Mayfield Road Improvements

Environmental Study Report

Municipal Class Environmental Assessment

from Chinguacousy Rd to Winston Churchill Blvd

June 2016

Region of Peel
Working for you

Mayfield Road Environmental Study Report

June 2016

For Mayfield Road from Chinguacousy Road to Winston Churchill Boulevard

Schedule C Municipal Class Environmental Assessment Study

Table of Contents

EXECUTIVE SUMMARY ..... **vii**

1.0 INTRODUCTION **1**

1.1 Study Area 1
1.2 Purpose 2
1.3 Background 2
1.4 Study Approach 3
1.5 Study Team 4
1.6 Municipal Class Environmental Assessment Planning Process 6
1.7 Mandatory Principles 6
1.8 Public and Agency Consultation 7
1.9 Aboriginal Consultation 8
1.10 Public Review and Next Steps 9

2.0 PLANNING CONCEPT **11**

2.1 Provincial Growth Plan for the Greater Golden Horseshoe 11
2.2 The Provincial Policy Statement 11
2.3 Peel Long Range Transportation Plan (LRTP) 2012 Update 11
2.3.1 Study Relationship to the LRTP 12
2.4 Review of Problem and Opportunity and Alternative Planning Solutions 12
2.5 The Regional Official Plan 13
2.6 Minimum Right-of-way Widths for Regional Roads 13
2.7 Supporting Background Studies 13
2.7.1 Road Characterization Study (RCS) 14
2.7.2 Peel Strategic Goods Movement Network Study 14
2.7.3 Town of Caledon Transportation Needs Study Update (2009) 14
2.7.4 City of Brampton Transit and Transportation Master Plan 2009 (Rev. Feb 2010) 14
2.7.5 Halton Region Transit Master Plan (HRTMP)(2031) AND Halton Peel Boundary Area Transportation Study (HPBATS) 15

2.7.6 Region of Peel Active Transportation (AT) Plan 15
2.7.7 Draft Greater Toronto Area (GTA) West Transportation Development Strategy 15
2.7.8 Heritage Heights Transportation Master Plan Study (and Re-engagement Dec 2015) 16
2.7.9 Mount Pleasant Secondary Plan and Block Plan (Area 51-1 and 51-2) 16
2.7.10 Caledon Area Transportation Study (CATS) 17
2.7.11 Caledon Mayfield West Phase Two Secondary Plan Transportation Impact Study 17
2.7.12 Caledon Regional Class EA Studies or Ongoing Construction Projects 17

3.0 EXISTING CONDITIONS 19

3.1 Land Use 19
3.2 Traffic Impact Study 19
3.3 Existing Traffic Conditions 20
3.4 Traffic Safety 22
3.5 Transit and Active Transportation 22
3.6 Natural Environment 23
3.6.1 Aquatic Habitat 23
3.6.2 Terrestrial Features 23
3.6.3 Species at Risk 24
3.6.4 Wildlife Habitat 24
3.7 Archaeology and Cultural Heritage Reports 24
3.7.1 Cultural Heritage Report 24
3.7.2 Archaeology 26
3.8 Air Quality Report 28
3.9 Noise Report 29
3.10 Contaminated Site Screening Study 30
3.11 Geotechnical Investigation 31
3.12 Hydrogeologic Investigation 32
3.13 Fluvial Geomorphological Assessment 33
3.14 Stormwater Management and Drainage 34

4.0 ALTERNATIVE PLANNING SOLUTIONS 38

4.1 Public Information Centre (PIC) No. 1 38
4.2 Alternative Design Concepts and Assessment 39
4.3 Transportation Demand Mangement (TDM) 41
4.4 Roundabouts vs Signalized Intersection Analysis 41
4.5 Storm Water and Drainage 42
4.6 Active Transportation 44
4.7 Public Information Centre (PIC) No. 2 45
5.0 RECOMMENDED DESIGN 47
5.1 Recommended Design Criteria 47
5.2 The Proposed Road Design 48
5.2.1 Existing Conditions 48
5.2.2 Proposed Horizontal Alignment 48
5.2.3 Proposed Vertical Alignment 49
5.2.4 Cross Sections 49
5.2.5 Cross Slope and Superelevation 50
5.3 Typical Cross Section and Recommended Design 50
6.0 IMPACTS OF THE RECOMMENDED ALTERNATIVE DESIGN 83
6.1 Intersections and Vehicle Turning Movements 83
6.2 Access and Safety 83
6.3 Property Impacts 83
6.4 Active Transportation and Pedestrian and Cycling Facilities 84
6.5 Accessibility for Ontarians with Disabilities Act (AODA) 85
6.6 Pavement Design and Rehabilitation of Existing Pavement 86
6.6.1 New Pavement 86
6.6.2 Existing Pavement Rehabilitation 86
6.7 Social Economic Impacts 87
6.8 Impacts to Cultural Heritage 87
6.9 Landscaping 87
6.10 Environmental Impacts and Recommended Mitigation 87
6.11 Summary of Commitments 88

7.0 NOTICE OF COMPLETION and CONSTRUCTION 91

7.1 Notice of Completion 91
7.2 Utilities 91
7.3 Proposed Construction Monitoring 94
7.4 Cost Estimate 94

EXHIBITS, ILLUSTRATIONS AND TABLES

EXHIBITS .....

Exhibit 1 Map of Study Area 1
Exhibit 2 Home United Church 25
Exhibit 3 Farmscape 25
Exhibit 4 Map of Location of Noise Receptors 30
Exhibit 5 4-lane Cross Section - Mississauga Rd to WCB to 2021 50
Exhibit 6 5- Lane Cross section - Chinguacousy Rd to Mississauga Rd to 2021 50

ILLUSTRATIONS .....

Illustration 1 Motor Vehicle Emission Sources 28
Illustration 2 Stormwater Infiltration/Recharge Chamber System 37
Illustration 3 Farmscape 44
Illustration 4 Example of Multi-Use Trail Placement within the Road Righ-of-Way 86
Illustration 5 Bike Detection Systems and Cross Ride Treatments 86

TABLES .....

Table 1 Summary of Aboriginal and First Nations Engagement 9
Table 2 List of Properties Requiring a Stage 2 Assessment 27
Table 3 Contaminants in Air Pollution 28
Table 4 Mitigation Effort Required for Projected Noise Levels to 2031 29
Table 5 Design Concepts & Screening Process for the Recommended Design 40
Table 6 Design Criteria for Mayfield Rd from Chinguacousy Rd to Winston Churchill Blvd 46

Table 7 Utilities Consulted 91
Table 8 Cost of 4-Lane Design - WCB to Mississauga Rd 95
Table 9 Cost of 5-Lane Design - Mississauga Rd to Chinguacousy Rd 95
Table 10 Cost of 6-Lane Design - Mississauga Rd to Chinguacousy Rd 96

APPENDICIES .....

Appendix A - Notifications and Contact Lists .....
Appendix B - Study Comments Received and Stakeholder Engagement .....
Appendix C - Aboriginal and First Nations Engagement .....
Appendix D - Traffic Study .....
Appendix E - Geotechnical Pavement .....
Appendix F - Drainage and Stormwater Management .....
Appendix G - Natural Heritage Assessment .....
Appendix H - Hydrogeology, Geomorphic and Meander Belt Assessment .....
Appendix I - Contaminated Soil .....
Appendix J - Archaeology .....
Appendix K - Cultural Heritage .....
Appendix L - Noise .....
Appendix M - Air Quality .....
Appendix N - Technical Advisory Committee .....
Appendix O - Geometric Review and Preliminary Roundabout Designs .....
Appendix P - Public Informaction Centres No. 1 and No. 2 .....

EXECUTIVE SUMMARY

The Region of Peel has completed a Schedule 'C' Municipal Class Environmental Assessment (EA) study for improvements to Mayfield Road between Chinguacousy Road and Winston Churchill Boulevard. The study was conducted to support planned growth in the area and to provide additional east-west road capacity as recommended through the Region's Long Range Transportation Plan Update 2012. This Class EA Study was undertaken using a context sensitive solutions approach to provide a complete and environmentally sound transportation and road infrastructure improvement plan for the study corridor.

Study Area Description

Mayfield Road is a boundary road between the Town of Caledon and the City of Brampton and shares an intersection with Halton Hills at Winston Churchill Boulevard.

Highlights of Recommended Design

1. ***Mayfield from Chinguacousy to Mississauga at 2020***

- a 5-lane cross section with a centre at-grade median
- a multi-use trail on the south side and paved shoulder on the north side for cycling
- improved stormwater management using Low Impact Development techniques
- urban cross section on the south side with curb and gutters and street lighting
- a rural cross section maintained on the north side

2. ***Mayfield from Chinguacousy to Mississauga at 2031***

- a six-lane cross section with a centre at-grade median
- multi-use trails on both sides of the road
- an urban cross- section on both sides with curb and gutters and street lighting

3. ***Mayfield from Mississauga to WCB by 2021***

- a 4-lane cross section with a centre at-grade median

The Mayfield Road study corridor presents unique opportunities and challenges for planning and execution of flexible design solutions. Key issues in North West Brampton include:

- the Ministry of Transportation has suspended its work on the environmental assessment of the Greater Toronto Area West Highway Corridor (GTA West). The project will be reviewed and an update will be provided by the Ministry in 2016. If it recommences, its results may impact property requirements and traffic along the corridor;
- a proposed North-South road connection anticipated to connect with the with the GTA West highway and whether development of that road will be carried forward;
- the North-West Brampton Shale Policy Review for lands planned to be released for the development of Heritage Heights. The review will not start until the end of December 2016 and take 6-12 months to complete;
- rapid development on the south (Brampton) side of Mayfield Road between Chinguacousy Road and Mississauga Road in advance of planned road improvements;

- a new Natural Heritage System that follows the natural watershed topography that has been developed from existing farm fields. Storm drainage for the widening will connect with servicing provided through development applications;
- implementation of water service infrastructure including the Alloa Pumping station has arrived in advance of the road improvements. Water improvements are necessary to facilitate development but location of infrastructure within and adjacent to the existing roadway has presented design constraints;
- Mayfield Road is a primary truck route for goods movement. The corridor experiences congestion at peak traffic times; and
- the Town of Caledon's development of the Rural Service Centre of Mayfield West which is located east of Chinguacousy Road. Growth in Mayfield West is occurring through a series of phased expansions, based on long-term population and employment forecasts.

Study Approach

The approach for review of the Mayfield Road study area was to divide it into 2 sections for the stormwater and drainage and to explain the recommended design:

Section 1 - Chinguacousy Road to Mississauga Road
Section 2 - Mississauga Road to Winston Churchill Boulevard

Municipal Class Environmental Assessment Planning Process

The EA process followed the guidelines of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 and 2015). There are 4 schedules for project classification: Schedule A, Schedule A+, Schedule B and Schedule C, rated according to their potential environmental impact and cost. Schedule C is the most comprehensive of the four processes and this EA was conducted in compliance with a Schedule C classification.

Consultation Program

Agency and potential public stakeholders were identified at the beginning of the study and a contact list prepared for each group. Agency partners were invited to the Technical Advisory Committee (TAC) kick off meeting to review potential issues and areas of interest or concern. A list of public stakeholders was created from addresses within and adjacent to the study area. The larger public was invited to participate through placement of notices within local newspapers throughout the stages of the EA. The stakeholder lists were updated as the study progressed. Interest in the project was considered to be any feedback received from a stakeholder indicating that they could be directly affected during the planning, construction and/or operation of the proposed undertaking.

A number of methods were undertaken to ensure robust public consultation including:

- placement of the Notice of Study Commencement, Public Information Centre 1 and 2 and Notice of Study Completion in local Brampton, Caledon and Halton newspapers on two separate dates before each event;
- scheduling of two Public Information Centres during Phases 2 and 3 of the study;
- placement of notices on the Region's website;
- informational mailings to the public and agency stakeholders including First Nations groups during various stages of the study;
- receipt and response to written submissions, emails and phone calls;
- participation in meetings and telephone discussions with agencies (including MNR and CVC, the Town of Caledon, City of Brampton, Halton Region and Halton Hills), utilities, stakeholders and the public; and
- placement of this ESR on Public Record for 33 calendar days and provision of a Notice of Study Completion to agencies and the public during Phase 4 of the study.

