OPSD 600.040
CONCRETE BARRIER CURB
WITH STANDARD GUTTER

LIMIT OF CONSTRUCTION

60.0m LEFT TURN STORAGE

PL VENTURES LIMITED

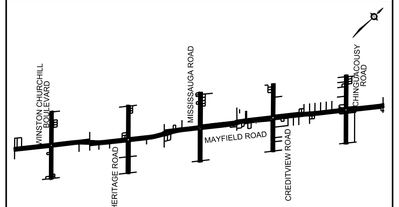
•11687

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:

- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- ○ RELOCATED HYDRO POLES

265
264
263
262
261
260
259
258
257
256
255
254

Type Symmetric Parabola
Dir Sag
L 24.00m
L1 12.00m
L2 12.00m
G1 -0.300%
G2 0.300%
e 0.02m
SD 168.49m
K 40.00
R 2.50

PVI 5+820.000
Elev 258.658

PVI 5+820.000
Elev 256.804

PVI 5+791.788
Elev 255.249

EXISTING GROUND

Grade = 0.30%
118.21m

PROPOSED GROUND

5+680 5+700 5+720 5+740 5+760 5+780 5+800

General Notes

All Driveways Are ASPHALT Unless Otherwise Noted

All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field

All Horizontal And Vertical Bends Are In Degrees

All Pipes Size In mm

20C Existing Water Service, Size In mm

WS20 Proposed Water Service, Size In mm

B.M. No. Elev.
Description
Location

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction. Location Of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

Designed by

Chkd.

Approved by

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Region of Peel
Working for you

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(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

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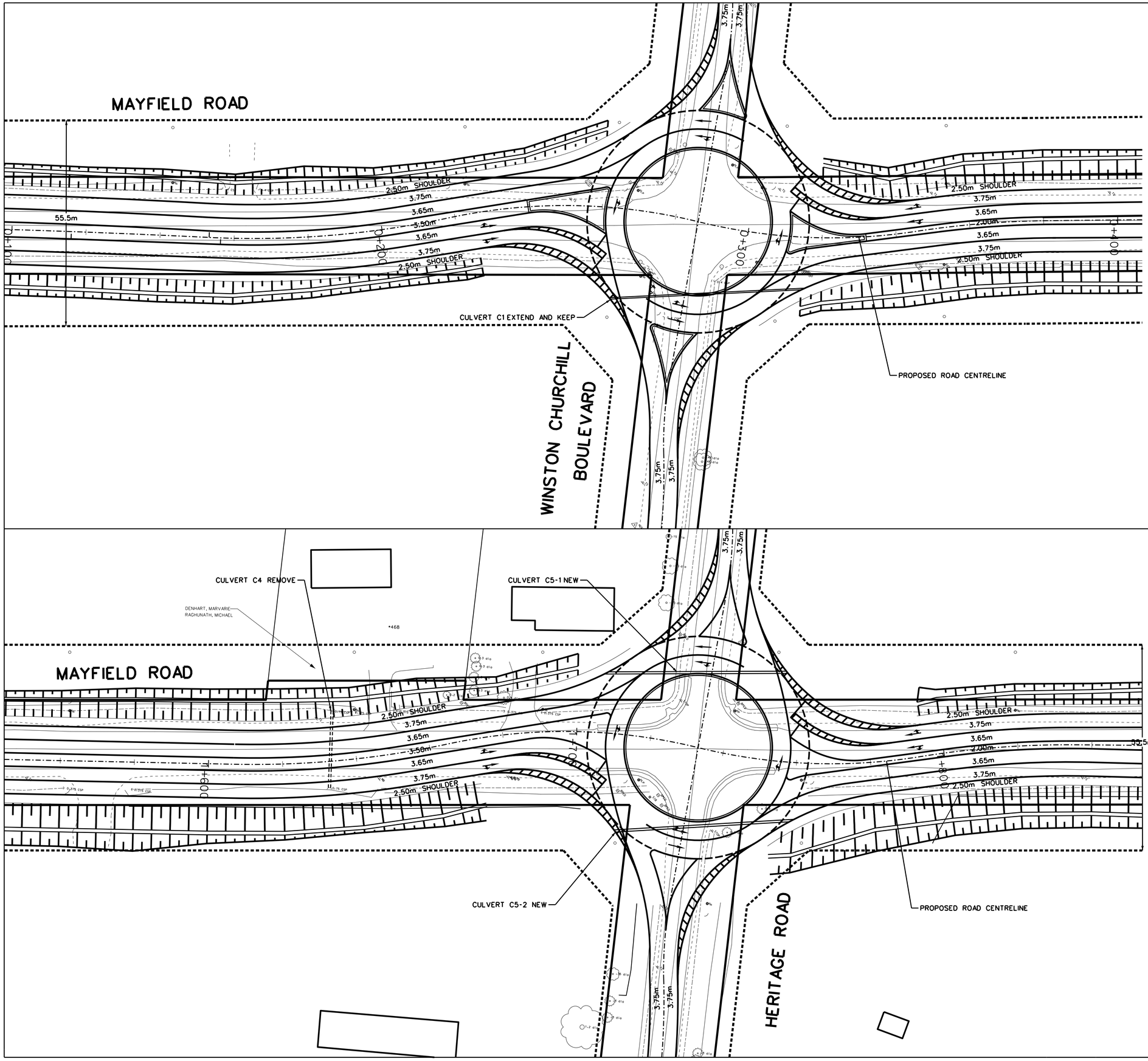
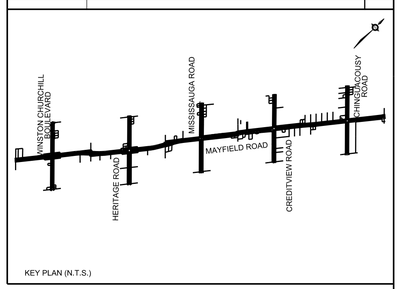
STA. 5+680 TO STA. 5+812

CAD Area	Area		Project No. 12-4390
Checked by	Drawn by	S.S.	
Date JANUARY 2015	Sheet	30 of 30	Plan No.

PRELIMINARY ROUNDABOUT DESIGNS





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TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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DATE	DETAILS	INIT.

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10Om 0 10 20 30m

Region of Peel
Working for you

MAYFIELD ROAD

PROPOSED ROUNDABOUTS

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 1 of 1	Plan No.	

P PUBLIC INFORMATION CENTRE (PIC) PIC 1 AND PIC 2 PRESENTATION BOARDS

Public Information Centre No. 1

Municipal Class Environmental Assessment

Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard

Public Information Centre #1

Date: Wednesday, November 27, 2013

Time: 6:30 p.m. – 8:30 p.m.

Location: Peel Regional Police Association
Banquet Hall
10675 Mississauga Road, Brampton

Region of Peel
Working for you

1 Welcome to PIC #1

- Please sign in and take a comment sheet
- If you have questions, our team is available to help you
- Place your completed comment sheets in the Comment Box or send them to:

  Neal Smith

  Project Manager

  neal.smith@peelregion.ca

  by **Friday, December 13, 2013**

Region of Peel
Working for you

2 Purpose of PIC #1

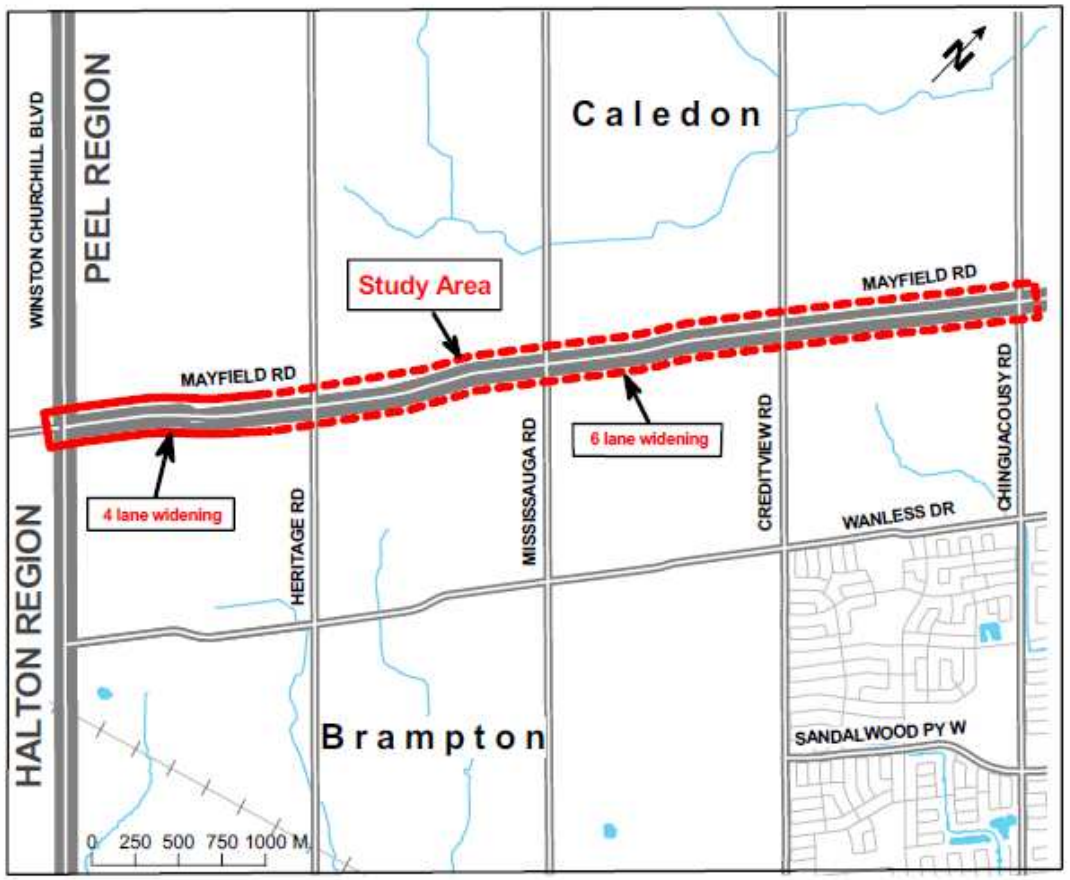
The purpose of this Public Information Centre (PIC) is to:

- Explain the Municipal Class Environmental Assessment process
- Present information from technical studies that have been completed to date
- Share with you the:
  - ✓ Problem / Opportunity Statement
  - ✓ Preliminary Alternative Solutions
  - ✓ Preliminary Evaluation Criteria
- Explain what will happen next
- Ask for your input

Mayfield Road and Winston Churchill Boulevard

3 Study Area

The Study Area extends from Chinguacousy Road to Winston Churchill Boulevard for a distance of approximately 5.4km



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4 Municipal Class EA Process

Phases

Phase 1: Problem or Opportunity
- ☑ Identify and describe the problem and opportunities

Phase 2: Alternative Solutions
- ☑ Identify alternative solutions to the problem
- ☑ Inventory the natural, social, economic & cultural environments
- ☑ Identify the impact of the alternative solutions after mitigation
- ☑ Evaluate the alternative solutions with consideration of environmental and technical impacts
- ☑ Identify a recommended alternative solution

Phase 3: Alternative Design Concepts for the Preferred Solution
- ❑ Confirm preference for recommended solution
- ❑ Identify alternative designs to implement the preferred solution
- ❑ Inventory the natural, social, economic & cultural environments
- ❑ Identify the impact of the alternative designs after mitigation
- ❑ Evaluate alternative designs with consideration of the impacts (preliminary recommendation made)
- ❑ Confirm the recommended design concept

Phase 4: Environmental Study Report
- ❑ Complete an Environmental Study Report (ESR) which sets out all of the activities undertaken to date through Phases 1, 2 and 3
- ❑ Notify the public and government agencies of completion of the ESR and of the PART II Order provision in the EA Act
- ❑ Place ESR on public record for 30 calendar days for review

Phase 5: Implementation
- ❑ Proceed to design and construction of the project
- ❑ Property acquisition utility relocation
- ❑ Initiate construction as appropriate
- ❑ Monitor for environmental provisions and commitments

Notice of Study Commencement

PIC#1 November 27, 2013
- Needs and Justification
- Planning Alternative Solutions
- Evaluation of Planning Alternative Solutions
- Preliminary Recommended Solution

The Region of Peel's Long Range Transportation Plan satisfies the requirements of Phases 1 and 2

We are here

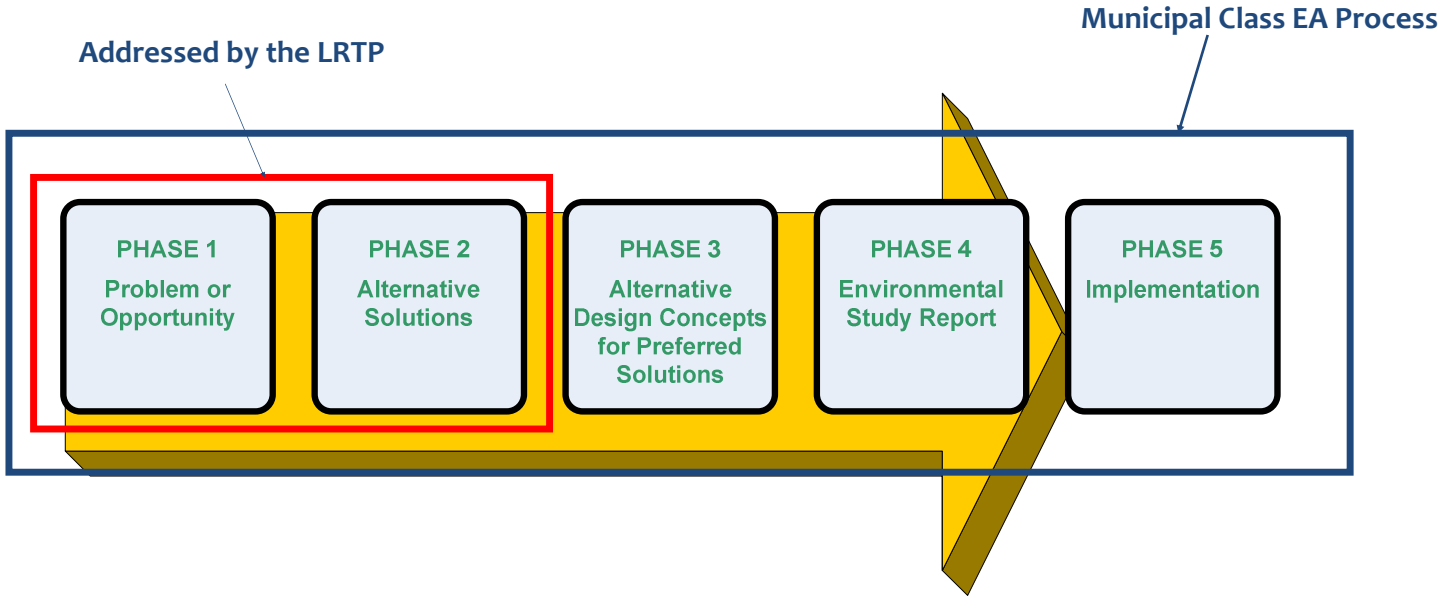
PIC#2 Fall 2014
- Alternative designs for the preferred solution
- Evaluation of alternative design concepts
- Preliminary recommended design concept