Supporting Studies/Plans

- Halton-Peel Boundary Area Transportation Study (HPBATS);
- Official Plans and Transportation Plans for the Region of Peel, Region of Halton, City of Brampton, Town of Caledon and Town of Halton Hills;
- Other on-going Class EA studies in the vicinity of the Study Area;
- Region of Peel Long Range Transportation Plan (LRTP) update 2012;
- Region of Peel Official Plan, Office Consolidation, 2013;
- Region of Peel Active Transportation Plan;
- Region of Peel Strategic Goods Movement Network Study;
- Region of Peel Road Characterization Study;
- Draft GTA West Transportation Development Strategy;
- City of Brampton Transit and Transportation Master Plan;
- Caledon Area Transportation Study Update (CATSU);
- Town of Caledon Cycling Route Study;
- Heritage Heights Transportation Master Plan Study;
- Mount Pleasant Block 51-1 Collector Road Environmental Assessment Study and Transportation Study;
- Mount Pleasant Block 51-2 Collector Road Environmental Assessment Study and Transportation Study; and
- Town of Caledon Mayfield West Phase Two Secondary Plan Transportation Impact Study.

Existing Conditions

A review of the existing conditions along the study corridor was conducted at the beginning of the study process and future conditions evaluated for the horizon years of 2021 and 2031. Mitigation was developed based on the recommended alternative design. Information was reviewed and reports prepared for:

- Land Use
- Traffic Study
- Roundabout Screening & Evaluation
- Utilities
- Geotechnical/Pavement
- Hydrogeology/Well Water
- Fluvial Geomorphology
- Stormwater Management and Drainage
- Natural Environment
- Archaeology – Stage 1 and Stage 2
- Built and Cultural Heritage
- Structures
- Air Quality and Noise
- Structures
- Contaminated Soil

Review of Problem and Opportunity and Alternative Planning Solutions

The first two phases of the EA process look at the existing corridor conditions and the problems and opportunities that exist. A problem and opportunity statement is created that identifies the corridor needs. Alternative Planning Solutions are developed to address the problem and opportunities within the corridor. These include:

- do nothing;
- road widening;
- road network improvements; and/or
- transportation demand management.

For this study, the work completed in preparing the Region's LRTP Update 2012 Master Plan study has satisfied the first two phases of the Municipal Class EA process for the study area including development of a Problem and Opportunity Statement and assessment of Alternative Planning Solutions. However, since the scope of Master Plans such as the LRTP is broad, they do not typically address site-specific issues.

Staff reviewed the Problem and Opportunity and Alternative Planning Solutions from the LRTP Master Plan and applied the Mayfield Road site specific lens. Evaluation of the corridor showed that "doing nothing" is not an option. The other planning solutions were carried forward for evaluation against various design alternatives.

Road Widening
2 to 4 lane widening - 1.5 km west of Mississauga Road to Winston Churchill Boulevard
2 to 6 lane widening - Chinguacousy Road to 1.5 km west of Mississauga Road

Road Network Improvements
Intersection improvements including Roundabout Evaluation

Transportation Demand Management facilities
Paved shoulders within rural limits
Multi-use trails on the south side of Mayfield Road within urban limits
Transit facilities as required

Principal Environmental Impacts and Mitigation Measures

Land Use

Land use is changing along the south side of the Mayfield corridor between McLaughlin Road and Mississauga Road following the approval of the Mount Pleasant residential development from rural agricultural to residential. The Heritage Heights Secondary Plan, which is still under review, may also impact the corridor between Mississauga Road and Winston Churchill Boulevard. There are no current development applications for the north (Caledon) side of the corridor.

Traffic Study

Analysis of future conditions indicates the need to widen Mayfield Road to 4 lanes from Chinguacousy Road to Winston Churchill Boulevard by 2021. Traffic volume projections were reviewed to 2031 and included the new developments west of Mississauga Road (Heritage Heights and Mount Pleasant West). The analysis indicates (without factoring in the GTA West Transportation Corridor) the need to widen Mayfield Road to 6 lanes from Chinguacousy Road to just west of Mississauga Road. A four-lane cross section for Mayfield Road just west of Mississauga Road was found capable of accommodating the projected 2031 traffic volumes, without the GTA West corridor.

Roundabout vs Signalized Intersection Analysis

A region screening process was completed to evaluate all intersections for roundabouts within the study limit and recommended that only 3 would warrant further evaluation. An evaluation of roundabout vs. signalized intersection was conducted for the 3 intersections. The analysis shows that roundabouts will function well to improve safety and congestion in the short term but may experience congestion in the longer term. The feasibility of roundabouts will be

determined in detailed design when the future of the GTA West highway is confirmed and development applications along the corridor have been approved.

Utilities (water/sewer/gas/cable)

Location of existing utilities was provided by the utilities within the study area. Utilities participated in the Technical Advisory Meetings and provided feedback on the proposed design.

Geotechnical and Pavement

The existing pavement structure was reviewed and it is in good condition. The new pavement structure following widening will support the goods movement corridor.

Hydrogeology/Well Water

- The proposed construction work will generally not involve significant excavation except in the vicinity of the three major crossings (2 culverts and one bridge).
- Any affected well owners will continue to have water supplied of appropriate quality and in adequate quantities during construction. Any work done on affected wells or any replacement wells will be done pursuant to O. Reg. 903, Wells (pursuant to the *Ontario Water Resources Act*).

Fluvial Geomorphology

- All but one watercourse are swales with either intermittent or ephemeral (brief) flows. 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.

Drainage and Stormwater Management

The surface runoff from a widened road right-of-way would typically be contained in a storm water management pond for quantity and quality control and treatment. The team has evaluated incorporating Low Impact Development (LID) practices within the road right-of-way to achieve quantity and quality targets. LID practices will help to recharge groundwater and in addition, would not require the purchase of additional land for a pond and with it the incumbent costs of maintenance over the infrastructure lifetime.

Use of Low Impact Development (LID) Practices

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 if falls. Within the study area the Region recommends using LID facilities to infiltrate minor rain events, in effect, to make a sewerless road.

- For those areas of the corridor with an urban profile, the preferred option is to use a stormwater infiltration/recharge chamber system under the multi-use trail as the preferred method of stormwater management. A system of this kind can provide filtration, conveyance, storage and infiltration of stormwater. The contact area with the soil is maximized by the fully open bottoms and perforated side walls.
- For rural areas it is proposed to use a flat bottom infiltration ditch.

LID options will be reviewed and finalized in detailed design.

Natural Environment

Aquatic Habitat
The study area contains the headwaters of the subwatersheds of Fletcher's Creek in the east and Huttonville Creek in the west. The drainage features are ephemeral but contribute to the features downstream. Mitigation measures will be provided to the satisfaction of the CVC in order to obtain the necessary permits under the Regulation.

Terrestrial Features
No woodlands or wetlands of any size have been identified along the study route. A total of 243 trees have been documented and individually tagged and their condition rated within 20m of either side of Mayfield Road. No terrestrial species at risk were identified.

Species at Risk
The watercourse flow is intermittent and does not provide suitable habitat for Redside Dace. No bird species at risk were identified within the study area.

Wildlife Habitat
Wildlife passage to support the movement of small mammals will be a feature of improved culverts.

Hydrogeological Investigation

It is recommended that all necessary de-watering regulations be followed including a Permit to Take Water during construction.

Fluvial Geomorphology and Meander Belt Width Assessment

Fourteen watercourses were surveyed. Most are dry swales but they possess enough channel definition to be identified as having watercourse features. Any culverts that will be removed are on watercourses identified as ephemeral (intermittent) and the impact of the removal is expected to be minimal.

Downstream of Mayfield Road there is active development construction and flow diversion with flows being combined to form a natural heritage system.

Archaeology

Stage 1 Assessment

- The Stage 1 Archaeological Assessment was completed and determined that 14 archaeological sites have been identified within 1 km of the study area. The frontage of the Alloa Home United Church has been identified for archaeological potential and should be subject to a Stage 2 review.
- A large portion of the study area does not retain archaeological potential because of extensive disturbance and can be cleared of the need for further review. Also small areas documented to be low and wet have been cleared of further archaeological concern.

Stage 2 Assessment

A Stage 2 Archaeological Assessment was completed where possible as the Region was unable to obtain permission to enter for some properties. The properties locations are provided in the main body of the report. The outstanding Stage 2 Archaeological Assessments will be completed in the detailed design stage.

Stage 3 Assessment

A Stage 3 Archaeological Assessment has been identified for three properties:

- Two sites are located side by side on the southeast side of Mayfield Road, northeast of Winston Churchill Boulevard; and,
- The third site is located on the northwest side of Mayfield Road and southwest side of Chinguacousy Road.

The Stage 3 Assessments will be completed in detailed design.

Contaminated Soil Screening

A contaminated site screening was completed for the study area and 3 properties were identified with the potential for soil contamination due to land use or previous spills. A Phase I

Environmental Site Assessment (ESA) may be required if property is needed for widening at the identified sites.

Noise Report

Modelled noise levels at 6 sensitive receptor locations were compared to the base case of no widening, prior to construction, and the completion of widenings in 2021 and 2031.

Overall the noise levels at the 6 receptor locations will meet the MTO's Environmental Noise Guidelines except for one location. For the one location there is less than 1 decibel difference in noise levels between the widening and no widening scenarios of 2031. In order to achieve the Ministry of Transportation criteria is it recommended that for the one sensitive location a 1.5m tall, 25m long berm be positioned on either side of the driveway leading to the residential unit.

Air Quality Report

Air quality modelling showed that the maximum combined concentrations of contaminants for the future ultimate road widening were all below the MOECC guidelines or the Canada Wide Standards with the exception of PM10 and TSP (total suspended particulate matter). Frequency analysis determined that the project exceeded the PM10 guideline 6 additional days over the 5 year period. The TSP guideline was exceeded 1 additional day over the 5 year period. Since for both contaminants this equates exceeding the standard less than 1% of the time, mitigation measures are not warranted.

Alternative Design Concepts

The following alternative design concepts were considered and three were evaluated in detail.

- **Do Nothing** (screened out due to traffic volumes);
- **Widen Equally About the Centre line**;
- **Widen Entirely to the North;**
- **Widen Entirely to the South; and**
- **Hybrid Widening Solution** – maintain the centre line where feasible and make adjustments to manage constraints.

The detailed analysis found that the **Hybrid Design Option** was the most favourable. The detailed analysis is available in **Section 5.2** of the ESR**.**

Description of the Recommended Design and Mitigation

The preliminary design is documented in detail in **Section 5.2** of the ESR. The following is a brief summary of the recommended design:

Design Description

Mayfield Road from Chinguacousy Road to Mississauga Road at 2021

- a 5-lane cross section with a centre at-grade median;
- a multi-use trail on the south side and paved shoulder on the north side;
- improved stormwater management using Low Impact Development practices;
- urban cross section with curb and gutters and street lighting on the south side; and
- a rural cross section maintained on the north side.

Mayfield Road from Mississauga Road to Winston Churchill Boulevard by 2021

- A 4-lane cross–section with a centre at-grade median;
- A paved shoulder on both sides of the road for active transportation (cycling); and
- A rural cross section with flat bottom infiltration ditches.

Mayfield Road from Chinguacousy Road to Mississauga Road after 2031

- a six-lane cross section with a centre at-grade median;
- multi-use trails on both sides of the road;
- an urban cross- section with curb and gutters and street lighting on both sides of the road Mayfield from Mississauga to WCB to 2031;
- a 4-lane cross section with a centre at-grade median;
- a paved shoulder for active transportation bicycling; and
- improved storm water management using Low Impact Development practices.

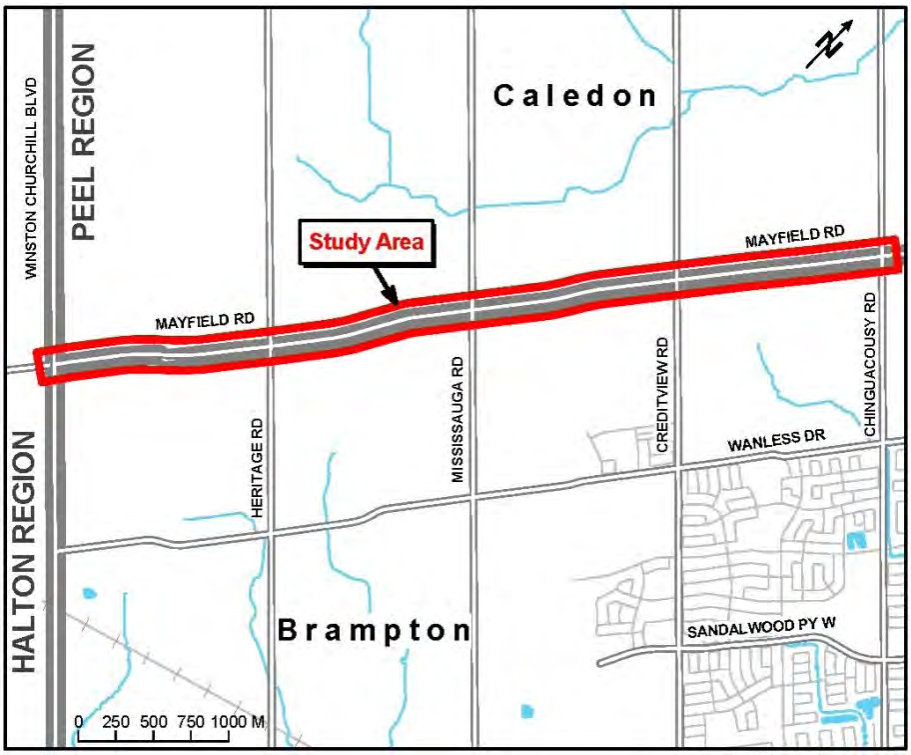
1.0 INTRODUCTION

The Region of Peel has completed a Schedule 'C' Municipal Class Environmental Assessment (EA) study for improvements to Mayfield Road (Regional Road 14) between Chinguacousy Road and Winston Churchill Boulevard. The study was conducted to support planned growth in the area and to provide for additional east-west road capacity in accordance with the Region's Long Range Transportation Plan (Updated 2012). This Class EA Study was undertaken using a context sensitive solutions approach to provide a comprehensive and environmentally sound transportation and road infrastructure improvement plan for the study corridor.