Notice of Study Completion and Filing the ESR

Region of Peel
Working for you

5 2012 Long Range Transportation Plan Update

- The 2012 Long Range Transportation Plan (LRTP) Update identifies the transportation challenges anticipated in the Region of Peel over the next 20 years and a road improvement plan to address those challenges
- The LRTP was conducted as a master plan transportation study that satisfies Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process



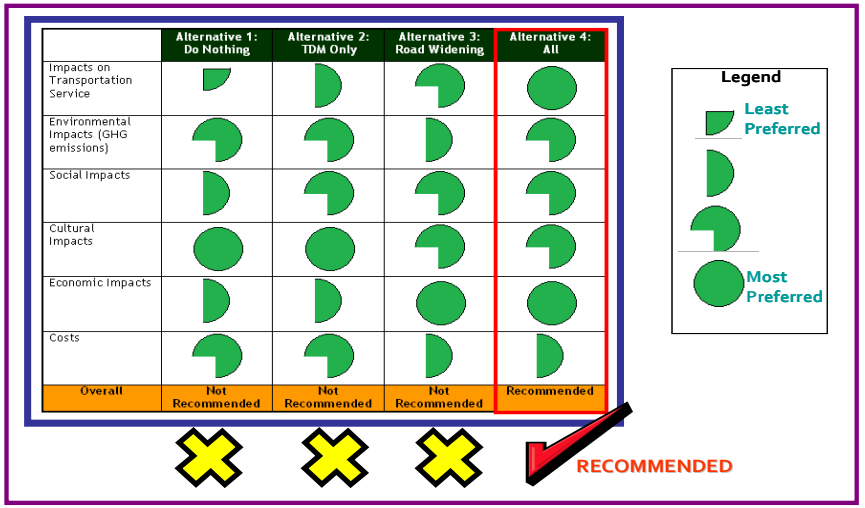
Region of Peel
Working for you

6 Region-wide Evaluation Matrix

Recommended Solution

- LRTP recommends the following improvements to Mayfield Road:
  - Until 2021 – widening from 2-4 lanes from Chinguacousy Road to Winston Churchill Boulevard
  - Until 2031 – widening from 4-6 lanes from Chinguacousy Road to 1.5km west of Mississauga Road
- The widening of Mayfield Road will accommodate future growth in traffic demand and allow for connectivity with the surrounding road network needed for future development
- Region of Peel realizes that the widening of roads will not be enough to meet the projected future travel demand

Region-wide Evaluation Matrix*



*as outlined in the 2012 LRTP Update
http://www.peelregion.ca/planning/residents/transportation/long-range.htm

Region of Peel
Working for you

7 Problem/Opportunity Statement

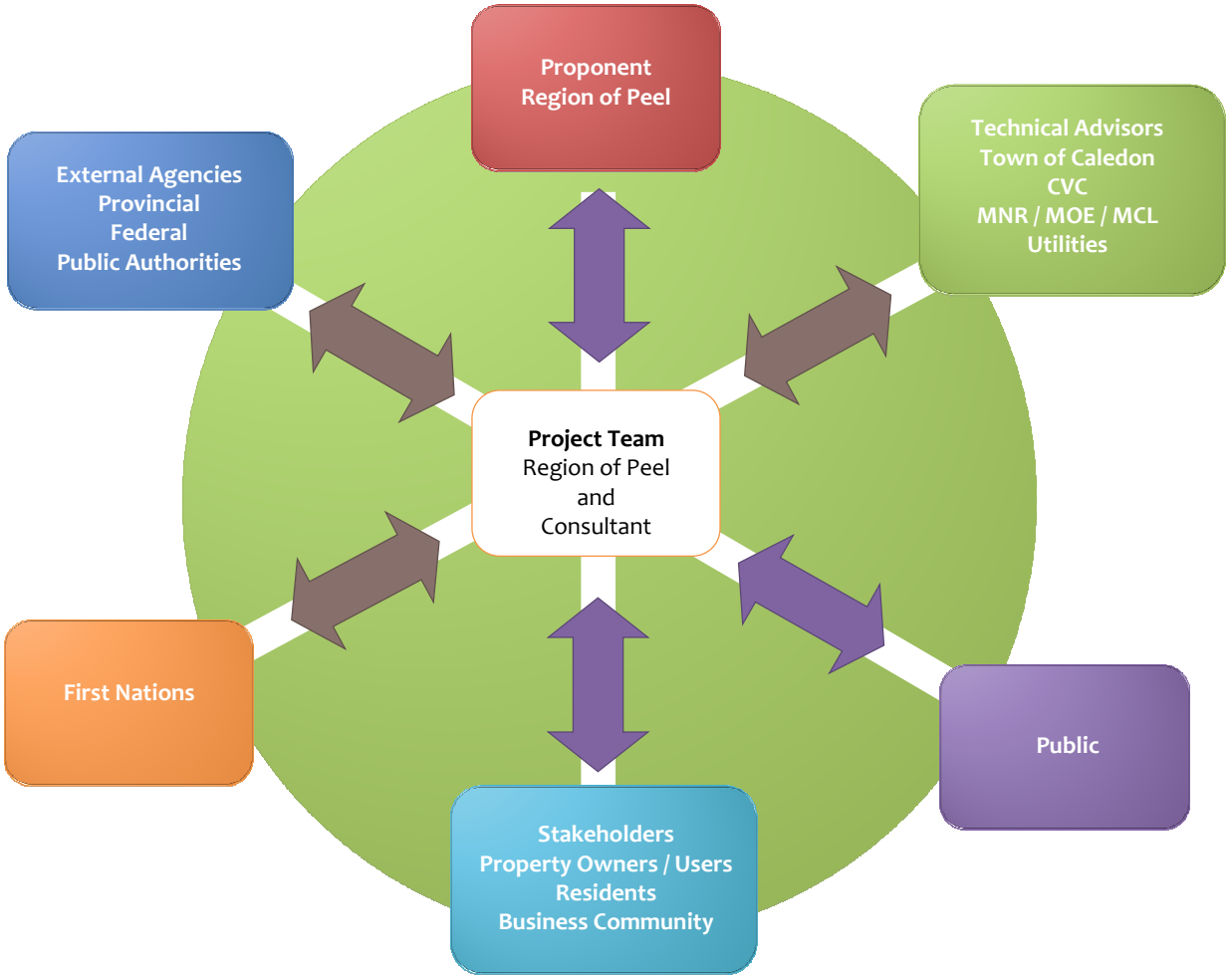
Improvements are needed along the Mayfield Road study area to address/accommodate:

1. Existing and future traffic demands
2. Pedestrian and cyclist movements through the study area
3. Access control
4. Goods movement

8 Study Objectives and Organization

Study Objectives

- Identify problems and opportunities
- Develop planning alternative solutions and a preferred solution
- Develop and evaluate design concepts for the preferred solution
- Complete a functional design for the preferred concept
- Prepare a formal Environmental Study Report (ESR) documenting the study findings and recommendations



Region of Peel
Working for you

9 Supporting Studies

The following supporting studies are being completed:

- Transportation and Traffic
- Natural Environmental Assessment (including Vegetation Assessment)
- Drainage and Stormwater Management
- Existing Natural Environment
- Geotechnical Investigation and Pavement Design
- Archaeological and Cultural and Built Heritage Assessments
- Contaminated Soil Screening
- Noise Study
- Air Quality

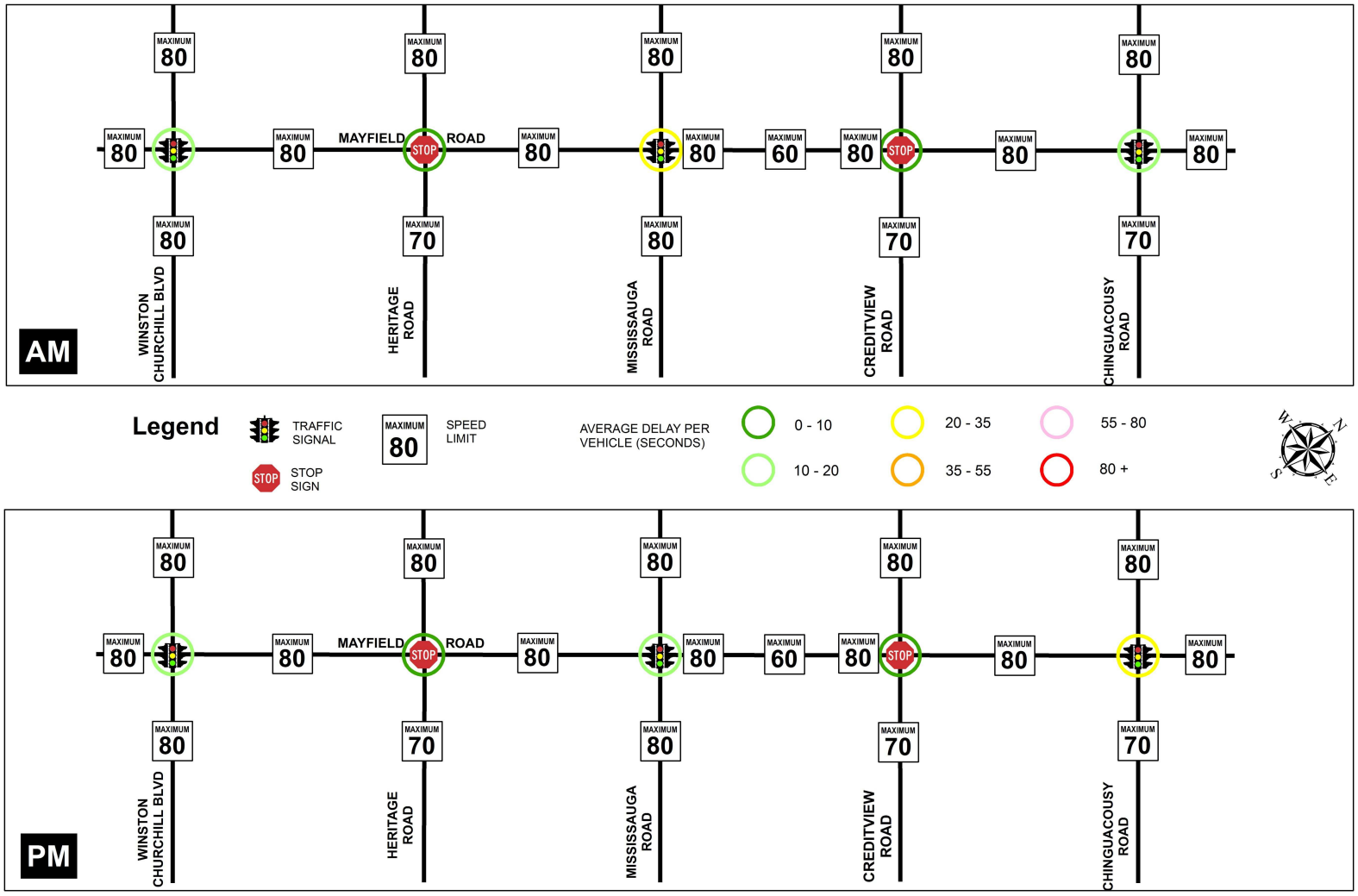
10 Transportation & Traffic Study Overview

The Transportation and Traffic study builds on the analysis and findings of the LRTP

- The purpose of the study is to:
  - Confirm timing for future improvements along the corridor
  - Define specific intersection design improvements (e.g. turn lanes, tapers)
  - Identify opportunities to improve:
    - Active transportation
    - Transit
    - promote Transportation Demand Management measures
- Traffic analysis assumed:
  - Both background (elsewhere in Peel Region and GTHA) and new development growth (due to Mount Pleasant Block Plans 51-1 and 51-2)
  - Development of Heritage Heights and GTA West are not included