The Environmental Study Report (ESR) documents the need and justification for the project, the planning and design process undertaken to select the recommended alternative (including preliminary design) and measures to mitigate impacts.

1.1 Study Area

Mayfield Road is a major east-west arterial road and goods movement corridor and supports a considerable volume of commuter traffic. It forms the boundary between the City of Brampton and the Town of Caledon. The Mayfield Road intersection at Winston Churchill Boulevard is shared with Halton Hills. The limits of the study area for the Regional Road corridor are illustrated in **Exhibit 1**.



Mayfield Rd. (RR #14) study area from Chinguacousy Road to Winston Churchill Boulevard

Exhibit 1

1.2 Purpose

The purpose of this Municipal Class EA study is to look at existing and proposed uses and provide a complete and environmentally sound planning process which is open to public participation that:

- improves traffic operations by addressing congestion;
- improves access management measures with potential to improve safety and traffic operations; and
- supports area development, approved growth and goods movement along the corridor.

1.3 Background

The Regional Municipality of Peel is one of the fastest growing municipalities in Ontario with a forecasted population increase of 42 percent by 2031 (1.64 million total population). The rapid growth of Peel's population and employment has led to increased demand on its transportation network, resulting in congestion on roads and highways.

The updated 2012 Long Range Transportation Plan (LRTP) identified transportation challenges anticipated by the Region over the next 20 years as well as a road improvement plan to address those challenges. The LRTP recommends widening Mayfield Road to accommodate future growth in traffic, allow for connectivity with the surrounding road networks and accommodate the movement of cars, trucks, transit, pedestrians and cyclists.

The Mayfield Road corridor right-of-way (ROW) is designated as 50 metres in the Regional Official Plan (ROP) and is sufficient to support up to a 6-lane cross-section and to support two separate hydro networks along the corridor; Brampton Hydro on the south side and Hydro One Networks on the north side. An additional 5.5m is required where single left turns are required and an additional 9.0m is required where dual left turns are required.

The Mayfield Road study corridor presents unique opportunities and challenges for planning and execution of flexible design solutions. Key issues in North West Brampton include:

- the outcome of the Environmental Assessment for the GTA West Corridor currently on hold; if it will recommence and how this will impact property requirements and traffic along the corridor;
- a proposed North-South road connection anticipated to connect with the with the GTA West highway and whether development of that road will be carried forward;
- the North-West Brampton Shale Policy Review for lands planned to be released for the development of Heritage Heights. The review will not start until the end of December 2016 and take 6-12 months to complete;

- rapid development on the south (Brampton) side of Mayfield Road between Chinguacousy Road and Mississauga Road in advance of planned road improvements;
- a new Natural Heritage System that follows the natural watershed topography that has been developed from existing farm fields. Storm drainage for the widening to connect with servicing provided through development applications;
- implementation of water service infrastructure including the Alloa Pumping station has arrived in advance of the road improvements. Water improvements are necessary to facilitate development but location of infrastructure within and adjacent to the existing roadway has presented design constraints;
- Mayfield Road is a primary truck route for goods movement. The corridor experiences congestion at peak traffic times; and
- the Town of Caledon's development of the Rural Service Centre of Mayfield West which is located east of Chinguacousy Road. Growth in Mayfield West is occurring through a series of phased expansions, based on long-term population and employment forecasts.

1.4 Study Approach

This study includes the review of existing conditions, identification of issues, confirmation of the transportation planning alternative identified by the Region's Long Range Transportation Plan, and identification of a preferred design solution along with proposed mitigation and timing for implementation.

The approach to reviewing the study information was to divide the study area into two sections as it encompasses two different land uses as discussed below.

South Side of Study Corridor (Brampton)

The south (Brampton) side of Mayfield Road between Chinguacousy Road and Mississauga Road currently is rural in character with ditches to manage stormwater. The proposed road profile for the south side is urban to facilitate the residential development that is currently being built. This means that the rural ditches would be removed and curbs, gutters, sidewalks, additional street lighting and storm sewers added.

Between Mississauga Rd and Winston Churchill Boulevard there is no current development approved and the rural profile will remain.

North Side of Study Corridor (Caledon)

There is no planned development on the Caledon side of Mayfield Road between Chinguacousy Road and Winston Churchill Boulevard at the time of this report. A rural profile which utilizes ditches to manage stormwater will remain until future development occurs.

Since the urban profile of Mayfield Road ends just west of Mississauga Road, the study area has been divided into two sections for review of the Stormwater and Drainage report and the Proposed Recommended as follows:

Section 1 - Chinguacousy Road to 1.5km west of Mississauga Road
Section 2 – 1.5 km west of Mississauga Road to Winston Churchill Boulevard

All other reports have been prepared for the entire corridor.

The recommended planning solution to address the problem and opportunity statement for the full study corridor was identified in the LRTP study as:

- **For Section 1** - widen from 2 to 6 lanes from Chinguacousy Road to 1.5km west of Mississauga Road; and
- **For Section 2** - staged widening from 2 to 4 lanes from 1.5 km west of Mississauga Road to Winston Churchill Boulevard; and widening to 6 lanes past 2031.

The recommended planning solution has been used as the base for the study review for Phases 3 and 4 of the Municipal Class EA process.

1.5 Study Team

This Class EA study was undertaken by the Region of Peel as an in-house project and Hatch Mott MacDonald was retained to undertake the appropriate analysis, prepare the technical reports and to assist in defining mitigation measures.
Team members from the Region's **internal** team include:

- Neal Smith, Project Manager
- Steve Ganesh, Manager
- Liz Brock, Technical Analyst, ESR
- Sargon Sifo, Technical Analyst, Design
- John Nemeth, Program Manager, Stormwater Management
- Eisa Eisa, Technical Analyst, Traffic Operations
- Sean Carrick, Specialist, Traffic Development
- Mina Zare, Technical Analyst, Traffic Safety
- Rebecca Caughey, Technical Analyst, Traffic Signals and Streetlighting
- Eric Chan, Principal Planner, Transportation Systems

- Arthur Lo, TDM Analyst, Active Transportation
- Jose Montouto, Project Manager, Roads Capital
- Lindsay Edwards, Planner, Goods Movement
- Ryan Vandenburg, Development Facilitator, Development Planning

Key members from **Hatch Mott MacDonald** include:

- Melissa Alexander, MCIP, RPP, Environmental Planning
- Juan Perez, P.Eng., Transportation Planning and Traffic Operations
- Margaret Parkhill, P.Eng., Road Safety
- John Hemingway, P.Eng., Roundabout Analysis and Preliminary Design
- Shad Hussain, P.Eng., Drainage, Stormwater Management, Hydraulics and Hydrology
- David Jackson, EIT
- M. Choy, Noise Evaluation

Additional subject-specific expertise was provided by:

- **Natural Environment**
  Jo-Anne Lane, Beacon Environmental
- **Cultural Heritage**
  Heidy Schopf, Archaeological Services Inc.
- **Archaeology**
  Paul Ritchie, Archaeological Services Inc.
- **Geomorphology**
  Ed Gazendam, Water's Edge Environmental Solutions Ltd.
- **Transportation**
  Juan Perez, Hatch Mott MacDonald
- **Geotechnical and Pavements**
  Mark Popik, Thurber Engineering Ltd.
- **Contaminated Soil**
  Mark Farrant, Thurber Engineering Ltd.
- **Hydrogeology**
  Thurber Engineering Ltd.
- **Air Quality**
  Novus Environmental

1.6 Municipal Class Environment Assessment Planning Process

This EA was undertaken and prepared in accordance with the guidelines of the Municipal Engineers Association (MEA) Municipal Class Environmental Assessment (October 2000, as amended in 2007, 2011 and 2015). There are 4 schedules for project classification: Schedule A, Schedule A+, Schedule B and Schedule C, rated according to their potential environmental impacts. Schedule C is the most comprehensive of the four processes and this EA was conducted in compliance with a Schedule C classification. A Schedule C project involves either the construction of new facilities or major expansion of existing facilities. For the existing facilities, this could include road widening, adjustments, and operational improvements.

The Municipal Class EA process is characterized by a five phase planning and design process:

Phase 1 - Problem Identification Steps
Phase 2 - Alternative Planning Solution Steps
Phase 3 - Alternative Design Concepts for Preferred Solution
Phase 4 - Environmental Study Report (ESR)
Phase 5 – Implementation

1.7 Mandatory Principles

This EA's planning process followed and adhered to the guidelines outlined by the Municipal Class EA document. It also reflects the five mandatory principals of Class EA planning:

- Consultation with affected parties early on and throughout the process so that the process is a co-operative venture;
- Consideration of a reasonable range of planning alternatives and the alternative methods of implementing the preferred solution;
- Identification and consideration of the effects of each alternative on all aspects of the environment;
- Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects; and

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PLANNING PROCESS

All municipal projects in Ontario are subject to Ontario's Environmental Assessment Act (EAA) which provides for the protection, conservation, and management of the environment. Activities with common characteristics and common potential effects may be assessed as part of a "class", and are subject to compliance with the pre-approved Class EA process. The Municipal Class EA is an approved Class EA process that applies to municipal infrastructure projects including roads, water, and wastewater. This process provides a comprehensive planning approach to consider several alternative solutions and evaluate their impact on a set of criteria (e.g. technical, environmental, social, cost) and determine any mitigating measures to arrive at a preferred alternative for addressing the problem (or opportunity). The process involves consultation of technical agencies and the public at the various project stages.

The Class EA process ensures that all projects are carried out with effectiveness, efficiency and fairness. This process serves as a mechanism for understanding economic, social and environmental concerns while implementing improvements to municipal infrastructure.

- Provision of clear and complete documentation of the planning process followed, to allow 'traceability' of decision-making.

1.8 Public and Agency Consultation

A wide range of stakeholders were identified and contacted at the outset of the study, to ascertain potential issues and areas of interest or concern. A list of study stakeholders is provided in **Appendix B**. In keeping with the spirit and intent of the Municipal Class EA, a number of methods were undertaken to achieve the objectives, including:

- advertising notices in the Brampton, Caledon and Halton newspapers and direct mail to residents within the study area and to agencies, utilities and First Nations groups with an interest in the study area as follows:
  Notice of Study Commencement – placed with the Brampton Guardian, Caledon Enterprise and The Georgetown Independent two times on March 7 and March 14, 2013
  Notice of Public Information Centre (PIC) No. 1 - placed with the Brampton Guardian, Caledon Enterprise and The Georgetown Independent two times on November 14 and November 21, 2013
  Notice of Public Information Centre (PIC) No. 2 – placed with the Brampton Guardian, Caledon Enterprise and The Georgetown Independent 2 times on September 24 and October 1, 2015
  Notice of Study Completion – placed with the Brampton Guardian, Caledon Enterprise and The Georgetown Independent two times on Thursday June 16, 2016 and Thursday June 23, 2016
  (see all Notices in Appendix A)
- Notices, PIC boards, Newsletters and preliminary designs were placed on the Region's website;
- Personal response to written submissions and phone calls;
- Participation in meetings and telephone discussions with regulatory agencies, utilities and the public; and
- Placement of this ESR on the Public Record and provision of a Notice of Study Completion to regulatory agencies and the public during Phase 4 of the study.

Public and Agency Consultation

Communication with the affected parties (stakeholders) is an essential part of the planning process and provides a tool for the Region to define and respond to issues before limiting decisions are made and EA documents are submitted for formal review and approval. Recognizing that public and regulatory agency consultation is a significant and integral part of the Municipal Class EA process, a consultation program is initiated at the outset of the study and continued throughout the study period.

1.9 Aboriginal Consultation

At the commencement of the study various First Nation and Aboriginal groups were identified and provided a Notice of Study Commencement. The Ministry of Aboriginal Affairs responded to the notice with information on First Nations that might have existing or asserted rights claims. The First Nations groups identified were the:

Six Nations of the Grand River Territory
Haudenosaunee Confederacy
Mississauga of the New Credit First Nations

These groups were included in the original notice and all subsequent notices.