11 Transportation and Traffic Study

2013 Existing Conditions



Region of Peel
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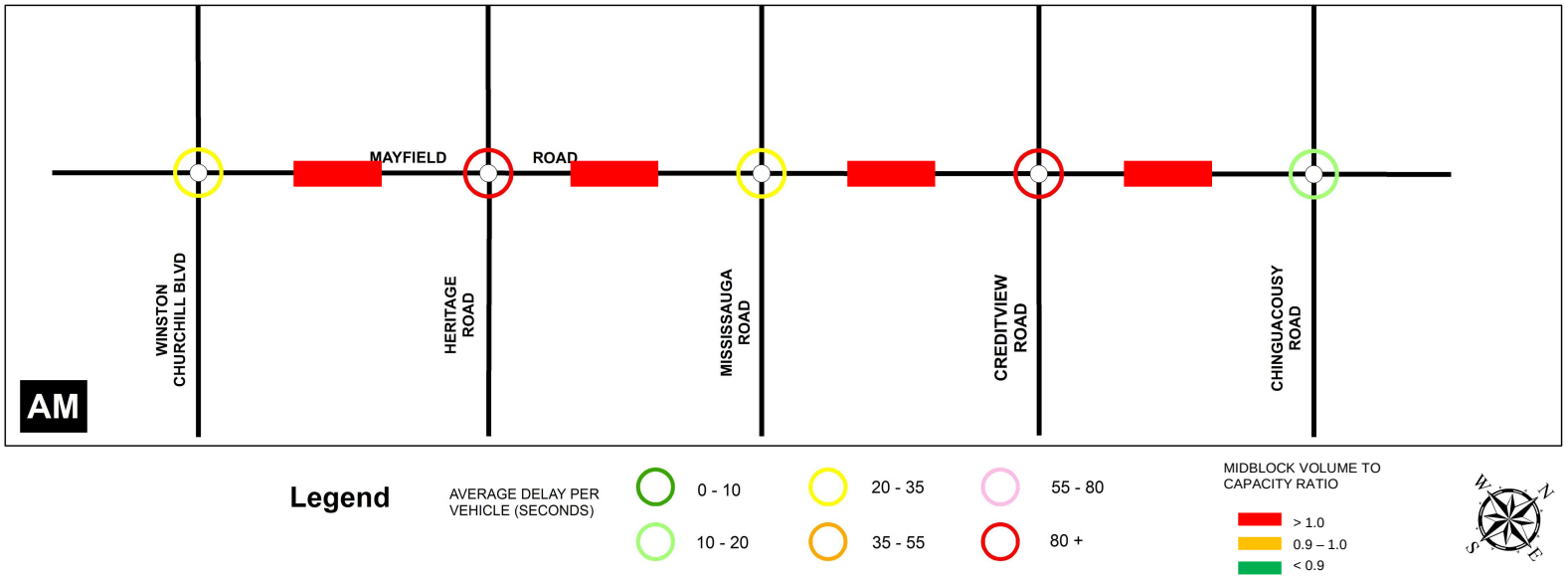
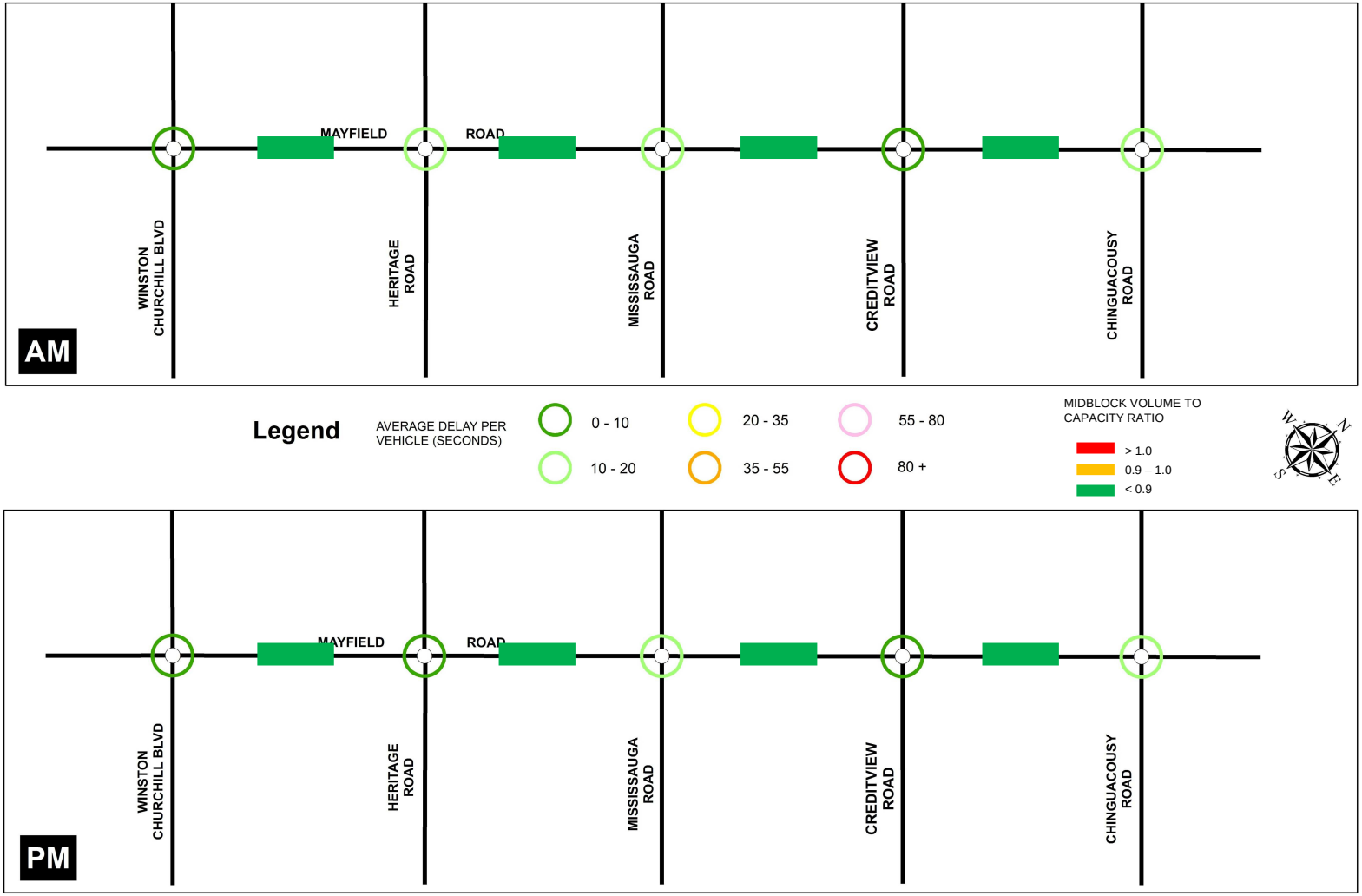
Transportation and Traffic Study

2021 Without Improvements to Mayfield Road



13 Transportation and Traffic Study

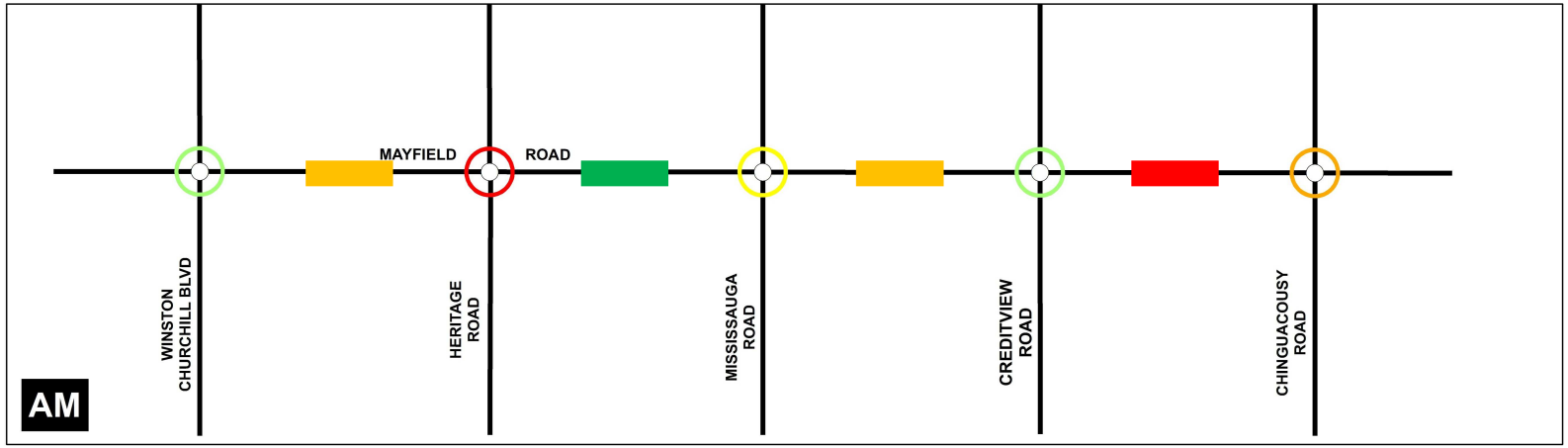
2021 With Widening of Mayfield Road to 4 Lanes and Other Planned Road Improvements

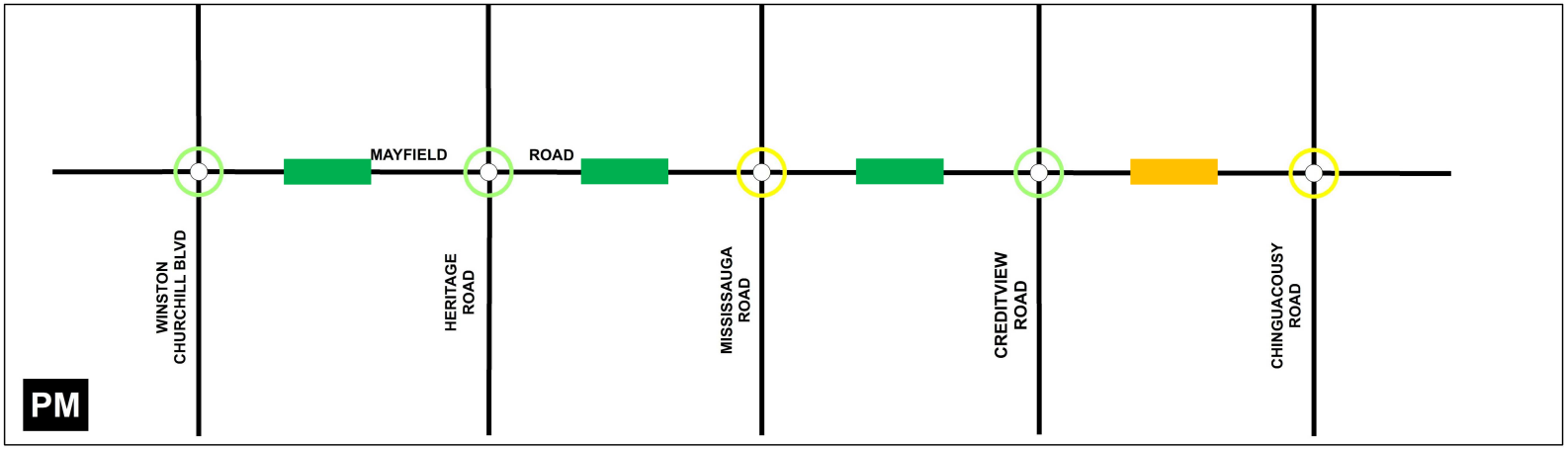


Region of Peel
Working for you

14 Transportation and Traffic Study

2031 With Widening of Mayfield Road to 4 Lanes (and Other 2021 Planned Road Improvements), But Without 6 Lanes





Legend

AVERAGE DELAY PER VEHICLE (SECONDS)

- 0 - 10
- 10 - 20
- 20 - 35
- 35 - 55
- 55 - 80
- 80 +

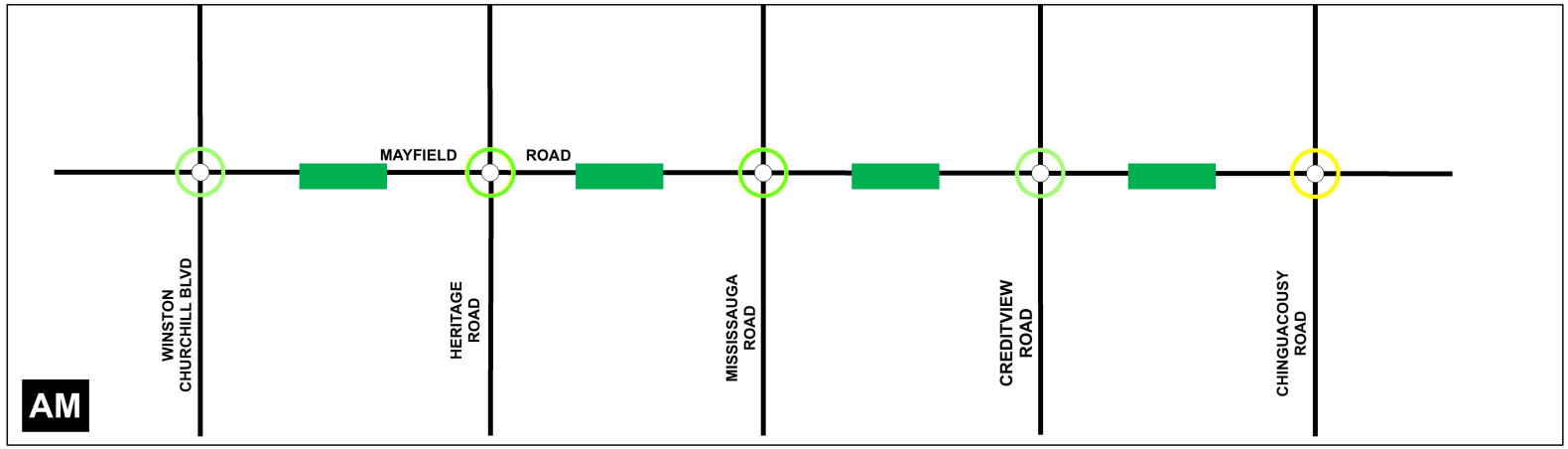
MIDBLOCK VOLUME TO CAPACITY RATIO

- > 1.0
- 0.9 – 1.0
- < 0.9

Region of Peel
Working for you

15 Transportation and Traffic Study

2031 With Widening of Mayfield Road to 6 Lanes



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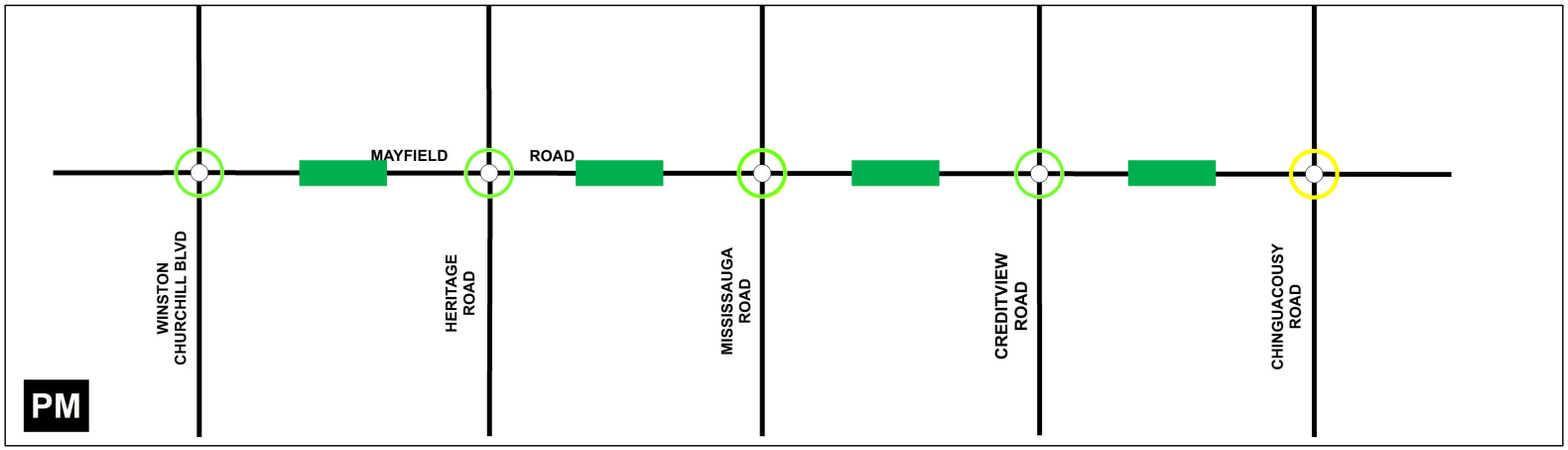

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Transportation and Traffic Study

Scenario Analysis Highlights

	2021	2031
Without improvements to Mayfield Road	• Over capacity conditions midblock and unacceptable delays for at least one turning movement at each intersection	• Over capacity conditions for most midblock sections and unacceptable delays for at least one turning movement at most intersections
With improvements to Mayfield Road	• Widening to 4 lanes and adding intersection turn lanes and traffic signals (roundabouts) will provide acceptable average delays • Only one left turn movement (WB lefts at Heritage Road) will operate at capacity	• Widening to 6 lanes will provide acceptable average delays • A few left turn movements will operate at capacity

17 Transportation and Traffic Study
Preliminary Conclusions

- Traffic analysis supports:
  - widening of Mayfield Road to 4 Lanes from Chinguacousy Road to Winston Churchill Boulevard by 2021
  - widening of Mayfield Road to 6 Lanes from Chinguacousy Road to Creditview Road by 2031 with intersection improvements at Mississauga Road, Heritage Road and Winston Churchill Boulevard
- The 6 lane widening of Mayfield Road from Creditview Road to GTA West will provide connected routes and accommodate planned growth
- Proposed multi-use trail on the south side of Mayfield Road and sidewalk on the north side will improve opportunities for pedestrian and bicycle travel in the study area

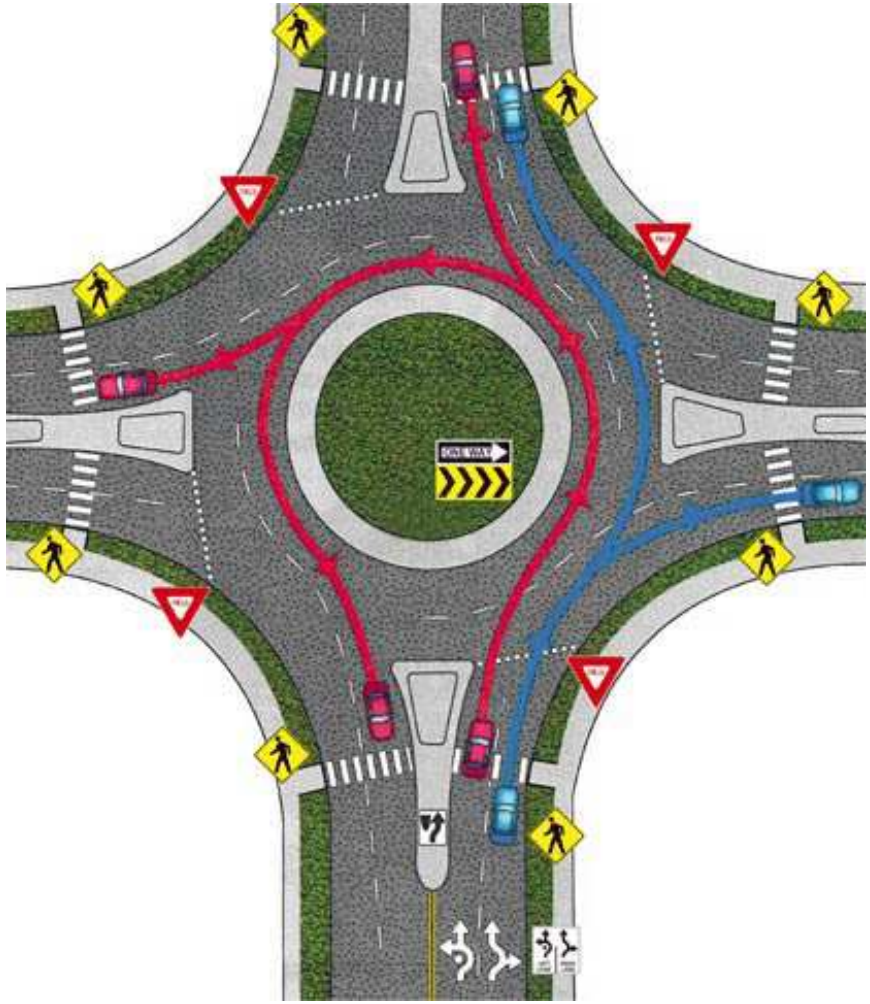
18 Transportation and Traffic Study
Roundabouts

Roundabouts are being considered at two locations in the study area:

1. Heritage Road and Mayfield Road

2. Winston Churchill Boulevard and Mayfield Road

The study will develop preliminary designs and assess capacity and delay for existing and future conditions.



19 Existing Natural Environment

- There are no identified Areas of Natural and Scientific Interest or Environmentally Sensitive Areas in the immediate study area
- Huttonville Creek and Fletcher's Creek subwatersheds traverses Mayfield Road
- The Regional and Local Official Plans indicate that the study area contains many headwaters that flow into the Credit River system

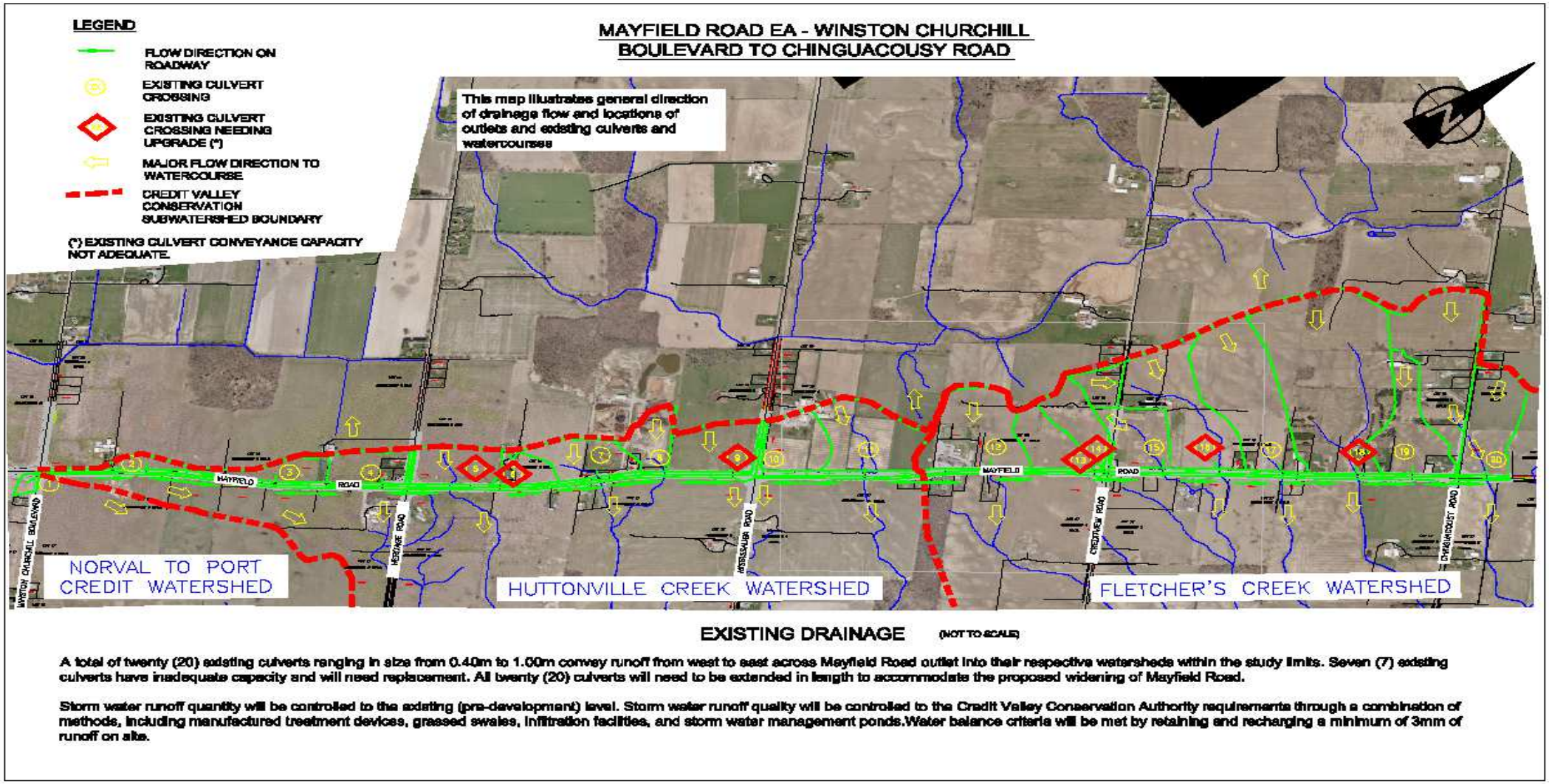
Huttonville Creek Tributary

Fletcher's Creek Tributary

20 Socio-Economic Assessment

The study area is dominated by agricultural land and/or undeveloped land with the exception of a small rural development

21 Drainage and Stormwater Management



EXISTING DRAINAGE (NOT TO SCALE)

A total of twenty (20) existing culverts ranging in size from 0.40m to 1.00m convey runoff from west to east across Mayfield Road outlet into their respective watersheds within the study limits. Seven (7) existing culverts have inadequate capacity and will need replacement. All twenty (20) culverts will need to be extended in length to accommodate the proposed widening of Mayfield Road.

Storm water runoff quantity will be controlled to the existing (pre-development) level. Storm water runoff quality will be controlled to the Credit Valley Conservation Authority requirements through a combination of methods, including manufactured treatment devices, grassed swales, infiltration facilities, and storm water management ponds.Water balance criteria will be met by retaining and recharging a minimum of 3mm of runoff on site.

22 Archaeology and Built Heritage

Archaeological Assessment

Stage 1 Archaeological Assessment determined there are many areas that have not been previously disturbed and require a Stage 2 Archaeological Assessment

Built Heritage Assessment

17 Cultural Heritage Resources

- 4 roadscapes*
- 11 farm complexes*
- 1 church
- 1 house

12017 Creditview Road

Home United Church

*Roadscapes = 2-lanes in width with the absence of shoulders or narrow shoulder only, ditches, tree lines, bridges culverts
*Farm Complexes = 2 or more buildings one of which must be a farmhouse or barn

23 Preliminary Evaluation Criteria

Criteria	Evaluate
Traffic Operations and Safety	How well do the alternatives manage motor vehicle, cycling and pedestrian traffic in a safe manner?
Natural Environment	What impacts do the alternatives have on natural environment features such as vegetation, wildlife and drainage?
Socio-Cultural Environment	What impacts do the alternatives have on existing established communities and businesses, property, noise, air/vibration, potential archaeological resources, built heritage features and visual character?
Economic Environment	What is comparative cost to construct each alternative, including utility location, capital, property, maintenance and operating costs?
How the Alternative Complies / Supports Regional and Municipal Official Plans and Policies	Active Transportation Plan
	Goods Movement Strategic Network
	Road Characterization Study
	Region of Peel's Long Range Transportation Plan and other municipal transportation plans

24 Design Considerations

- Home United Church
- Alloa Public School
- Hydro One Networks
- Roundabouts
- Enhanced Streetscaping/ Landscaping
- Addition of multi-use trails to implement the Region of Peel's Active Transportation Plan recommendation

Home United Church

Alloa Public School

Winston Churchill Boulevard / Mayfield Road

Hydro One Networks Station

Heritage Road / Mayfield Road

Region of Peel
Working for you

25 Design Criteria

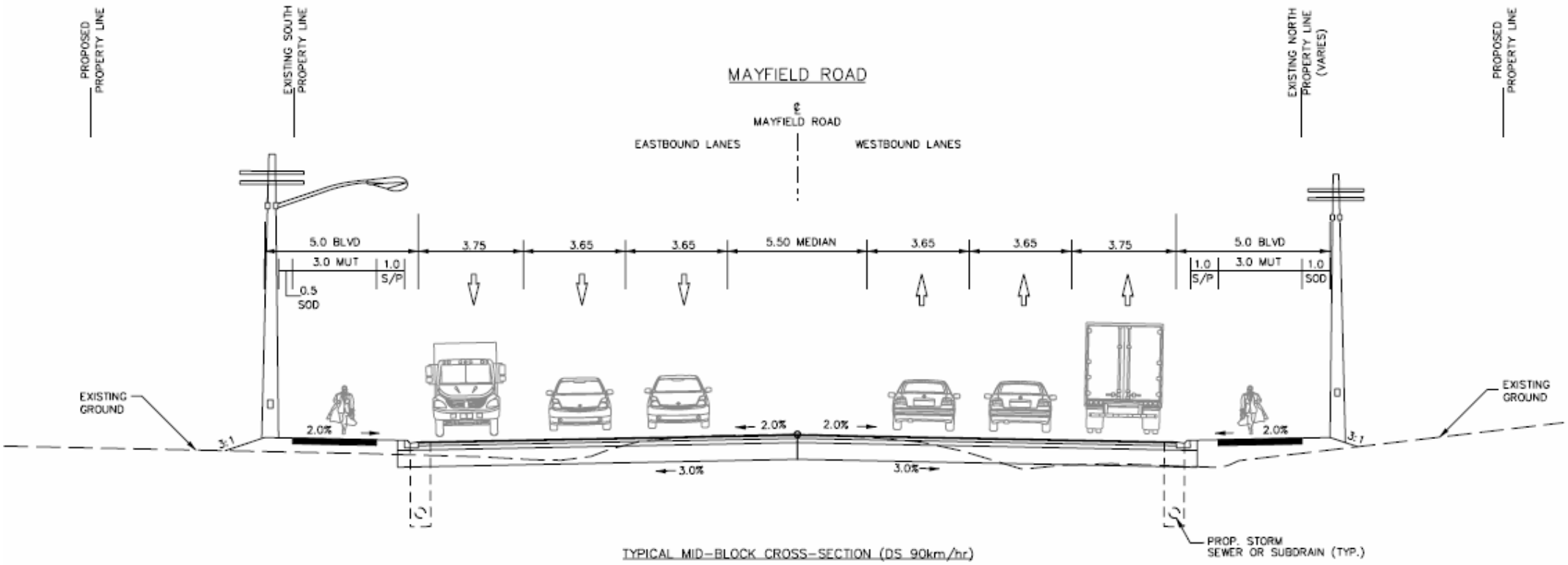
DESIGN PARAMETERS	PRESENT CONDITIONS	DESIGN STANDARDS		PROPOSED STANDARDS
		TAC	MTO	
Row Width	36m	20 - 45	N/A	50.5m (1)
Posted Speed	80km/hr	80 km/hr	80 km/hr	80km/hr
Design Speed (D.S.)	90km/hr	90 km/hr	90 km/hr	90km/hr
Minimum Stopping Sight Distance	N/A	130-170 m	160 m	160 m
Equivalent Minimum 'K' Factor for 90km/hr D.S.	N/A	30 – 40 Sag 32 – 53 Crest	40 Sag 50 Crest	40 Sag 50 Crest
Minimum Radius for 90km/hr D.S	N/A	380 m	N/A	380 m
Lane Width for 90km/hr D.S.	2 x 3.6 m	3.5 – 3.7 m	3.5 m	3.75m Curb Lanes, 3.65m Inside Lanes 3.5m Turn Lanes, 5.5m Median (2)
Superelevation	N/A	$e_{max=0.04}$	$e_{max=0.04}$	$e_{max=0.04}$
Boulevard Width	N/A	3.0 m	3.0m	5.5m Min.