The identified First Nations Groups and various others were contacted by letter and/or email throughout the study, provided notice of each of the two Public Information Centres and given the opportunity to engage in the study process. The groups contacted are: (see the Stakeholder List in Appendix B)

1. Allen MacNaughton, Haudenosaunee Confederacy Chiefs Council
2. Metis Consultation Unit, Metis Nation of Ontario Head Office
3. Chief Brian Laforme, Mississauga of the New Credit First Nation
4. Dave Simpson, Alderville First Nation
5. Tracy Gauthier, Mississaugas of Scugog Island
6. Patricia Chrisjohn, Peel Aboriginal Network
7. Chief William Montour, Six Nations of the Grand River Territory
8. Kate Cave, Six Nations Council - Land and Resources
9. Richard Cuddy, Credit River Metis Council
10. Chiefs of Ontario Office
11. The Chippewas of Georgina Island
12. Chief Phyllis Williams, Curve Lake First Nation
13. Chief Sharon Stinson Henry, The Chippewas of Rama First Nation

Agencies contacted:

1. Deputy Minister Lori Sterling, The Ministry of Aboriginal Affairs
2. Allan Dokis, Intergovernmental Affairs Director Anishinabek Nation/Union of Ontario Indians, Nipissing First Nation
3. Ms. Rolanda Elijah, Director of Intergovernmental Affairs, Association of Iroquois and Allied Indians

No issues were identified by those Aboriginal/First Nations groups that responded to the notices. The record of Aboriginal and First Nations engagement is summarized below and also provided in **Appendix C.**

Table 1: Summary of Aboriginal and First Nations Engagement

Project Notice	Aboriginal/First Nations Group who Responded	Comments	Follow-up to comments
Notice of Commencement	Chippewas of Rama First Nation	The Chippewas of Rama referred the notice to their solicitor who did not engage further with the study.	none
Notice of PIC#1	Alderville First Nation	Project deemed Level 3 with minimal potential to impact First Nations Rights. They asked to be kept informed during the study.	none
	Chippewas of Georgina Island First Nation	Asked to be kept informed throughout the study process and remain on the study contact list.	none
Notice of PIC#2	none	none	none

1.10 Public Review and Next Steps

If after reading this document you have concerns about the planned project, you can proceed as follows:

1. Contact the Region of Peel project manager to discuss your questions or concerns:

   Neal Smith, C.E.T., Project Manager
   Infrastructure Programming and Studies
   Transportation Division
   Region of Peel
   10 Peel Centre Drive, 4th Floor, Suite B
   Brampton, ON L6T 4B9
   Tel: 905 791-7800 ext. 7866
   Email: neal.smith@peelregion.ca
2. The project manager may arrange a meeting if you have significant concerns that require detailed explanation.
3. The Region will attempt to resolve the concerns but it they remain unresolved, you may request the Minister of the Environment and Climate Change, by order, to require the Region of Peel to comply with Part II of the Environmental Assessment Act (EAA) before

proceeding with the project; this is called a Part II Order request. The Minister may make one of the following decisions:

- deny the request with or without conditions;
- refer the matter to mediation; or
- require the Region of Peel to comply with Part II of the EAA by undertaking one of the following:
  - set out direction with respect to preparing the Terms of Reference and an individual EA for the undertaking; or
  - declare that the Region has satisfied the requirements for the preparation of a Terms of Reference and that it must still prepare an individual EA.

To submit a Part II Order to the Minister of the Environment and Climate Change contact:

Minister's Office
Ministry of the Environment and Climate Change
77 Wellesley Street West, 11th Floor, Ferguson Block
Toronto, ON M7A 2T5

A copy of the Part II Order request must be forwarded by you to the attention of the project manager at the Region of Peel.

If no Part II Order requests are received then the Region may proceed with the detailed design and construction of the recommended works as presented in this ESR.

2.0 PLANNING CONTEXT

The Provincial Growth Plan for the Greater Golden Horseshoe and the Provincial Policy Statement provide planning guidance for the Region's Long Range Transportation Plan.

2.1 Provincial Growth Plan for the Greater Golden Horseshoe

The June 2006 Growth Plan for the Greater Golden Horseshoe – Places to Grow, provides the framework for implementing the Provincial government's vision for building stronger, prosperous communities by better managing growth to the year 2041. The Growth Plan contains specific policies and directives regarding transportation, infrastructure, land use planning, urban form, housing, natural heritage and resource protection. The plan also offers guidance regarding transportation system development, envisioning an "integrated transportation network that will allow people choices for easy travel both within and between urban centers." Travel by automobile remains a significant means of transport but other travel modes such as transit, walking and cycling are important elements in the Region's transportation system.

2.2 The Provincial Policy Statement

The Provincial Policy Statement 2014 provides a vision for Ontario's land use planning, built environment, and management of land and resources to achieve livable and resilient communities.

With reference to this study, Section 1.6.7 promotes Transportation Systems which are "safe, and facilitate the movement of people and goods that are appropriate to address projected needs". Transportation demand strategies are also encouraged. Section 1.6.8.2 notes that "major goods movement facilities and corridors should be protected for the long term", which supports the use of Mayfield Road as a goods movement corridor.

TRANSPORTATION PLANNING

2.3 Peel's Long Range Transportation Plan (LRTP) 2012 Update

The LRTP addresses major transportation challenges that the Region of Peel expects to face over the next several decades, in particular:

- increasingly congested roads due to high population growth; and
- sustainable planning and protection of our environment to ensure a liveable future.

The LRTP has recommended road improvements for the Mayfield Road study area to address congestion issues and to plan for future travel demand to 2031.

2.3.1 Study Relationship to the LRTP

The scope of Master Plans such as the LRTP is broad and includes analysis of the system in order to outline a framework for future works and development. They do not typically address site-specific issues. However they do satisfy the requirements of Phases 1 and 2 of the Municipal Class EA process including problem identification and alternative planning solutions. For this study, the work completed in preparing the Region's LRTP master plan study has satisfied the **first two phases** of the Municipal Class EA process for the proposed Mayfield Road widening.

This study started at Phase 3 of the Municipal Class EA process.

2.4 Review of Problem and Opportunity and Alternative Planning Solutions

Phase 1 of the Municipal Class EA process involves documenting the factors which lead to the conclusion that an improvement or change is needed. Then a clear statement of the identified problem to be investigated is developed along with the opportunities for improvements. Phase 2 of the Municipal Class EA process develops various planning solutions to the problem and opportunity statement; identifies the net positive/negative effects of each alternative; identifies mitigating measures; evaluates all alternative solutions; and identifies the preliminary recommended solution. Since the do-nothing scenario was reviewed in the LRTP with the conclusion that the study corridor should be widened, it was not one of the planning solutions carried forward to Phases 3 and 4 of this study.

Though the problem identification and alternative planning solutions had already been reviewed by the LRTP the study team refined and expanded the problem and opportunity statement as follows:

Improvements are needed along the Mayfield Road study area to address/accommodate:

- existing and future traffic demands
- pedestrian and cyclist movements through the study area

Peel's Long Range Transportation Master Plan (LRTP) 2012 Update

The LRTP is a document that is used to identify Peel's transportation challenges over the next 20 years. It examines current and future transportation issues and proposes strategies to mitigate traffic congestion. One strategy is to identify the number of road lane required to mitigate projected traffic congestion levels until 2031.

Its purpose is to:

- ensure that transportation planning decisions are made within the context of changes in provincial legislation and general transportation and land use trends;
- serve as input to other studies including environmental assessments; and
- support transportation policies in the Region Official Plan (ROP).

The LRTP study is conducted as a Transportation Master Plan under the Municipal Class Environmental Assessment Process and complies with the Province of Ontario's Environment Assessment Act. The study addresses Phases 1 and 2 of the Municipal Class EA process **(see Section 1.6).**

- access control
- goods movement

The recommended planning solutions to address the problem and opportunity statement for the study corridor as supported by the LRTP are:

- staged widening from 2 to 4 lanes from 1.5 km west of Mississauga Road to Winston Churchill Boulevard by 2021; and
- widening from 2 to 6 lanes from Chinguacousy Road to 1.5km west of Mississauga Road by 2031.

The recommended planning solution has been used as the basis for the study as it proceeded through Phases Three and Four of the Municipal Class EA process.

2.5 The Regional Official Plan

The Regional Official Plan Amendment 26 has identified the need to update the Regional Road Right-of-Way Requirements (ROPA Schedule F) for Mayfield Road from Chinguacousy Rd to Mississauga Rd from 2 to 4 to 6 lanes; and Mayfield Road from Mississauga Rd to Winston Churchill Boulevard from 2 to 4 lanes.

2.6 Minimum Right-of-way Widths for Regional Roads

Over the summer of 2010 members of the Building Industry Liaison Team (BILT), City of Brampton, Hydro Brampton One and Peel staff met to discuss minimum ROW requirements for new development adjacent to Regional roads to accommodate road widening, transit and active transportation infrastructure.

For the Mayfield Road corridor this translates to a 55.5 m ROW for a typical intersection functional plan six lane road and a single left turn lane and 59.0m ROW for a dual left turn.

2.7 Supporting Background Studies

At the beginning of the study, staff reviewed existing Peel Regional, Halton Regional, Provincial and Local Municipal plans, policies, studies and reports that were applicable or would provide direction to the study. The plans/policies/studies/reports are described below.

2.7.1 Road Characterization Study (RCS)

The RCS integrates the Region's Healthy by Design principles with Transportation objectives based on land use concepts. The RCS defines Mayfield Road within the study corridor as an industrial connector. Industrial connector routes are characterized by a high amount of warehousing and industrial development. There are high levels of truck traffic and the connector often serves as a primary route between industrial hubs such as rail or air distribution centres. Traffic is intended to be free flowing but may provide some driveway access for truck traffic. Pedestrian traffic is low and is primarily from transit stops to employment sites. Bicycle traffic is limited and may be unsafe in areas where there are multiple driveways with constant truck traffic.

2.7.2 Peel Strategic Goods Movement Network Study

The study has identified planning, policy, program and infrastructure investment options for enhancing the Region's ability to accommodate goods movement as part its overall investment strategy. Its objective is to develop a goods movement network in Peel to improve, prioritize and preserve goods movement corridors. There are no truck restrictions on Mayfield Road and it is defined as a goods movement corridor.

2.7.3 Town of Caledon Transportation Needs Study Update (2009)

The study has identified that there is peak period traffic congestion along Mayfield Road that causes a problem for commuters and business activities in the Town. The traffic study forecasts to 2031 show a 111% increase in the peak hour traffic volumes across Mayfield Road.

2.7.4 City of Brampton Transit and Transportation Master Plan 2009 (Rev. Feb 2010)

The 2009 Brampton Transit and Transportation Master Plan (BTTMP) vision embraces compact communities, sustainable development, protection of the natural environment, economic vitality, and healthy communities while providing safe, affordable, and efficient transportation for people and goods. The revised 2010 update study addresses northwest Brampton road improvements and new construction. Key features of the recommended road network for northwest Brampton is that it accommodates 2031 travel demand including full build-out of northwest Brampton as follows:

- A North-South Transportation Corridor at six lanes between 407 ETR and Bovaird Drive by 2016, widening to eight lanes by 2031. Road function to be established by the Halton-Peel Boundary Area Transportation Study. Final road alignment to be established during the EA and Preliminary Design Stage;
- Extension of North-South Transportation Corridor at six lanes from Bovaird Drive to Mayfield Road by 2031, widening to eight lanes beyond 2031. Road function to be established by Halton-Peel Boundary Area Transportation Study;
- Bovaird Drive at six lanes the between North-South Corridor and Main Street;

- Mississauga Road at six lanes up to Sandalwood Parkway; four lanes between Sandalwood;
- Parkway and Mayfield Road by 2031; and Mississauga Road at six lanes beyond 2031
- Chinguacousy Road at six lanes;
- Heritage Road at four lanes with an eastern by-pass of the proposed village core in the Bram West Secondary Plan Area (at Embleton Road);
- Mayfield Road at four lanes between Winston Churchill Boulevard and McLaughlin Road;
- Connection of Williams Parkway to Heritage Road (at four lanes) and North-South Corridor; and
- Sandalwood Parkway Extension at four lanes between Winston Churchill Boulevard and Creditview Road.

2.7.5 Halton Region Transportation Master Plan(HRTMP) (2031) and Halton Peel Boundary Area Transportation Study (HPBATS)

Halton Hills shares the intersection of Mayfield Road (17th Sideroad Halton side) at Winston Churchill Boulevard with the Region of Peel. Halton Hills is a town in the Regional Municipality of Halton. The HRTMP does not identify any improvements to 17th Sideroad or the shared intersection to 2031.