NOTE:

(1) ROW width may be greater than 50.5m based on grading and design selected at the intersections.

(2) A four lane interim condition will be considered in advance of the ultimate six lane widening.

26 Preliminary Typical Cross-Sections



TYPICAL MID-BLOCK CROSS-SECTION (DS 90km/hr)

Region of Peel
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27 Utility Relocations

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Next Steps

- Receive public comments by Friday, December 13, 2013
- Review and confirm preferred planning alternatives and assessment in light of comments received from the public and agencies to date and confirm / modify design
- Complete supporting studies
- Develop alternative design concepts
- Complete detailed impact analysis
- Develop proposals for mitigation of negative effects
- PIC #2 – Fall 2014

29 Timeline

PROJECT COMMENCEMENT

MAR 2013

APR 2013

PROBLEM OR OPPORTUNITY

NOV 2013

ALTERNATIVE PLANNING SOLUTIONS

PUBLIC INFORMATION CENTRE NO. 1

OCT 2014

PUBLIC INFORMATION CENTRE NO. 2

ALTERNATIVE DESIGNS AND RECOMMEDED SOLUTION

JAN 2015

REGION OF PEEL

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT STUDY

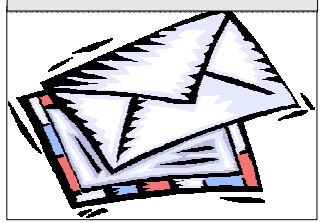
MAYFIELD ROAD IMPROVEMENTS FROM CRINGUACOUSY ROAD TO WINSTON CHURCHILL BOULEVARD

ENVIRONMENTAL STUDY REPORT

DRAFT ENVIRONMENTAL STUDY REPORT

MAY 2015

NOTICE OF COMPLETION



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30 What happens next?

How can you provide comments on the project?

Please fill out the comment sheet today or send comments by email/fax/letter to **Neal Smith** by **Friday, December 13, 2013.**

You can view tonight's information boards again on our website:

http://www.peelregion.ca/pw/transportation/environ-assess/mayfield-road-ea-2.htm

Neal Smith, C.E.T.
Project Manager
Regional Municipality of Peel
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, Ontario L6T 4B9
Phone: 905-791-78100 ext. 7866
Toll Free: 1-800-919-7800
Fax: 905-791-1442
Email: neal.smith@peelregion.ca

Thank you for your participation

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Public Information Centre No. 2

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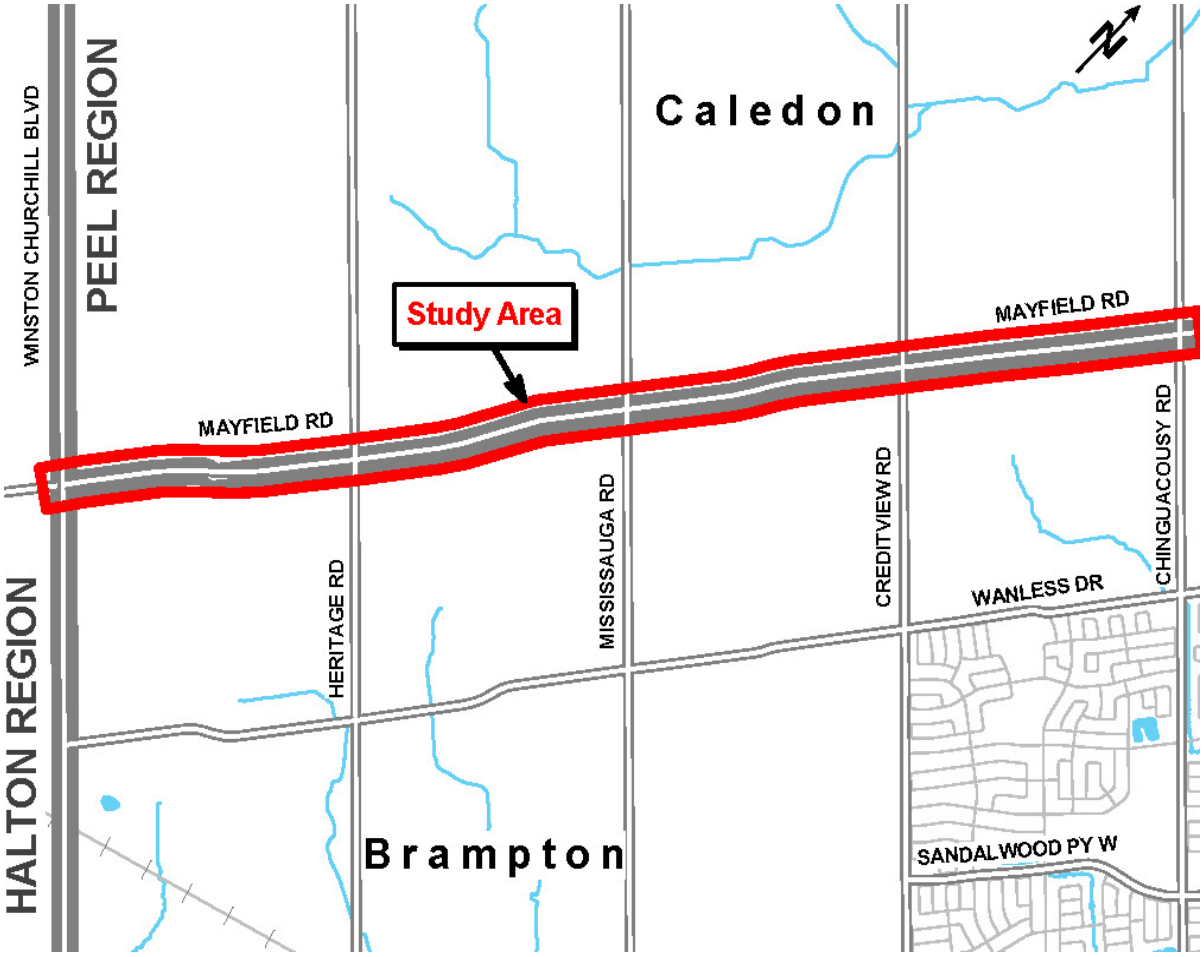
Welcome

Public Information Centre No. 2

MAYFIELD ROAD CLASS ENVIRONMENTAL ASSESSMENT

from Chinguacousy Road to Winston Churchill Boulevard
Brampton, Caledon, Halton



Held at the
Peel Regional Police Association Banquet Hall
10675 Mississauga Road, Brampton
on
Thursday October 8, 2015

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The purpose of Public Information Centre No. 1 was to introduce the study area, discuss the problems and opportunities and present a preliminary recommended planning alternative.

The purpose of Public Information Centre No. 2 is to:

1. explain how the Municipal Class EA process works
2. review what has taken place so far and confirm the recommended planning alternative from PIC No. 1
3. present a summary of technical studies completed
4. present the alternative designs and evaluation process used to select a preliminary recommended design
5. discuss the potential environmental impacts and the ways to reduce the impacts of the recommended design
6. ask for input and comments on the preliminary recommended design and show what will happen next

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How the Municipal Class EA process works

The Municipal Class EA process provides a framework for municipalities to plan, design, and construct municipal infrastructure projects. This project is following the Municipal Class EA Schedule C process which is the most comprehensive.

Phases 1 to 4

1. • Problem/Opportunity
2. • Alternative Planning Solutions

Phases 1 and 2 completed under the Region's Long Range Transportation Plan Study Update 2012

3. • Alternative Designs

We are here

4. • Environmental Study Report

30-day public review following Notice of Completion

Phase 5

Implementation – Detailed Design and Construction

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What has taken place so far?

Confirmation of the preferred planning solution for the study area as recommended in the Region's Long Range Transportation Plan 2012 Update:

- widen Mayfield Road from 2 to 6 lanes from Chinguacousy Road to Heritage Road
- widen Mayfield Road from 2 to 4 lanes from Heritage Road to Winston Churchill Boulevard
- Transportation Demand Management options for the
- corridor (i.e. transit, carpool walk/bike)

- Comments received following PIC No. 1 were addressed
- Impact analysis of alternative designs and recommended mitigation
- Development of alternative design concepts for the preferred planning solution

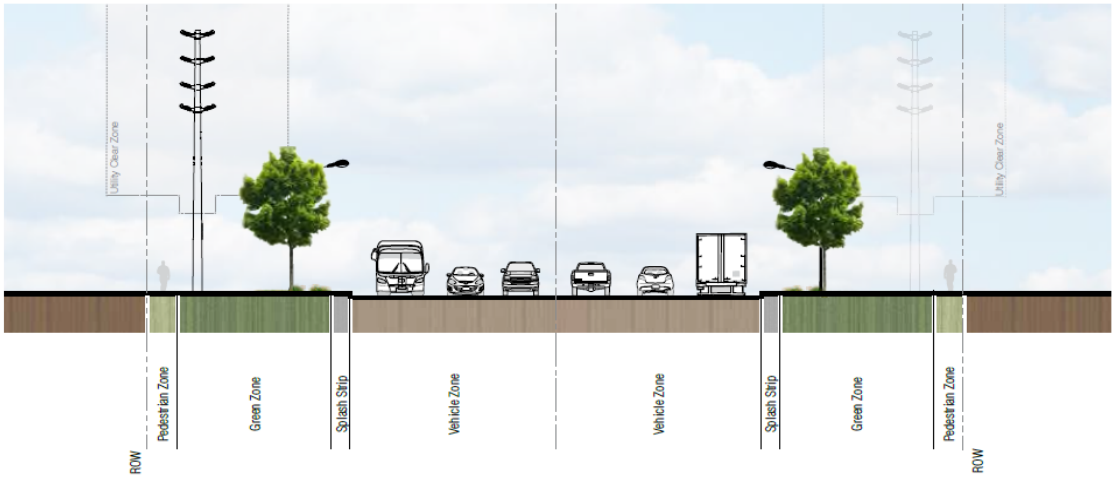
Study reports completed:

- Traffic
- Natural Environment – terrestrial and aquatic
- Archaeology and Cultural Heritage
- Structural Assessment
- Stormwater and Drainage
- Air Quality
- Contaminated Site Screening
- Geotechnical and Pavement
- Noise

Industrial Connector and Goods Movement corridor

Industrial Connector

45 metre ROW – Existing Conditions



Zone Dimensions

Vehicle Zone (Lane Width)	Pedestrian Zone	Green Zone	Splash Strip
3.7 metres	1.5 metre min	8.0 metre min	1.0 metre

The Region's Road Characterization Study has identified Mayfield Road's character as industrial connector in the study area. The study can be accessed at the following link:

http://www.peelregion.ca/pw/transportation/business/rcs-may2013.htm

Mayfield Road is a Primary Truck Route designed to handle significant truck volumes and function as a key mobility corridor. There is an anticipated future connection with the GTA West highway. The current truck percentage on this section of Mayfield Road is 15 percent.

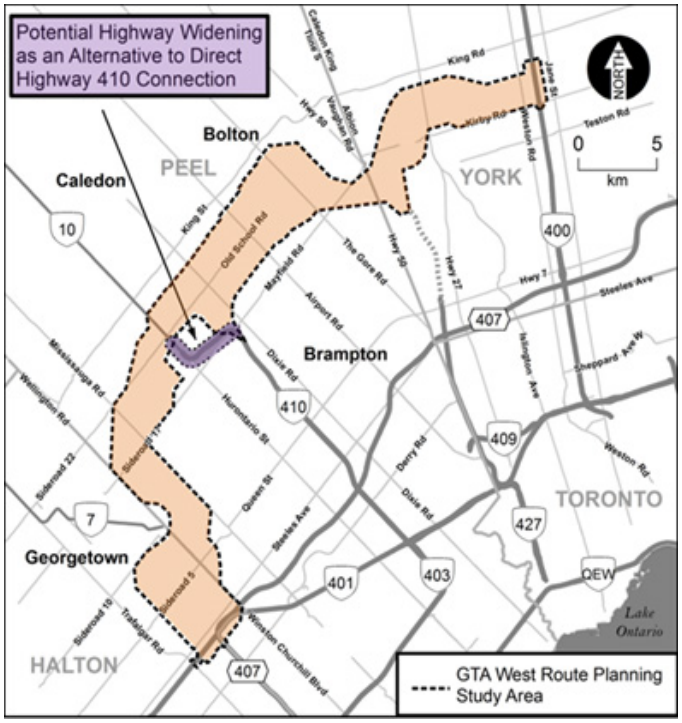
Planning & Development Context

GTA West Corridor

Once the corridor and interchange locations are finalized through the Ministry of Transportation Planning and Environmental Assessment Study for the GTA West corridor, the Mayfield Road proposed interchange location will be examined in further detail by the Ministry. Further information on the GTA West can be found at:

http://www.gta-west.com

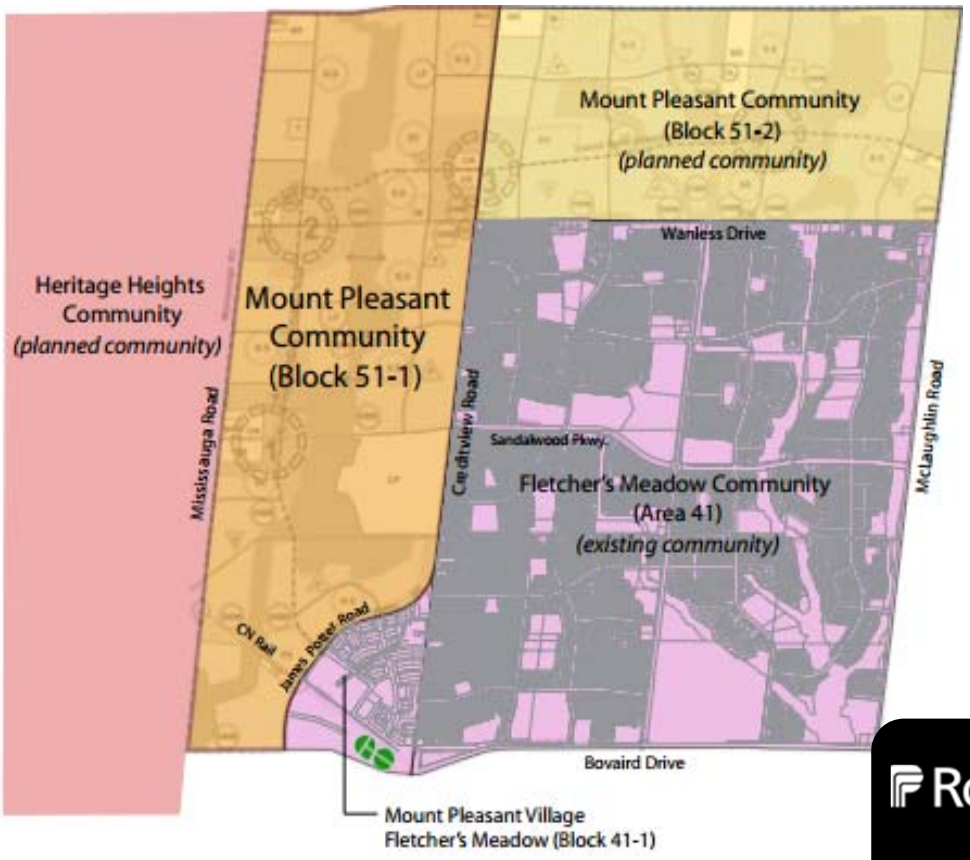
GTA West study map



Land Development Planning

Land development applications within the Mount Pleasant and Heritage Heights development areas are under review at the City of Brampton.

Mayfield Road



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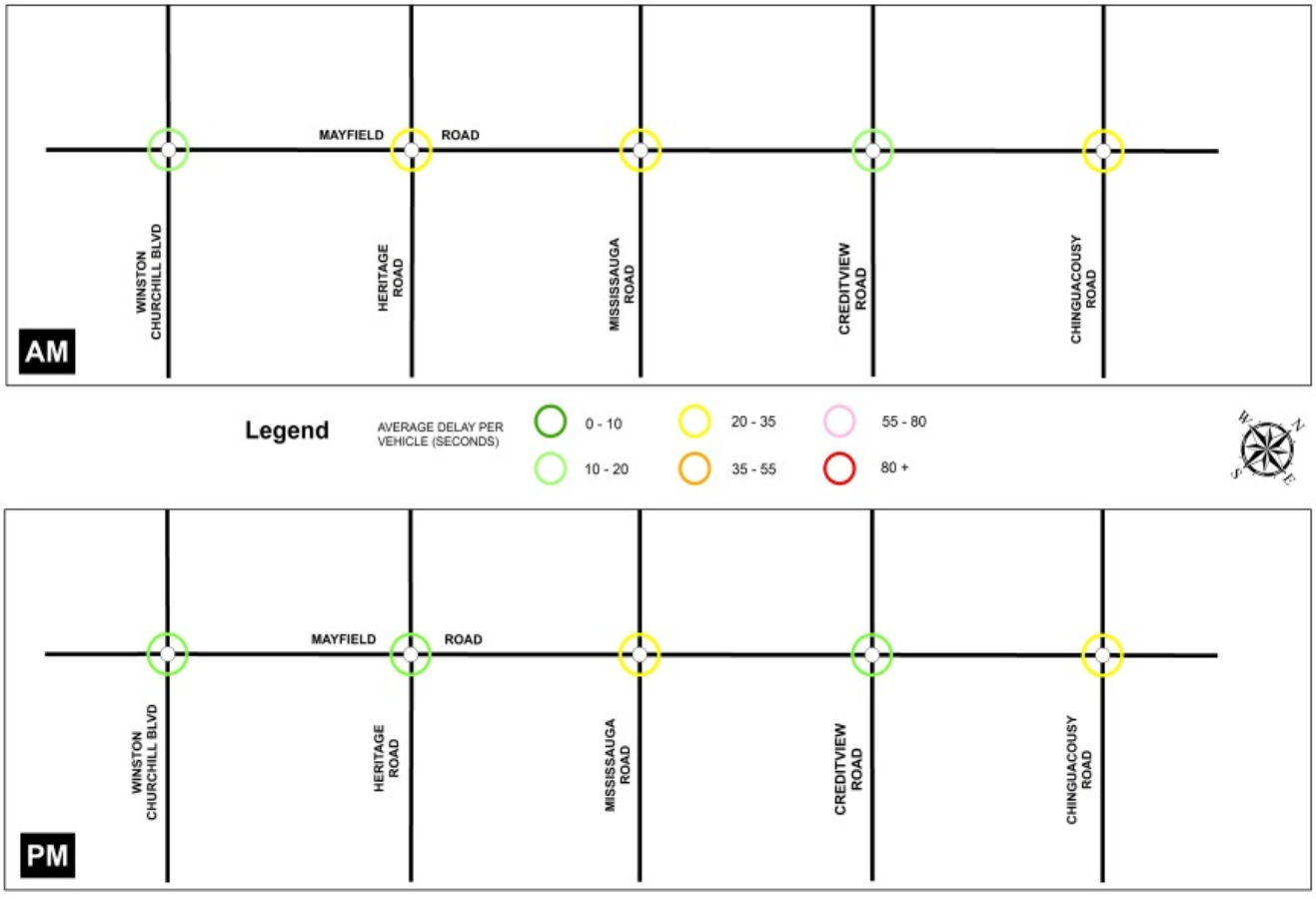
1 update on Technical Reports

Traffic

The traffic report looked at traffic delay at both the current signalized and unsignalized intersections for 2021 and 2031. The report shows that without improvements, Mayfield Road will experience increasing levels of delay. With improvements, traffic delays will be minimal as illustrated below for the ultimate 2031 scenario:

The 2031 a.m. and p.m. traffic modelling shows there will be **improved traffic flow.**



Roundabout Feasibility

Roundabout feasibility was screened for all intersections along Mayfield and 3 intersections were identified as possible roundabout locations: Heritage Road

Proposed Sandalwood Parkway Extension (City of Brampton Road)

Winston Churchill Boulevard

Capacity and operational analysis will be further reviewed during detailed design as more planning information becomes available (i.e. location of the GTA West and status of development applications).

The environmental assessment will protect for both signals and roundabouts. The final selection of the preferred option will be made during the detailed design process.

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2 Update on Technical Reports

Natural Environment

Aquatic Features

- The study area is located entirely within the jurisdiction of Credit Valley Conservation, within the subwatersheds of Fletcher's Creek in the east and Huttonville Creek in the west. The headwaters of both of these subwatersheds area located along the study area at Mayfield Road.

Terrestrial Features

- No woodlands have been identified.
- Several small wetlands may be required to be removed.
- 243 trees were documented within 20m of either side of Mayfield Road and rated from poor to good.

Evaluation of Species at Risk

- There are no endangered tree species within the study area.
- Two grassland bird species, Bobolink and Meadowlark are listed as Endangered, and the Barn Swallow is listed as Threatened under the Endangered Species Act. Though they have the potential to live within the study area, no suitable habitat has been identified.

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3 Update on Technical Reports

Archaeological and Built Heritage Resources

- The Stage 1 Archaeological Assessment has been completed.
- Sections of Mayfield Road including the frontage of the Alloa Home United Church retain archaeological potential and will be assessed in the Stage 2 Archaeological Assessment to be conducted in the fall.

- The Built and Cultural Heritage Report recommends a Heritage Impact Statement for both the Alloa Home Church and the Farmscape at the southwest corner of Heritage Road and Mayfield Road (419 Mayfield Rd)
- Tree protection zones are recommended for all cultural heritage resources where tree removals are planned due to the recommended widening.

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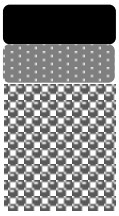
4 Update on Technical Reports

Geotechnical & Pavement Design

- The proposed pavement structure for new pavement is:

Corridor Pavement Profile



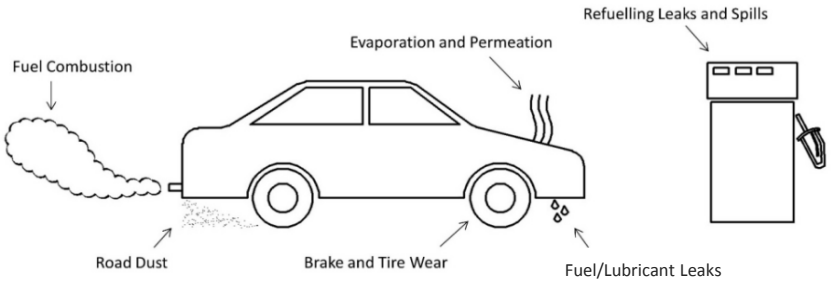
Hot Mix Asphalt 160mm (170mm for roundabout)

Granular A Base 150mm

Granular B Sub-base 500mm

Air Quality

Motor Vehicle Emission Sources



All contaminants were assessed and found to be below Ministry of the Environment and Climate Change guidelines except for the following:

- Coarse Particulate Matter (PM10) and Total Suspended Particulate Matter (TSP) are above Ministry guidelines; however they will exceed the guidelines less than 1% of the time over the 5 years following widening.
- Mitigation measures are not warranted due to the small number of additional days which are expected to exceed the guideline.

Noise

The noise study reviewed noise levels for the future widening conditions at 6 receptor locations along the corridor:

- Noise walls are not warranted for any existing sites except for one receptor location which is expected to exceed the threshold limit in 2031. However since the threshold will be exceeded whether or not widening takes place, mitigation is not recommended.

Contaminated Site Screening

Soil contamination within the study area can occur in 3 ways:

- from property acquired for the road widening that is already contaminated
- spills along the existing right-of-way
- movement of contaminants into the existing right-of-way from adjacent properties

If areas of contamination are identified, all Provincial practices will be followed .

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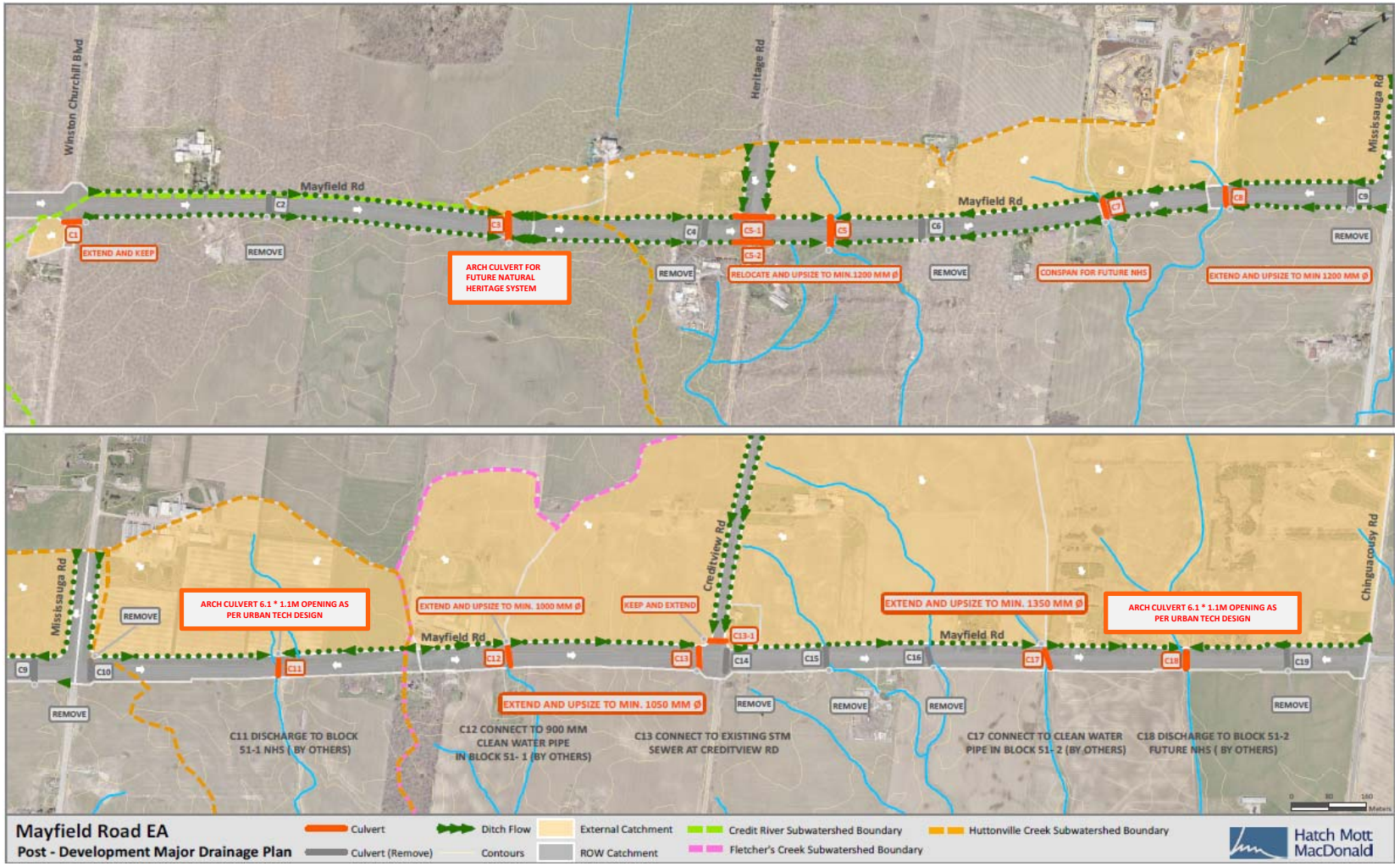
5a

Update on Technical Reports

Structural Assessment



Illustrated are the drainage areas and culvert/structure replacements for the major drainage area. Some existing culverts will be removed with their flows re-directed to the larger culverts, and the remaining will be upgraded in size and capacity.

Drainage for the minor system will be infiltrated using green infrastructure techniques (Low Impact Development known as LID) that are contained within the road right-of-way.