The Halton Peel Boundary Area Transportation Study (HPBATS) assessed transportation demands along and across the Halton Peel boundary north of Highway 401. This study made a number of recommendations related to roads and transit in this area to improve mobility to and from North East Halton.

2.7.6 Region of Peel Active Transportation (AT) Plan

Active Transportation means using human power to get from place to place. The plan promotes daily physical activity that links residents to their everyday destinations such as work, school and recreation. The Active Transportation Plan is a coordinated Region-wide approach that builds on local municipal needs and plans.

Within the study corridor the recommended active transportation facilities are a 2.0m multi-use trail on the south (Brampton) side and a 1.8m sidewalk on the north (Caledon) side.

2.7.7 Draft Greater Toronto Area (GTA) West Transportation Development Strategy

The Ministry of Transportation (MTO) was leading an Environmental Assessment (EA) to develop a GTA West Corridor highway and the Mayfield Road study area fell within the broadly-defined path for the GTA West Corridor. However just before this ESR was filed, the Ministry of Transportation suspended its work on the environmental assessment on December 16, 2015, stating that the project will be reviewed and an update provided in spring 2016.

2.7.8 Heritage Heights Transportation Master Plan Study (and Re-engagement Dec 2015)

In December 2009 the City of Brampton initiated a secondary planning study for Areas 52 & 53 collectively termed as the Heritage Heights Community. The planning area is bounded by Mayfield Road to the north, Winston Churchill Boulevard to the west, Mississauga Road to the east and the Credit River Valley to the south. Key issues in North West Brampton that will impact the future planning include:

- planning for employment lands;
- Stage 2 – Environmental Assessment for the GTA West Corridor;
- North-West Brampton Shale Policy Review – review may commence at the end of December 2016 and take 6-12 months to complete;
- GO Train layover facility and potential new GO Station; and
- a new 400-bed Health Care Facility.

A resolution by the City's council in March 2015 directed its staff to revisit the June 2014 Land Use Plan that involves the participation of all the landowners within Secondary Plan Areas 52 and 53. This re-engagement will occur in spring 2016.

2.7.9 Mount Pleasant Secondary Plan and Block Plan (Areas 51-1 and 51-2)

The Mount Pleasant Area consists of about 870 hectares and is bound by Mayfield Road to the north, Mississauga Road to the west, Bovaird Drive to the south, with the existing Fletcher's Meadow community to the east. The Mount Pleasant Secondary Plan Area 51 and Land Use Plan were approved by City Council on February 10, 2010. Subsequently, the block plans for sub-area 51-1 and sub-area 51-2 were also approved.

The road network in the Mount Pleasant Secondary Plan is intended to reflect the principles of continuity and connectivity of roads. A preferred road network was identified:

- Creditview Road as a Minor Arterial Road with a south realignment (Bovaird Drive - Mayfield Road) and widened to four lanes;
- Four-lane extension of Sandalwood Parkway as a Minor Arterial Road from Creditview Road to Mississauga Road; and
- required additional (beyond programmed improvements) arterial road improvements in the Study Area, including:
  - Bovaird Drive widened to six lanes (east of Mississauga Road)
  - Wanless Drive widened to four lanes (Chinguacousy Road - Mississauga Road)
  - Mayfield Road widened to six lanes (McLaughlin Road - Chinguacousy Road)
  - Mayfield Road widened to four lanes (Chinguacousy Road - Creditview Road)
  - Mississauga Road widened to six lanes (Bovaird Drive - Sandalwood Parkway)
  - a north-south collector road (i.e., TOD corridor), comprising four lanes (26.0m ROW)

2.7.10 Caledon Area Transportation Study (CATS)

The study identified that Mayfield Road is a high-capacity arterial road that experiences peak period congestion and will need to be widened.

2.7.11 Caledon Mayfield West Phase Two Secondary Plan Transportation Impact Study

The Mayfield West Phase 2 Secondary Plan proposal will bring development to the Chinguacousy Road boundary of the study area and will include employment lands such as a Mayfield West Business Park for small to mid-sized office and commercial developments and housing for 11,500 new residents -- 3,900 new residents pre-2021 and 7,600 new residents post-2021.

There is no planned development for the north (Caledon side) of Mayfield Road within the study area to 2031.

2.7.12 Completed Regional Class EA Studies or Ongoing Construction Projects

Results from the following recently completed Peel Regional Transportation and Water and Wastewater EA's were reviewed as background to this study.

- The Mayfield Road EA from Heartlake Road to Chinguacousy Road EA;
- The Mississauga Road EA from Bovaird Drive to Mayfield Rd EA; and the
- Alloa Reservoir, Pumping Station and Feedermain Class Environmental Assessment and construction project.

3.0 EXISTING CONDITIONS

A preliminary inventory was taken of existing conditions for the social, economic and natural environments. The following pages detail specific report findings and recommendations.

3.1 Land Use

Land use along the study area is changing. On the north side (Caledon) there are no development applications within the study area and lands retain their rural agricultural character. However development of the approved Mayfield West Secondary Plan Phase 2 to the east of the study area (between Hurontario Street and Chinguacousy Road) will impact traffic within the study area.

On the south side (Brampton) of Mayfield Road is the approved development of Mount Pleasant which is being constructed concurrent with the EA. The Mount Pleasant Secondary Plan area consists of about 870 hectares and is bound by Mayfield Road to the north, Mississauga Road to the west, Bovaird Drive to the south and McLaughlin Road to the east.

In 2009 The City of Brampton initiated a Secondary Plan for Area 52 (Huttonville North) and Area 53 (Mount Pleasant West) collectively referred to as "Heritage Heights" (see **Section 2.7.8**). The planning area is bounded by Mayfield Road to the north, Winston Churchill Boulevard to the west, Mississauga Road to the east and the Credit River Valley to the south. The Secondary Plan is still awaiting approval.

3.2 Traffic Impact Study

The Traffic Impact Study reviewed the anticipated traffic volumes for 2021 and 2031 in conjunction with ongoing and budgeted road improvements by the City of Brampton, Halton Region and the Region of Peel.

In anticipation of the impact of the future GTA West on the corridor function, a sensitivity analysis was performed comparing the 2031 volumes in the study area with and without the GTA West corridor to capture the volume variation and its effect on the performance of the study area.

Mayfield Road is located in an area where a number of road improvements by different agencies (Region of Peel, City of Brampton and Region of Halton) are included in capital programs or are anticipated to be completed by the 2021 and/or 2031 horizon years. Although the GTA West Corridor Planning and EA Study is currently on hold, at the time of the start of the study a sensitivity analysis was performed. The analysis compared the 2031 volumes in the study area with and without the GTA West corridor to capture the volume variation and its effect on the performance of Mayfield Road within the study area.

The traffic operations analysis of future conditions indicates the need to widen Mayfield Road to 4 lanes from Chinguacousy Road to Winston Churchill Boulevard by 2021. Traffic volume projections were reviewed to 2031 and included the new developments west of Mississauga Road (Heritage Heights and Mount Pleasant West). The analysis indicates (without factoring in the GTA West Transportation Corridor) the need to widen Mayfield Road to 6 lanes from Chinguacousy Road to just west of Mississauga Road. A four-lane cross section for Mayfield Road just west of Mississauga Road was found capable of accommodating the projected 2031 traffic volumes, without the GTA West corridor and with the timing of future development.

Roundabout Screening

Two-lane roundabouts at Heritage Road and Winston Churchill Boulevard, as well as at a future arterial road connection between these two roads will operate at acceptable levels of service under projected 2021 AM peak hour traffic volumes (the critical period for analysis purposes). However, under projected 2031 AM peak hour traffic conditions, roundabouts were found to be operating at capacity on some approaches (especially the eastbound and northbound approaches). The feasibility for implementation of roundabouts will be examined further in detailed design and in relation to whether the GTA West project is re-initiated. The preliminary roundabout options are shown in **Appendix O**.

3.3 Existing Traffic Conditions

All signalized intersections are currently operating at an acceptable Level of Service (LOS) during both the AM and PM peak hours. At the unsignalized intersections most locations are operating at an acceptable LOS, except for the southbound approach at Heritage Road and Mayfield Road during the AM peak hour with a LOS F.

The existing conditions operational analysis identified localized intersection improvement requirements as follows:

- The introduction of exclusive eastbound and westbound left turn lanes at Chinguacousy Road and Mayfield Road to address the identified capacity deficiency and optimizing signal cycle and phase timings; and
- Installing traffic control signals at Heritage Road and Mayfield Road would alleviate delay for the southbound approach during the AM peak hour (currently LOS F), but signalization is not yet warranted.

Following is a synopsis of existing road conditions within the study area.

Mayfield Road (Regional Road 14) – is a 2-lane east-west Regional arterial road with a rural cross section and speed limit of 80 km/h, except for a 500m section adjacent to the existing Alloa Public School.

Intersecting Roads

Chinguacousy Road – is currently a 2-lane north-south City of Brampton minor arterial and Town of Caledon collector road with a rural cross section and posted speed limit of 80 km/h north of Mayfield and 70 km/h south of Mayfield. The intersection is signalized at Mayfield. The City of Brampton has recently completed a Class EA to widen Chinguacousy Rd to 4 lanes from Wanless Drive to Mayfield Road to provide additional north-south traffic capacity.

Creditview Road – is currently a 2-lane north-south City of Brampton minor arterial road and Town of Caledon collector road with a rural cross section and posted speed limit of 80 km/h north and 70 km/h south of Mayfield Road. The City of Brampton has recently completed a Class EA to widen Creditview Road to 4 lanes from Mayfield Road to Fairhill Drive (approximately 1, 500 metres north of Bovaird Drive) to address planned growth and development related to the Mount Pleasant Secondary Plan. Due to development and increasing volume, traffic signals will be added in late 2016.

Mississauga Road (Regional Road 1) – is a 2-lane north-south Regional major arterial road with a rural cross section and posted speed limit of 80 km/h. Intersection is signalized at Mayfield. The Region completed an environmental assessment for widening Mississauga Road to 4 lanes from Bovaird Drive to Mayfield Road with anticipated construction starting in 2019.

Heritage Road – is a 2-lane north-south City of Brampton minor arterial and Town of Caledon collector road with a rural cross section with a posted speed limit of 80 km/h north and 70 km/h south of Mayfield Road.

Winston Churchill Boulevard (Regional Road 19) – is a 2-lane north-south Regional major arterial road that forms the boundary between Peel and Halton and has a rural cross section with a posted speed limit of 80 km/h. Intersection is signalized at Mayfield.

The Traffic Impact Study (TIS) is a needs assessment and safety review of the study area.

The TIS was prepared by Hatch Mott MacDonald with input from Peel's Traffic Operations, Traffic Safety, Traffic Signals and Systems and Traffic Development groups along with input on projected population impacts from Transportation Planning.

To determine the traffic needs a number of studies and resources were consulted including:

- the Peel Long Range Transportation Plan, 2012 Update;
- the Caledon Transportation Needs Study Update (CATS) (2009);
- Mount Pleasant Secondary Plan and Block Plan (Areas 51-1 and 51-2)
- The City of Brampton Transit and Transportation Master Plan 2009 (Rev. Feb 2010); and
- the Region of Peel Transportation Demand Forecasting Model with 2021 and 2031 a.m. peak hour forecasts.

Traffic counts were analyzed for the all intersections. Traffic analysis took into account existing and forecasted traffic for the years 2011, 2021, and 2031. Traffic capacity analysis was undertaken for all intersections and road sections for future road network scenarios. The traffic forecasts were derived by using previous studies and growth factors within the study area.

Details of the Traffic Impact Study can be viewed in **Appendix D.**

3.4 Traffic Safety

The corridor is performing well from a safety perspective with a low, or low to moderate potential for collision reduction. Based on the review of collision history (January 2006 to December 2010), the five study intersections are listed below in order of collision frequency:

1. Heritage Road
2. Mississauga Road
3. Winston Churchill Boulevard
4. Chinguacousy Road
5. Creditview Road

Nearly 70% of all the study area collisions occurred at these locations. The intersection of Heritage Road and Mayfield Road is of particular concern as 10 of the 14 collisions resulted in injuries, one of which was fatal, and all were the result of right angle impact. The Winston Churchill Boulevard and Mayfield Road intersection also experienced a relatively high number of right angle collisions.

The safety review highlighted concerns with two of the midblock segments. The locations on Mayfield Road of greatest concern, in terms of collisions and injuries, are listed below in order of collision frequency:

1. Mississauga Road to Heritage Road
2. Chinguacousy Road to Creditview Road

Single motor vehicle collisions are the most frequently occurring impact type within these sections. Only one collision was reported in the five-year period between Creditview Road and Mississauga Road. No collisions were reported between Heritage Road and Winston Churchill Boulevard. Midblock collisions occurring at night are also a concern.

3.5 Transit and Active Transportation

Currently there is no transit service along this section of the Mayfield Road corridor. GO Transit operates one bus route in proximity to the study area which runs along Hurontario Street from Orangeville south through Caledon and Brampton to the downtown Brampton terminal.

Pedestrian and cycling activities are uncommon within the Mayfield Road corridor, likely because the study area does not feature any Active Transportation (AT) facilities. The north-south Etobicoke Creek Trail located within the City of Brampton is the closest route, and is situated to the east between Hurontario Street and Kennedy Road.

The City of Brampton Transportation and Transit Master Plan Sustainable Update 2009 outlines future improvements to local transit service to the year 2021. The proposed 2021 transit network includes service on Mayfield Road to Chinguacousy Road and on Chinguacousy Road to Mayfield Road. Service along Mayfield Road within the Study Area is not contemplated. Metrolinx identifies the expansion of Regional Rail on the Kitchener GO line to full-day, two-way service and the provision of Light Rail Transit (LRT)/Bus Rapid Transit (BRT) on Hurontario Street to the Mayfield West community in the vicinity of the Study Area.

3.6 Natural Environment

3.6.1 Aquatic Habitat

The study area is under the jurisdiction of Credit Valley Conservation and contains the headwaters of the subwatersheds of Fletcher's Creek in the east and Huttonville Creek in the west.

Habitat assessments of drainage features were made based on an analysis of channel form (channel width and depth profile, bank height, stability and channel morphology), vegetation (riparian cover type and extent, wetland areas and floodplain vegetation), and linkage (side channels and floodplain, valley lands, ponds and wetlands).

The majority of the crossings are Headwater Drainage features with ephemeral flow, meaning that flow is present only in response to surface events such as the spring snow and ice melt and after rain events. Each of the drainage features is upstream of watercourses managed by Credit Valley Conservation.

3.6.2 Terrestrial Features

No woodlands or identified wetlands of any size have been identified along the study route. A woodlot is approximately 80m south of Mayfield Road and individual trees closer to the road in this area have been identified in the tree inventory.

There are several smaller wetlands associated with the riparian areas of tributaries identified within the study area. Parts of these features will likely need to be removed, to accommodate the proposed construction works. Given their relatively low function and biodiversity, it is anticipated that any adverse impacts can be readily mitigated.

A total of 243 trees were documented within 20m of either side of Mayfield Road between Chinguacousy Road and Winston Churchill Boulevard. Of these 243 trees, 91 were individually numbered and tagged and are shown in the Natural Heritage Report in **Appendix G**. The remaining 152 trees were documented as part of tree groupings.

Ontario Regulation 160/06 gives CVC the authority to regulate development, interference with wetlands and alterations to shorelines and watercourses. The headwater drainage features of Fletcher's Creek provide ephemeral flow contribution to the features downstream. Mitigation measures will be provided to the satisfaction of CVC in order to obtain the necessary permits under the Regulation.

It is anticipated that the proposed construction works can be completed with minimal impacts if mitigation measures are followed:

- implementation of an erosion and sediment control program, with the installation of measures prior to construction works;
- completion of construction works within the regulated area during the relevant fisheries timing window for confirmed CVC regulated features;
- completion of watercourse crossings during dry conditions and a forecasted period of dry weather; and
- Implementation of a contingency plan in the event of unforeseen precipitation during instream works.

3.6.3 Species at Risk

The Headwater Drainage Features within the study area do not provide suitable conditions for Redside Dace but provide contributing habitat. The new Natural Heritage Systems constructed as part of the Mount Pleasant Development lands along Mayfield Road will also become contributing habitat for Redside Dace.

The CVC identified one Bobolink in 2011 within the study area, a bird species protected under the Endangered Species Act. However, there is no suitable habitat to support the 3 most common birds protected under the Act; Bobolink, Eastern Meadowlark, and Barn Swallow and no mitigation is required.

3.6.4 Wildlife Habitat

Wildlife passage to support the movement of small mammals will be a feature of improved culvert sizing throughout the corridor where specified by the MNRF.

3.7 Archaeology and Cultural Heritage Reports

3.7.1 Cultural Heritage Report

Research and a field review confirmed that the study area contains a number of nineteenth and early twentieth century cultural heritage resources within or adjacent to the study area. Fifteen cultural heritage landscapes and two built heritage resources have been identified in the Mayfield Road study area and are numbered within the report.

The following recommendations have been developed for the identified resources:

- avoid construction impacts to cultural heritage resources;
- prepare heritage impact statements for the Home United Church (identified as BHR 1 in the Cultural Heritage Report) at 1500 Mayfield Road and the Farmscape (identified as CL4 in the Cultural Heritage Report) at the southwest corner of Heritage Road and Mayfield Road prior to construction;

Exhibit 2 - Home United Church (named BR-1 in the report

Exhibit 3 - Farmscape (named CL4-in the report

- The feasibility of implementing tree protection zones should be investigated for all cultural heritage resources where tree removals are planned;
- A cultural heritage landscape documentation report should be prepared for cultural heritage landscapes expected to be impacted through alteration to the setting of replaceable landscape features (shrubs and young trees) and the construction of new elements (such as sidewalks);
- Post-construction landscaping and rehabilitation plans should be undertaken in a manner that is sympathetic to the overall setting and fence rows should be preserved where they exist;
- Should future work require an expansion of the Mayfield Road study area then a qualified heritage consultant should confirm the impacts of the proposed work on potential cultural heritage resources; and
- The cultural heritage report is provided in **Appendix K.**

3.7.2 Archaeology

Stage 1 Report

The Stage 1 archaeological assessment determined that 14 archaeological sites have been registered within 1 km of the Mayfield Road study area. The Mayfield Road right-of-way is heavily disturbed but there is archaeological potential beyond its limits throughout the length of the study corridor. Following are the report recommendations:

- The frontage of the Alloa Home United Church has been identified for archaeological potential and should be subject to a **Stage 2** review.
- A large portion of the study area does not retain archaeological potential because of extensive disturbance and can be cleared of the need for further review. Also small areas documented to be low and wet can be cleared of further archaeological concern.
- Any work that occurs outside of the existing right-of-way should be subject to a further Stage 1 review.

Stage 2 Assessment

A Stage 2 Archaeological Assessment was completed where possible as the Region was unable to obtain permission to enter for some properties. The Stage 2 Assessments will be completed in the detailed design stage for the following identified sites.

Table 2: List of Properties Requiring a Stage 2 Assessment

PIN No.	Address	Location
250590058	11324 Winston Churchill Boulevard, Halton	s/w corner of WCB and 17th Sideroad
143610021	709 Mayfield Rd, Brampton	Mayfield Rd east of Heritage Rd
250580122	11694 Winston Churchill Blvd, Halton Hills	n/w corner of WCB and Mayfield Rd
142550128	84 Mayfield Rd, Caledon	n/e corner of WCB and Mayfield Rd
142550024	400 Mayfield Rd, Caledon	n/w corner of Mayfield Rd at Heritage Rd
142550026	486 Mayfield Rd, Caledon	n/w corner of Mayfield Rd at Heritage Rd
142550055	12134 Mississauga Rd, Caledon	n/w corner of Mayfield Rd at Mississauga Rd
142550274	12111 Mississauga Rd, Caledon	n/e corner of Mayfield Rd at Mississauga Rd
142520031	1890 Mayfield Rd, Caledon	Mayfield Rd west of Chinguacousy Rd

For those properties that gave the Region access, a Stage 2 Assessment was conducted which consisted of both pedestrian and test pit survey of 8.1 ha of the study corridor. Approximately 1.6 ha was found to have no potential due to deep and pervasive disturbance. During the course of the pedestrian survey, three archaeological sites with further cultural heritage value were found and they will require a Stage 3 assessment in order to clarify the nature and extent of the cultural deposits.

Stage 3 Assessment

Three archaeological sites were identified in the Stage 2 Assessment that yielded Euro-Canadian artifacts corresponding to occupation circa 1840-1890; 1830-1880; and 1840-1870. . The sites have cultural heritage value and are subject to a Stage 3 comprehensive archaeological assessment which will occur in detailed design. Three locations were identified as follows:

- Two properties located side-by-side at the southeast side of Mayfield Road, northeast of Winston Churchill Boulevard; and,
- One property located on the northwest side of Mayfield Road and southwest side of Chinguacousy Road.

The Stage 1 and 2 Archeological Assessments are provided in **Appendix J**.

Contaminated Soil Screening

A contaminated site screening was completed for the study area and 3 properties were identified with the potential for soil contamination due to land use or previous spills. A Phase I Environmental Site Assessment (ESA) may be required if property is needed for widening at the identified sites.

3.8 Air Quality Report

Air Quality is modelled for the future ultimate road widening using computer simulations for predetermined sensitive receptor locations and compared to guidelines established by government agencies and organizations. The guidelines that are followed are the:

- Ministry of the Environment and Climate Change (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 (CWS).

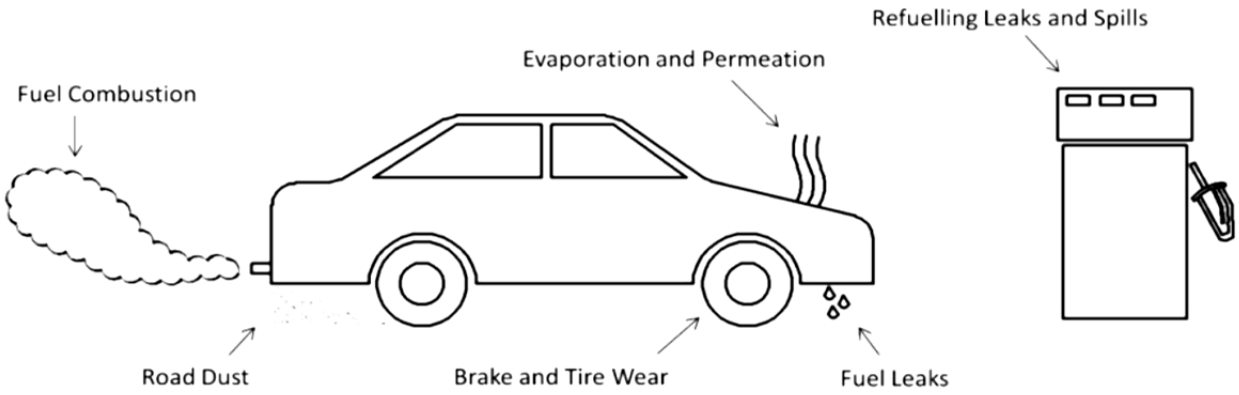


Illustration 1 - Motor Vehicle Emission Sources

The contaminants that were reviewed in the study are:

Table 3 – Contaminants in Air Pollution

Contaminants		Volatile Organic Compounds (VOCs)	
Name	**Symbol**	**Name**	**Symbol**
Nitrogen Dioxide	NO2	Acetaldehyde	C2H4
Carbon Monoxide	CO	Acrolein	C3H4
Fine Particulate Matter (<2.5 microns in diameter)	PM2.5	Benzene	C6H6
Coarse Particulate Matter (<10 microns in diameter)	PM10	1,3-Butadiene	C4H6
Total Suspended Particulate Matter (<44 microns in diameter)	TSP	Formaldehyde	CH2O

The contaminants are compared against 1, 8, and 24-hour averaging periods.

The modelling showed that maximum combined concentrations for the future ultimate road widening were all below the MOECC guidelines or the Canada Wide Standards (CWS) with the exception of PM10 and TSP. Frequency analysis determined that the project exceeded the PM10 guideline 6 additional days over the 5 year period. The TSP guideline was exceeded 1 additional day over the 5 year period. Since for both contaminants this equates exceeding the standards less than 1% of the time, mitigation measures are not warranted.

The full Air Quality report is available in **Appendix M.**

3.9 Noise Report

Modelled noise levels are compared between the proposed road widening scenario and the noise levels before the proposed widening takes place (base case).
2012 – Base Case – Prior to expansion construction
2021 – Completion of widening
2031 – 10-years following completion of expansion construction

The traffic growth incorporated into the noise model was modelled to 2031. The criteria that were used for evaluation follow the MTO's Environmental Guide to Noise.

Table 4 - Mitigation Effort required for Projected Noise levels to 2031

Projected Change in Overall Noise	Mitigation Effort Required
<5dB change or <65dBA	none
≥ 5 dB change or ≥ 65 dB	Introduce Noise Mitigation Measures (Noise control measures should achieve a minimum 5 dBA attenuation)

Six sensitive receptor locations were chosen to model locations that would be significantly affected by the roadway expansion. Locations of modelled receptors are as follows:

- 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; and
- R6, House, South of Mayfield Rd on Chinguacousy Rd.