Region of Peel
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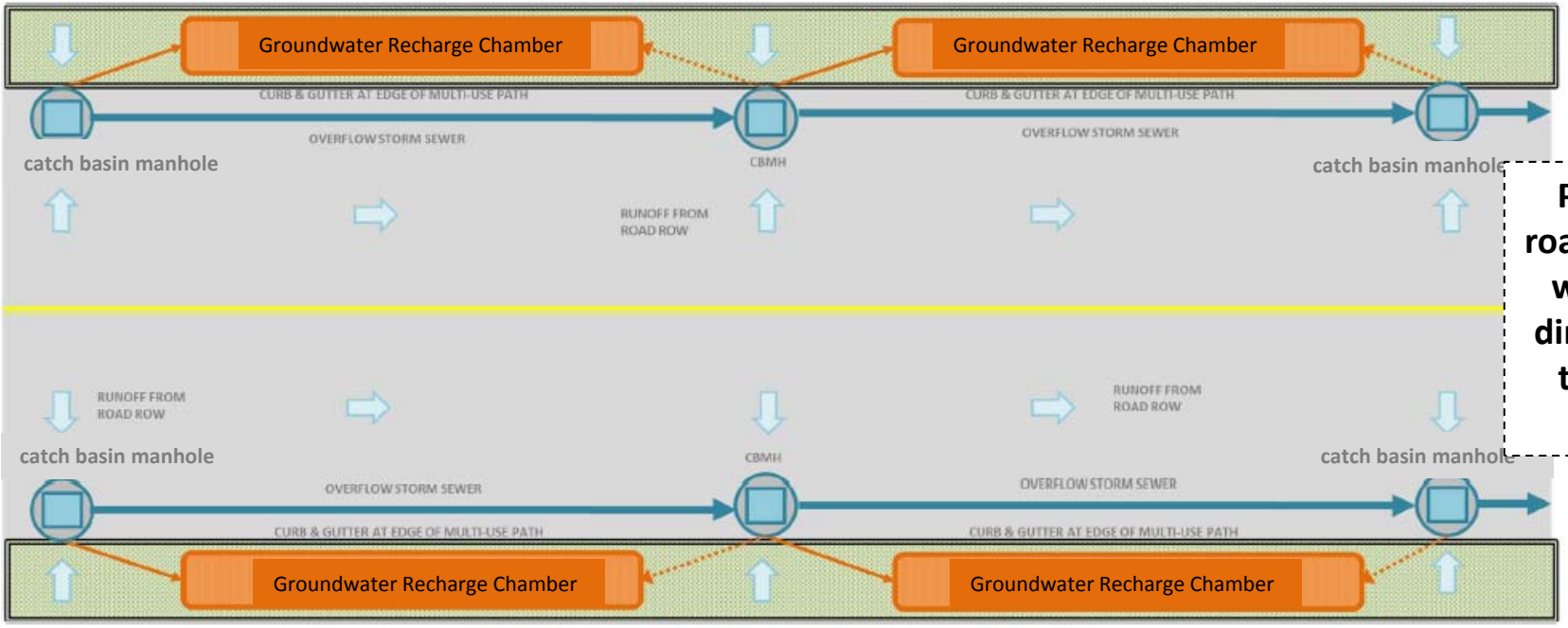
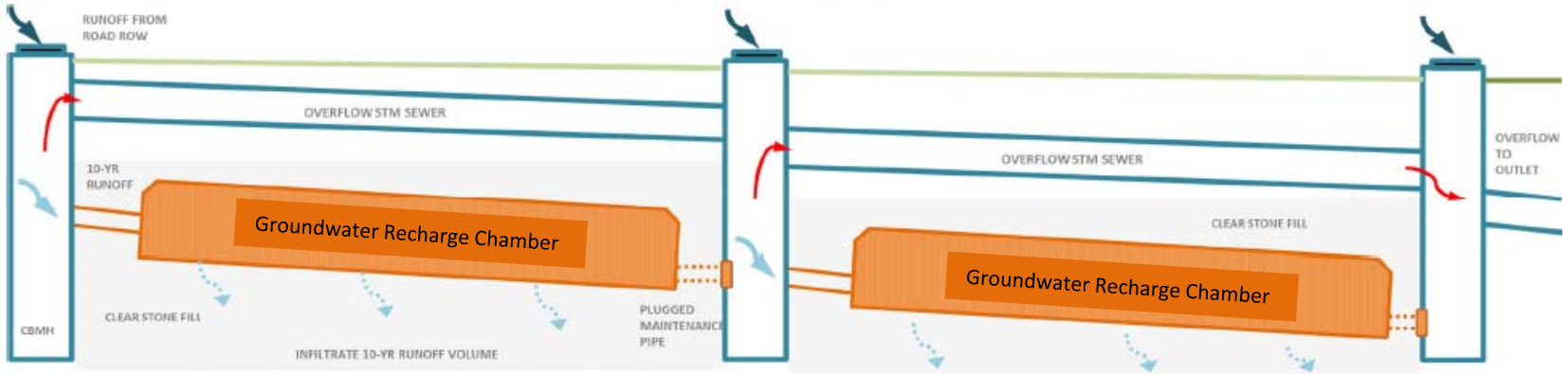
5b

Update on Technical Reports

Stormwater & Drainage for the Ultimate Road Design



PLAN VIEW – ROAD ROW LID IMPLEMENTATION USING MULTI-USE TRAIL



PROFILE VIEW – SUB-SURFACE INFRASTRUCTURE

Plan view of road shows how water will be directed within the right-of-way.

Conceptual Low Impact Development (LID) Strategy design to capture minor storm events will be further explored in detailed design.

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6a Update on Technical Reports

Managing Stormwater

Water on the road from rain events or melting snow is managed through quantity controls and quality controls.

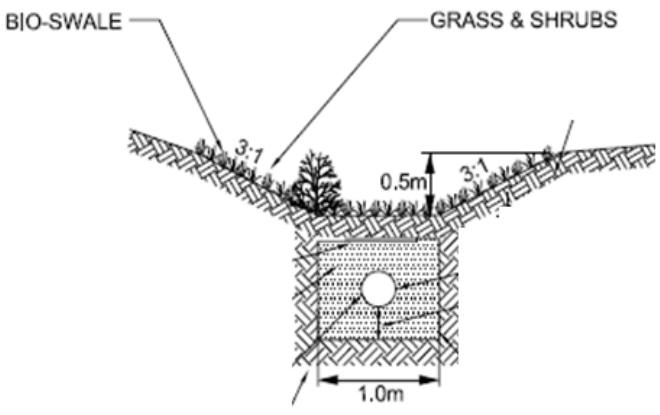
Quantity Control

Water volume is either conveyed through ditches or through stormwater systems.

- ditches are currently found on the north and south sides of Mayfield Road. If the road is widened, areas where ditches remain following widening will be improved to flat bottom infiltration ditches for better water quantity and quality .
- New storm sewer infrastructure for urban areas will convey water using curb and gutters and storm sewer pipes. Water is conveyed to culverts/receiving drainage systems.

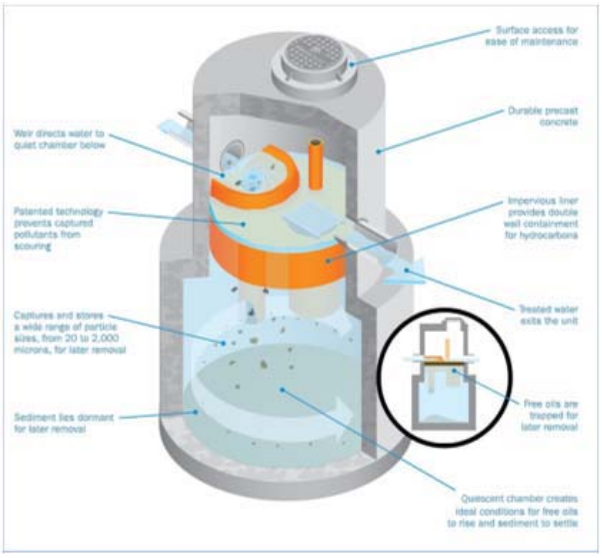
Quality Control

- use of enhanced flat bottom ditches
- oil/grit separators to treat storm water
- sediment and erosion control measures to protect water quality during construction



Enhanced flat bottom ditch

For use on the north side interim condition



Oil and grit separator

For use on the side ultimate condition

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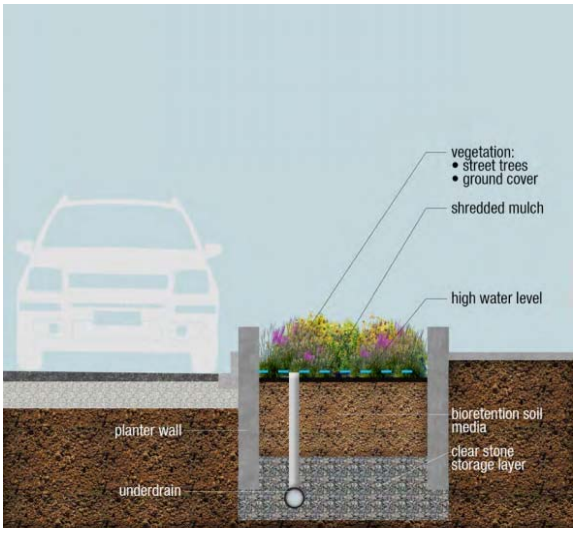
6b Update on Technical Reports

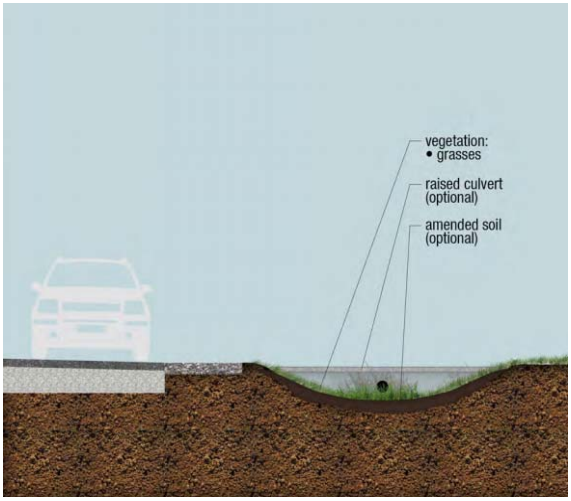
Improving Stormwater management through green infrastructure

The Region recommends using Low Impact Development (LID) practices to infiltrate minor rain events. LID options will be reviewed in the Detailed Design stage.

What is LID?

LID is a green infrastructure approach to stormwater management that uses simple cost-effective landscaped features and other techniques to filter, store, infiltrate and use rainfall where it falls.





LID options to be reviewed in the **detailed design stage** of the project may include:

- bioretention planters and boulevard units
- bioswales
- enhanced grass swale
- perforated pipe systems
- permeable pavement sidewalks and multi-use trails (MUT)
- prefabricated modules (i.e. soil support systems / silva cells, modular bioretention systems, etc.)
- infiltration facilities (i.e. trenches, galleries and soak-a-way pits)

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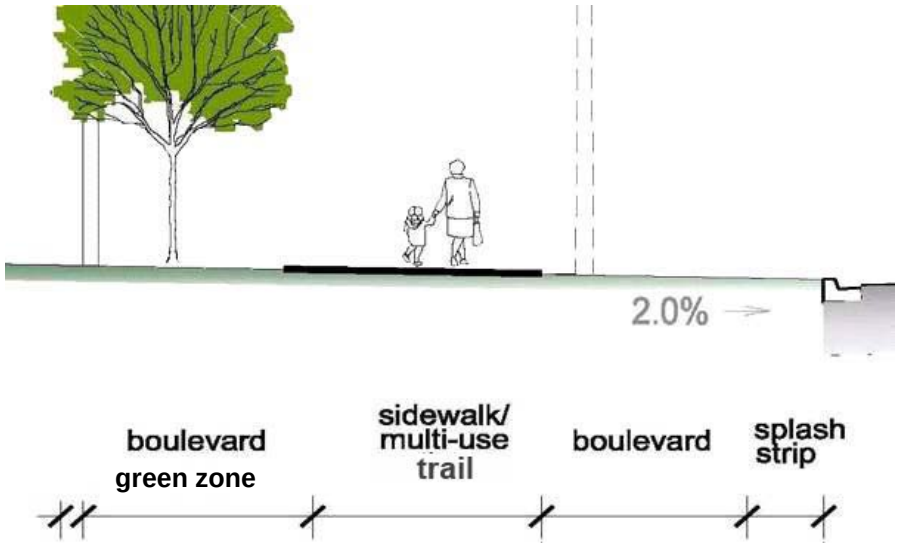
Active Transportation (AT)/Transportation Demand Management (TDM) initiatives

The Ontario Traffic Manual is the design guideline for active transportation facilities and the Ontario Cycling Strategy's vision is to make cycling a viable transportation mode. The Region's Active Transportation Plan recommends a multi-use trail on Mayfield Rd. For more information on the Region's AT program visit: http://www.peelregion.ca/planning/residents/transportation/active/



Bicycle detection systems and cross ride treatments will be evaluated in the detailed design stage.

Transportation Demand Management (TDM)

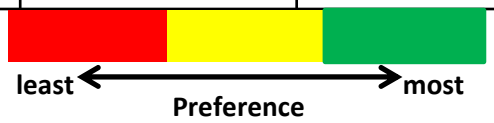
TDM is the application of strategies and measures to provide travel options and choices to reduce single occupant vehicle travel.

TDM will be part of the recommended solution for Mayfield Road through the construction of multi-use trails for walking and cycling, transit infrastructure along Mayfield Road and the use of **Smart Commute** tools to participate in carpooling

All alternatives were evaluated on their potential technical, natural environment, social/land use and cultural environment impacts as well as constructability and cost.

Design Alternatives Evaluation Matrix

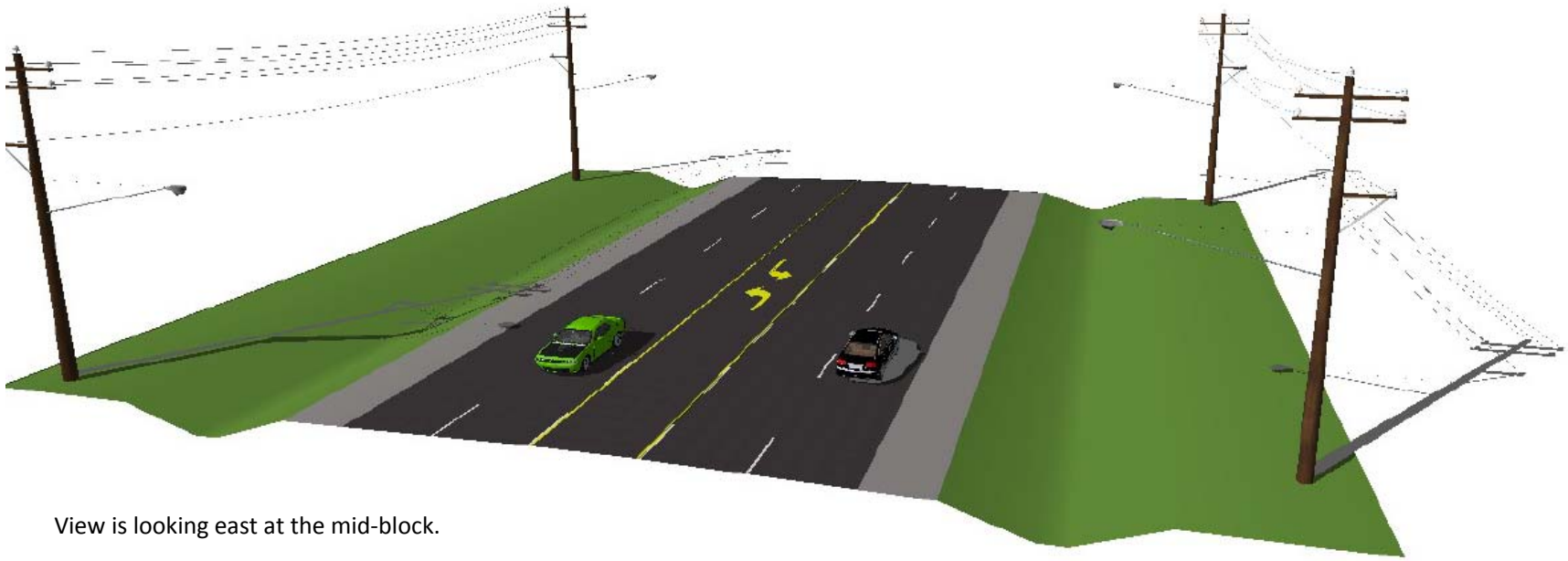
Category	Factors	Criteria	Alternative 1 Widen to the North	Alternative 2 Widen to the South	Alternative 3 Widen equally around the centerline	Alternative 4 A hybrid approach
Technical	Utility Impacts	Hydro/Bell poles impacted				
	Stormwater & Drainage	Impact to existing stormwater management and drainage facilities				
	Constructability	Ease of construction				
	Geometrics	Roadway geometrics are within acceptable design standards				
	Alternative Modes of Transportation (TDM)	Easily able to incorporate alternative modes of transportation into the design				
Natural Environment	Terrestrial	Impact to existing vegetation, wildlife, wildlife crossings, including proximity to Areas of Natural and Scientific Interest, Wetlands and habitats of Endangered or Threatened species				
	Aquatic	Impacts to valley lands, floodplains, watercourses, water bodies, crossings and fisheries (including impacts to hydrogeological features).				
Social, Land Use and Cultural Environment	Social Environment	Low potential for short-term construction related effects (e.g. noise, dust, etc.) on area residents				
	Land Use	Impacts to existing land uses Low potential for property taking				
	Proximity to Built-Up Areas	Impacts to existing built-up areas				
	Archaeology and Built Heritage	Impacts to existing archaeological or built heritage features				
Construction	Capital Costs	Low potential for capital costs				
	Property Costs	Low potential property acquisition costs				



The recommended alternative throughout the corridor is Alternative 4 – a hybrid approach which offers the most design flexibility and least property impacts.