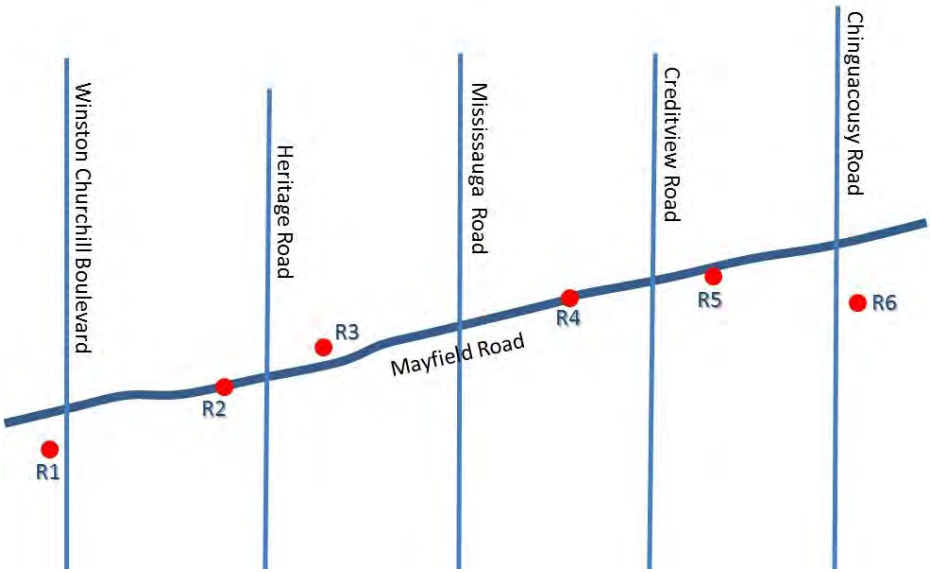


Exhibit 4 – Map of Location of Noise Receptors

The predicted noise levels 10 years following the completion of the Mayfield Rd widening (2031) between the widening versus no widening scenarios will not differ by more than 5dB.

Overall the noise levels in 2031 at the sensitive receptors indicate that all but one receptor (R2) meet the MTO Environmental Noise Guidelines of less than 65 dBA. The noise level at R2 will already exceed the MTO guideline of 65 dBA by 2021. However there is less than 1 dB difference in noise levels between the widening and no widening scenarios of 2031.

In order to achieve the criteria of 65 dBA or less at Receptor R2 during the daytime, it is recommended that a 1.5m tall, 25m long berm be positioned on either side of the driveway leading to the residential unit. Similar sized berms should be placed along Mayfield Road flanking residential driveways 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 should be constructed.

The Noise Report is available in **Appendix L.**

3.10 Contaminated Site Screening Study

The potential for contaminated properties to impact the project can occur in 3 possible ways:

- the purchase of contaminated property required to increase the right-of-way of the Mayfield Road corridor;
- spills along the existing right-of-way; and/or
- migration of contaminants into the existing right-of-way from adjacent properties.

The following properties are identified as areas of moderate potential environmental concern that may have an impact on the project. 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); and
- the intersection of Mayfield Road and Creditview Road (fertilizer and diesel fuel spills).

A Phase I Environmental Site Assessment (Phase I ESA) may be required if property is required for widening at the above locations. In conjunction with the Phase I ESA, and based on existing information, consideration may be given to conducting a 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.

If soil removed during construction is determined to be contaminated, the disposal of contaminated soil will be consistent with Part XV.1 of the Environmental Protection Act and Ontario Regulation 153/04, Records of Site Conditions.

The Contaminated Site Screening report is available in **Appendix I.**

3.11 Geotechnical Investigation

Pavement evaluation involves:

- taking pavement cores at pre-determined locations along the corridor;
- drilling boreholes at various depths; and
- installing monitoring wells.

Geotechnical laboratory testing of borehole samples consists of evaluating natural moisture content, visual classification and description of soil samples. Grain size distribution and particle

size analyses are carried out to determine granular materials and sub-grade soils. The "Falling Weight Deflectometer" test determines how much flexion there is in the pavement.

A pavement condition assessment was completed along Mayfield Road on October 10, 2013. The assessment considered the existing pavement to be in very good condition, with very few surface distresses.

The recommended new pavement structure for Mayfield Road should consist of:

50 mm	HL1 (Top Coat)
110 mm	HDBC (2 lifts)
150 mm	Granular 'A' Base
500 mm	Granular 'B', Type I Sub-base

Reconstruction of the existing pavement structure should include full-depth removal of the existing asphalt surface; followed by the removal of the underlying granular material to subgrade level. The exposed subgrade should be graded, and shaped, with a 3 percent cross-fall to provide subsurface drainage. In all pavement widening areas, the surface topsoil should be removed and the underlying subgrade shaped, graded, and compacted as required for the construction of the new pavement structure. All new ditches should be constructed prior to the placement of pavement materials.

Improvements along Mayfield Road will include lengthening and replacement of Corrugated Steel Pipes (CSP) with High Density Polyethylene (HDPE) Pipes, with the construction of three new structural culverts at Natural Heritage System crossings.

The Geotechnical report is available in **Appendix E.**

3.12 Hydrogeologic Investigation

The Hydrogeologic investigation reviews the existing geologic conditions (bedrock and soil), surface topography, sub-surface conditions including groundwater and hydraulic conductivity (the ease with which water can move through the pore spaces or fractures).

The study area is located within the southern slope of the Oak Ridges Moraine. An in-depth description of the corridor hydrology is provided in **Appendix H** . The proposed works that may have hydrogeological impact relate to the excavation and dewatering procedures during construction including:

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

Before construction, dewatering by using a pump may be required to remove ground or surface water from the construction site. Construction dewatering is used on most construction sites to remove accumulated water in trenches and excavations, areas of inadequate slope or high water table. Dewatering activities must be done properly to avoid eroding the soil or affecting water courses with sediment or warm water.

It is recommended that all necessary de-watering regulations be followed including a Permit to Take Water as required including:

- Monitoring of water quality for groundwater collected within the excavation dewatering system;
- groundwater to be discharged at least 30 m away from any stream;
- If discharge to sewers or a surface water body is proposed, treatment of groundwater to meet acceptable levels is required;
- temporary erosion control measures should be installed to control erosion at the discharge points; and
- private wells identified within or adjacent to the construction to be provided with an alternate water supply if required and/or a well monitoring program implemented.

The Hydrogeologic report is provided in **Appendix H.**

3.13 Fluvial Geomorphological and Meander Belt Width Assessment

Fluvial Geomorphological Assessment

The Fluvial geomorphology assessment reviews how a watercourse will respond to human-induced changes within a watershed and how they may impact human infrastructure and fish habitat.

Fourteen crossings were surveyed within the study area with two being defined as regulated watercourses and twelve defined as headwater drainage features. Though the majority of the drainage features are dry swales, they possess enough channel definition to be identified as headwater drainage features.

The Credit River Tributary 2 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.

In this study area, all but one headwater drainage feature are swales with either intermittent or ephemeral (brief) flows. 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.

Meander Belt Assessment

"Meander belt is the land area on either side of a watercourse that represents the farthest potential limit of watercourse channel movement. Areas within the meander belt may someday be occupied by the watercourse; areas outside of the meander belt will not." (Source TRCA). In this study, all but one watercourse are swales with either intermittent or ephemeral flows. The Meander Belt widths are shown in the final report available in **Appendix H**.

3.14 Stormwater Management and Drainage

Alloa Pumping Station

Concurrent with the environmental assessment study the design for a new water distribution pumping station was completed. The pumping station is located just north and east of Mississauga Road with an access road beside the current location of Alloa Public School. Stormwater management for the pumping station site is managed by a storm pond designed to accommodate the overland water flow plus water from the 100 year storm event. As staff reviewed the stormwater plans for Mayfield Road concern arose on how to deal with the additional release of water from the pumping station in the event of a power failure and storm event in size similar to the July 8, 2013 event (greater than the 100 year storm). In the worst case scenario of a catastrophic storm event, the pond is assumed to fail. Discussion occurred on how this flow could be directed. Staff from Water and Transportation agreed that the best solution would be to provide a spillway to the north, away from development to the south that would outlet into Etobicoke Creek.

The TRCA agrees in principle with the need for a spillway into Etobicoke Creek under emergency circumstances for greater than 100-yr event storms. Approval of the spillway is subject to completion of appropriate design and studies at the detailed design stage. See **Appendix F** for the Alloa Reservoir Storm Overflow Assessment Scenario.

Stormwater Management within the Road Right-of-Way

In order to provide adequate conveyance for drainage across the study corridor for road ROW and external catchments, as well as to connect to future development drainage infrastructure, the proposed drainage plan includes:

Between Winston Churchill Boulevard and Mississauga Road

- enhanced grassed swales for drainage conveyance for the 4-lane rural road ROW cross-section, as well as external drainage; and
- four consolidated cross-culverts upsized to convey at least the 100-yr design flows to downstream ditches/swales, with the provision for further upsizing of two of these culverts to meet future natural heritage systems (NHS)/animal passage access requirements.

Between Mississauga Road and Chinguacousy Road

- external drainage north of the road ROW to be collected via swales to culvert crossings;
- road ROW drainage for the 6-lane ultimate build condition to be conveyed via curb and gutter to catch basins, discharging into sub-surface storm sewer systems eventually connecting to downstream development storm sewers or proposed Natural Heritage Systems (NHS);
- five consolidated cross-culverts upsized to convey at least the 100-yr design flows to downstream proposed development conveyance infrastructure within Block 51-1 and Block 51-2, with two of these culverts further upsized to meet proposed NHS/animal passage access requirements; and
- all downstream conveyance features (i.e., clean water pipes, channel dimensions) from proposed outlet culverts to be developed under the future development plans to be adequately sized to convey the 100-yr flow at a minimum as estimated in the study.

The following SWM/LID measures are proposed to be implemented to treat, reduce and infiltrate road ROW runoff from design events within the corridor as much as feasibly possible in order to meet water quality and quantity control objectives:

Between Winston Churchill Blvd and Mississauga Road:

- Water quantity/balance benefits to be achieved through the wide enhanced grassed swales to encourage peak flow attenuation prior to discharge, as well as temporary ponding during storm events. If no further future widening of the road is planned, Low Impact Development (LID) measures such as bio-swales with sub-surface storage can be considered as a permanent measure instead of enhanced grassed swales.
- Water quality benefits to be achieved through wide enhanced grassed swales to encourage pollutant settling prior to discharge.

Between Mississauga Road and Chinguacousy Road for the ultimate condition 6-lane urban cross-section:

- Water quantity control through the use of linear LID sub-surface underground detention chambers located under multi-use paths designed to capture and detain road ROW runoff from impervious areas via catch basins from the 10-yr storm event. Runoff from less frequent, larger events (> 10-yr) is expected to overflow through storm sewers to outlets (i.e., culvert crossing/downstream development sewer connections).
- Water quality control of runoff from paved surfaces is to be implemented through treatment train approach using catch basin inserts at curb and gutter prior to directing runoff to the underground detention chambers to encourage pollutant settling. Any overflows from the underground detention will be treated via end-of-pipe oil and grit separator (OGS) devices prior to discharge to suitable outlets.

- Additional water quantity and quality control may be provided by proposed downstream stormwater management ponds in Block 51-2 for runoff from portions of road ROW sewer sheds connected to downstream development storm sewers.

During the detailed design stage, all applicable Region, MOECC, CVC and TRCA standards for drainage system design will be followed. All hydraulic (i.e., HEC-RAS and CulvertMaster) models will be updated for evaluation based on final design of road profiles, bridge design and comprehensive survey data of the stream corridor and adjacent land topography. Soil infiltration testing at the proposed LID feature locations will be conducted in order to determine exfiltration rates from the underground detention chambers and optimize chamber sizing. Additional boreholes at the LID feature locations may be considered to understand shallow groundwater water levels that may impact the functionality of LIDs. Erosion and sedimentation control measures must be implemented during construction.

Use of Low Impact Development (LID) Practices

Within the study area the Region recommends using LID facilities to infiltrate minor rain events, in effect, to create a sewerless road.