4-lane Interim Cross Section

Mayfield Road west of Mississauga Road to Winston Churchill Boulevard to 2021 - preliminary recommended design

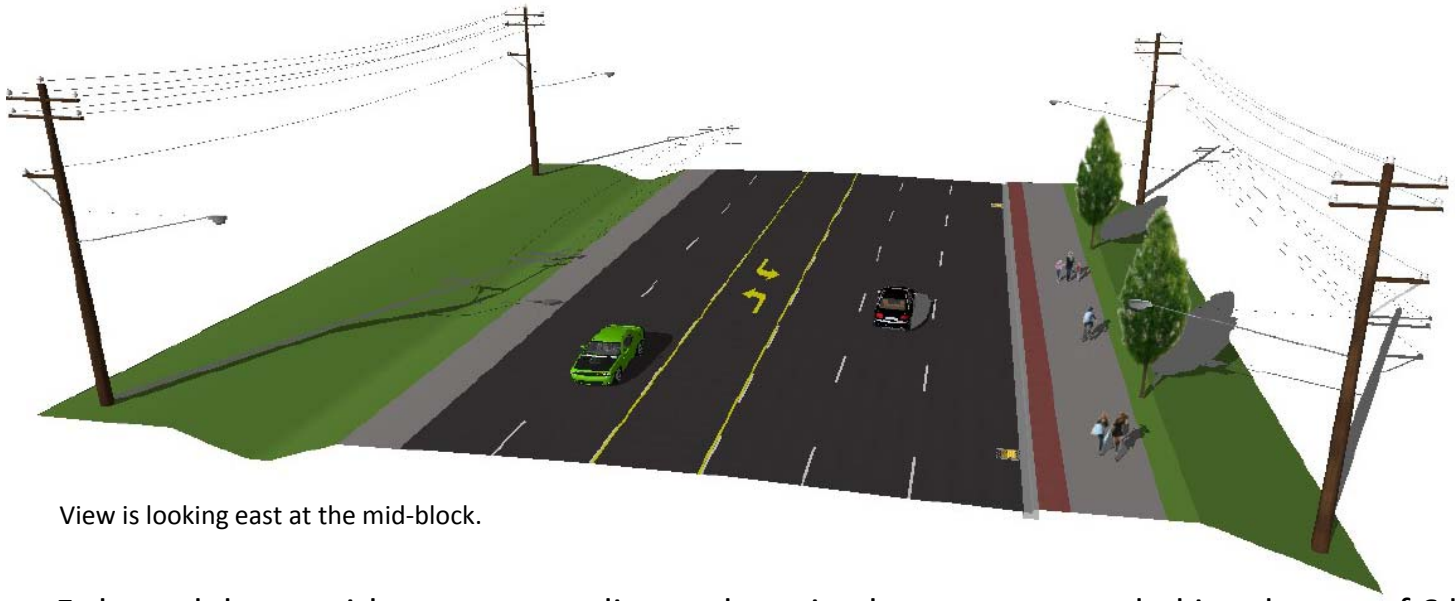


View is looking east at the mid-block.

-
- ditches on both sides of the road; rural cross section is maintained
- a paved shoulder for safe stopping of motor vehicles and for bicycle use on both sides of the road

5-lane Interim Cross section

Mayfield Road from Chinguacousy Road to just west of Mississauga Road to 2021 - preliminary recommended design

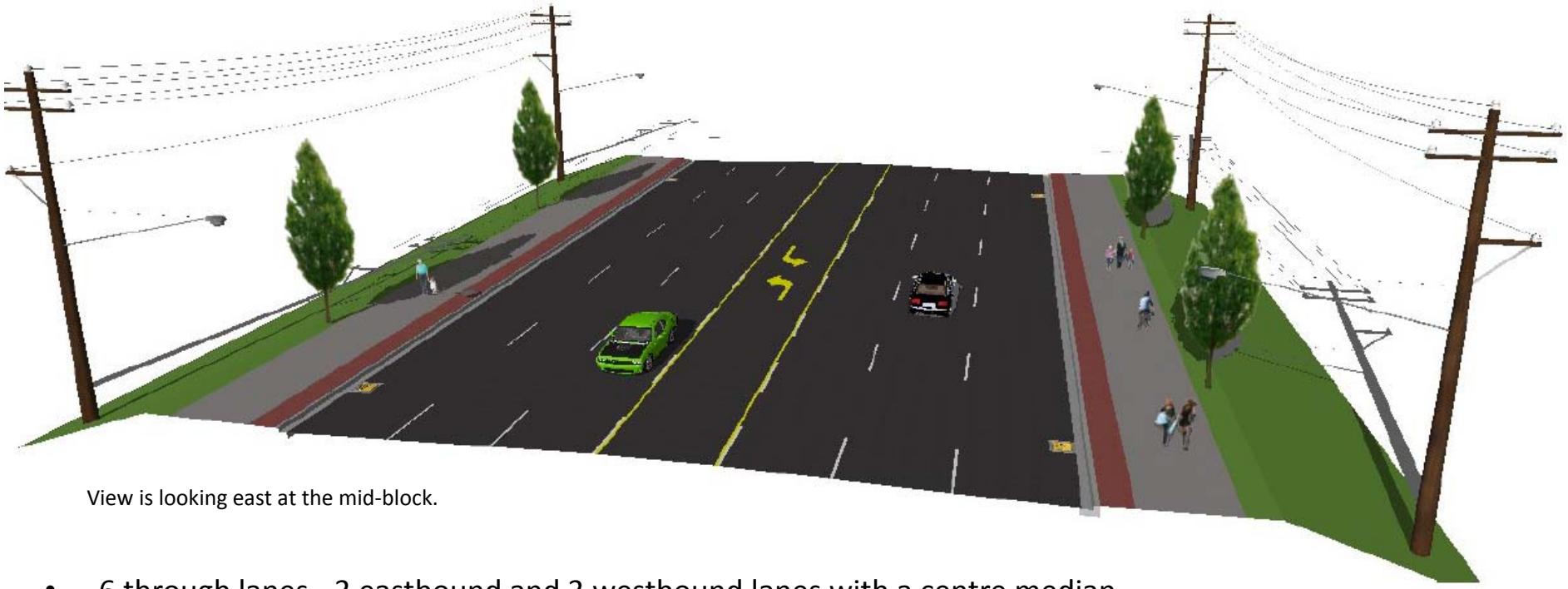


View is looking east at the mid-block.

- 5 through lanes with a centre median and turning lane recommended in advance of 6 lanes. The south side of Mayfield Rd will be developed first and placing the south-side lanes in the ultimate location will reduce future construction costs and disturbance
- 3 eastbound and 2 westbound lanes with a centre turning lane
- a ditch on the north side (rural cross section)
- a paved shoulder on the north side for safe stopping of motor vehicles and use of bicycles; and a multi-use trail on the south side for active transportation
- curb and gutter and storm sewers on the south side

6-lane Ultimate Cross Section

Mayfield Road from Chinguacousy to Heritage Road after 2031 - preliminary recommended design



View is looking east at the mid-block.

- 6 through lanes - 3 eastbound and 3 westbound lanes with a centre median
- curbs and gutters and storm sewers (urban cross section)
- multi-use trails on both sides of the road

Anticipated Construction Staging

Construction will be completed in stages and for ease of explanation, the corridor has been divided into 2 sections:

Section 1 – *Mayfield Road from Chinguacousy Road to just west of Mississauga Road*

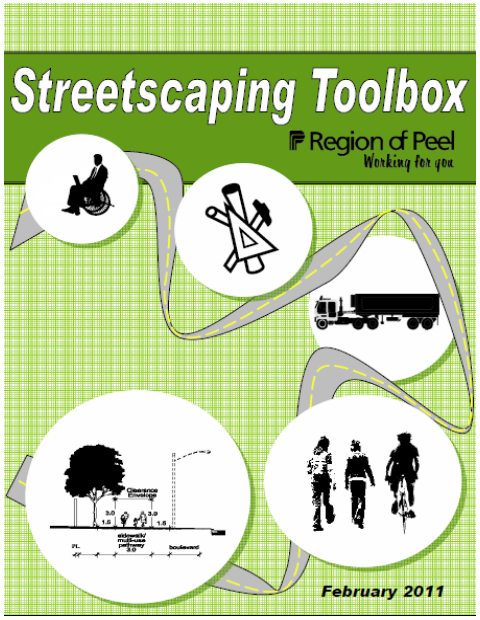
Section 2 – *Mayfield Road from just west of Mississauga Road to Winston Churchill Boulevard*

Project construction dates are tentative based on Council approval and project schedule.

	Section 1	Section 2
2017	Detailed design and utility relocates for both sections.	
2020	Construction starts for the 5–lane cross section – 3 lanes to the south and 2 lanes to the north with a centre turning lane for safe turning	
2021		Construction starts for the 4-lane cross section – 2 lanes on the south side and 2 lanes on the north side with a centre turning lane for safe turning
2031	Construction starts for the 6–lane cross section with a centre median	

COMMITMENTS

- **engineering**
- **access and safety**
- **environment**
- **active transportation (AT)/TDM**
- **social/economic/cultural heritage**
- **landscaping**
- **storm water management**



We will:

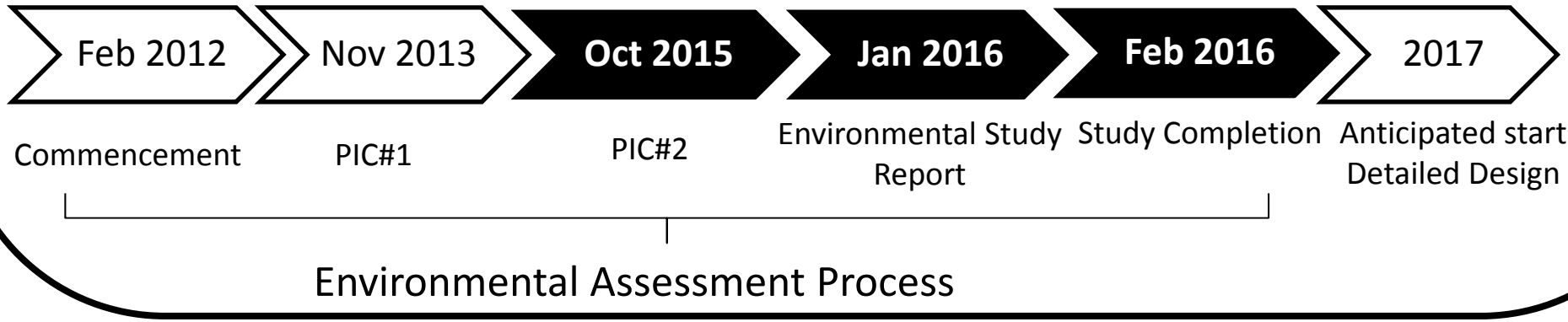
- improve sight lines for property accesses identified with deficiencies
- ensure access to existing properties/entrances is maintained during and after construction
- implement safety improvements which may include channelized right turn lanes (smart channels) and review roundabouts for 3 possible locations along the corridor
- provide an overall benefit to the environment through the use of wider culverts
- facilitate active transportation through implementation of a multi-use trail on the south side of Mayfield Road and paved shoulder on north side rural areas for cyclists (interim stage) and both sides for the ultimate 6 lane scenario; implement TDM policies and strategies
- ensure there are no property impacts to Alloa Home United Church
- provide a landscaping plan which will follow the guidelines for the Region's Streetscaping Toolbox
- prepare a formal tree preservation/planting plan in the detailed design phase with tree removals replaced on a basis agreed between the Region and the Credit Valley Conservation Authority
- improve stormwater management for the entire corridor and add new storm sewers on the south side of Mayfield Road
- implement storm water management practices within the Region's right-of-way using Low Impact Development practices

Region of Peel
Working for you

What happens next?

- receive public comments by October 23, 2015
- consider public input
- confirm the recommended design concept
- document the study findings and results and incorporate them along with the recommended design concept into an Environmental Study Report (ESR)
- issue a notice of completion to adjacent property owners within the corridor and members of the public who registered at the PICs
- advertise the study completion in local newspapers
- place the ESR on public review for 30 days

Timeline



Region of Peel
Working for you

Please tell us what you think before

October 23, 2015

You can review the boards on our website and provide comment at:

http://www.peelregion.ca/pw/transportation/environ-assess/mayfield-road-ea-2.htm

or fill out the comment sheet today and submit, or send comments by email/fax/letter to:

Neal Smith, C.E.T.
Region of Peel, Transportation Division
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, ON L6T 4B9
Tel: 905-791-7800 ext. 7866
Toll Free: 1-888-919-7800
Fax: 905-791-1442
Email: neal.smith@peelregion.ca