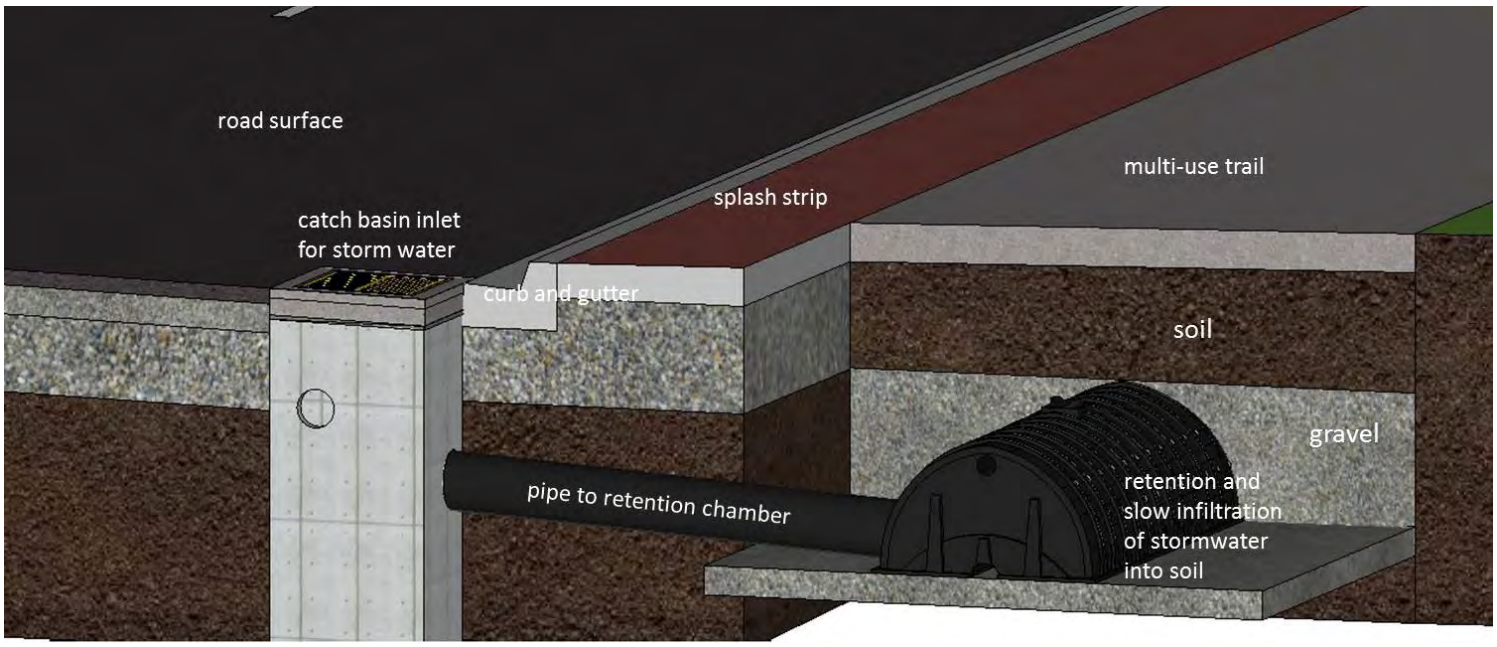
- LID is a green infrastructure approach to stormwater management that uses simple, cost-effective, landscaped features and other techniques to filter, store, infiltrate and use rainfall where if falls.
- LID options will be reviewed and finalized in detailed design.

The preferred option is to use a stormwater infiltration/recharge chamber system under the multi-use trail instead of a conventional stormwater management system such as a stormwater sewer and pond. A system of this kind can provide filtration, conveyance, storage and infiltration of stormwater. The contact area with the soil is maximized by the fully open bottoms and perforated side walls. The advantage of using this type of system under the multi-use trail is that it:

- encourages controlled infiltration of water into the ground;
- replenishes the groundwater;
- stormwater management ponds are not required which reduces opportunity of mosquito breeding for West Nile Virus and the possibility of accidental drowning;
- avoids redirecting stormwater to a watercourse;
- uses land currently available in the road right-of-way;
- the high capacity, open bottom chambers provide more storage and infiltration than conventional systems.

The Fluvial Geomorphological and Meander Belt Width Assessment reports are provided in **Appendix H**.

Illustration 2 - Stormwater Infiltration/Recharge Chamber System



4.0 ALTERNATIVE PLANNING SOLUTIONS

Phase 1 of the Municipal Class EA process involves documenting the factors which lead to the conclusion that an improvement or change is needed. Then a clear statement of the identified problem to be investigated is developed along with the opportunities for improvements. Phase 2 of the Municipal Class EA process develops various planning solutions to the problem and opportunity statement; identifies the net positive/negative effects of each alternative; identifies mitigating measures; evaluates all alternative solutions; and identifies the preliminary recommended solution.

Since the alternatives for the corridor had already been examined in the LRTP Master Plan, the EA team refined and expanded the problem and opportunity statement for the Mayfield Road Environmental Assessment corridor as follows:

Improvements are needed along the Mayfield Road study area to address/accommodate:

- existing and future traffic demands;
- pedestrian and cyclist movements through the study area;
- access control; and
- goods movement.

The recommended planning solution to address the problem and opportunity statement for the study corridor was identified in the LRTP study as:

- staged widening from 2 to 4 lanes from 1.5 km west of Mississauga Road to Winston Churchill Boulevard; and
- widening from 2 to 6 lanes from Chinguacousy Road to 1.5km west of Mississauga Road.

The recommended planning solution has been used as the basis for the study as it proceeded through Phases Three and Four of the Municipal Class EA process.

4.1 Public Information Centre (PIC) No. 1

The public was invited to review the project information including existing conditions and the preferred alternative solution at the first Public Information Centre.

A Technical Advisory Committee (TAC) meeting was held prior to the first PIC that gave agency stakeholders such as MNRF, CVC, Hydro One Networks, Hydro One Brampton, Halton Hills Hydro, the Town of Caledon, the City of Brampton and Halton Region an opportunity to discuss the study to date and review the content of the PIC information boards. The TAC meeting details are available in **Appendix N**.

The first PIC was held on November 27, 2013 at the Peel Police Association Banquet Hall in Brampton. Following the PIC the stakeholder list was updated to include any new interested parties. Interest in the project was considered to be any feedback received from a stakeholder indicating that they could be directly affected during the planning, construction and/or operation of the proposed undertaking. Notices are available in **Appendix A** and PIC boards are available in **Appendix P**.

The public identified an interest in bicycling facilities along Mayfield Road, voiced concerns about property impacts of the proposed widening, and asked about the GTA West study. A list of attendees and comment sheets are provided in **Appendix B**.

4.2 Alternative Design Concepts and Assessment

Following PIC No. 1 staff confirmed the preferred planning solution, to widen Mayfield Road with intersection improvements incorporating transportation demand options.
Phase 3 of the EA involves:

- Development and description of reasonable design concepts
- Screening of alternative design concepts
- Evaluation and identification of a recommended design concept

The following alternative design concepts were considered and were evaluated for each Section of Mayfield Road.

- Widen Equally about the Centre Line
- Widen Entirely to the North
- Widen Entirely to the South
- Hybrid Widening (as determined by pre-existing constraints)

The recommended alternative throughout the corridor is Alternative 4 – a hybrid approach which offers the most design flexibility and least property impacts.

Table 5 provides the description of the design concepts and the screening process that was used to determine a recommended design concept.

All alternatives were evaluated on their potential technical, natural environment, social/land use and cultural environment impacts as well as constructability and cost.

Table 5 – Design Concepts & Screening Process for the Recommended Design

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				

4.3 Transportation Demand Management (TDM)

TDM was carried forward from the review of planning alternatives. TDM is the application of strategies and measures to provide travel options and choices to reduce single vehicle occupant travel and encourage people to use sustainable modes of transportation such as transit, biking and walking. The Active Transportation Plan recommends sidewalks/multi-use trails to support the TDM program. Within the study area, multi-use trails are recommended on the south side of Mayfield Road to Winston Churchill Boulevard. A paved shoulder is recommended on the north side of Mayfield Road while the road profile remains rural and ditches are present.
TDM is 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 encourage participation in carpooling.

4.4 Roundabouts vs Signalized Intersection Analysis

Roundabout

Peel staff completed roundabout feasibility analysis and pre-screening of all intersections along the Mayfield Road corridor before the commencement of the environmental assessment. The feasibility analysis showed that roundabouts may be an appropriate solution at the

intersections of Mayfield Road at Heritage Road and Winston Churchill Boulevard, subject to more detailed capacity and operational analysis to confirm the feasibility of installation.

The draft Heritage Heights Transportation Master Plan proposes the extension of Sandalwood Parkway as a major arterial road to connect with Mayfield Road between Heritage Road and Winston Churchill Boulevard. Given the proximity of this proposed intersection to both Heritage Road and Winston Churchill Boulevard, it may also be desirable / preferable to implement a roundabout at a proposed new arterial road intersection with Mayfield Road located approximately midway between Winston Churchill Boulevard and Heritage Road. The traffic report conducted a detailed analysis of roundabouts at these three potential locations for the 2021 and 2031 horizon years.

Analysis showed that two-lane roundabouts would function acceptably with 2021 future traffic volumes, operating at a LOS A during both the AM and PM peak hours and the roundabout approaches would operate below capacity.
For the 2031 horizon, it was assumed that Mayfield Road would be widened to a 4-lane cross section between Winston Churchill Boulevard and Heritage Road. The Region has proposed providing two circulating lanes, with 2-lane approaches and right-turn by-pass lanes for Mayfield Road.

However the eastbound approach at Heritage Road would operate at LOS D in the AM peak hour and the northbound approach at LOS F in the PM peak hour. The eastbound approach at Winston Churchill Boulevard would operate at LOS F during the AM peak hour and the westbound approach at LOS B during the PM peak hour. Otherwise, the remaining approaches to the intersection of the future arterial road are expected to operate at LOS A. All movements would operate below capacity with v/c ratios of 0.82 or less on all approaches. The preliminary roundabout options are shown in **Appendix O**.

Intersection

Analysis of traffic signal control for these intersections showed that projected traffic volumes could be satisfactorily accommodated for both the 2021 and 2031 horizons.
Overall, it was concluded that the intersections will operate at satisfactory levels of service and delay under roundabout control for the 2021 traffic conditions but not for the 2031 traffic conditions with long queues being experienced on the eastbound approach during the AM peak hour. Roundabout capacity and level of service at the three intersections can be improved by providing separate right turn bypass lanes for the high-volume right turn movements; and/or providing opportunities for vehicles to make 'U"-turns before and after the roundabouts to reduce the number of the left turn – through movement conflicts. Analysis of these measures has confirmed that satisfactory operations are possible under roundabout control; however, there

Traffic Peaks Hours are measured from 7 a.m. to 9 a.m. and 3 p.m. to 7 p.m.

are a number of factors in addition to capacity that must be considered in deciding the most appropriate form of intersection control. These factors include safety, construction and maintenance cost, property requirements and environmental factors.

4.5 Storm Water and Drainage

Drainage and natural heritage corridors including animal passage were considered in the Heritage Heights Subwatershed Study and the design of Blocks 51-1 and 51-2 in the Mount Pleasant Secondary Plan Area. The intention of the Region's drainage plan is to match the location and type of conveyance infrastructure to what has been already approved for development in the Heritage Heights Subwatershed Study and the Mount Pleasant Secondary Plan Area.

In order to provide adequate conveyance for drainage across the study corridor for road ROW and external catchments, as well as to connect to future development drainage infrastructure, the proposed drainage plan includes:

Between Winston Churchill Boulevard and Mississauga Road

- Enhanced grassed swales for drainage conveyance for the 4-lane rural road ROW cross-section, as well as external drainage; and
- Four consolidated cross-culverts upsized to convey at least the 100-yr design flows to downstream ditches/swales, with the provision for further upsizing of two of these culverts to meet future natural heritage systems (NHS)/animal passage access requirements.

Between Mississauga Road and Chinguacousy Road

- External drainage north of the road ROW to be collected via swales to culvert crossings;
- Road ROW drainage for the 6-lane ultimate condition to be conveyed via curb and gutters to catch basins then discharging into sub-surface storm sewer systems and eventually connecting to downstream development storm sewers or proposed natural heritage systems;
- Five (5) consolidated cross-culverts upsized to convey at least the 100-yr design flows to downstream proposed development conveyance infrastructure within Block 51-1 and Block 51-2, with two (2) of these culverts further upsized to meet proposed NHS/animal passage access requirements; and
- All downstream conveyance features (i.e., clean water pipes, channel dimensions) from proposed outlet culverts to be developed under future development plans should be adequately sized to convey the 100-yr flow at a minimum as estimated in this study.

The following SWM/LID measures are proposed to be implemented to treat, reduce and infiltrate road ROW runoff from design events within the corridor as much as feasibly possible in order to meet water quality and quantity control objectives:

Between Winston Churchill Blvd and Mississauga Road:

- Water quantity/balance benefits to be achieved through the wide enhanced grassed swales to encourage peak flow attenuation prior to discharge, as well as temporary ponding during storm events;
- If no further future widening of the road is planned, LID measures such as bio-swales with sub-surface storage can be considered as a permanent measure instead of enhanced grassed swales; and
- Water quality benefits to be achieved through wide enhanced grassed swales to encourage pollutant settling prior to discharge.

Between Mississauga Road and Chinguacousy Road for the ultimate condition 6-lane urban cross-section:

- Water quantity control through the use of linear LID sub-surface underground detention chambers located under multi-use paths designed to capture and detain road ROW runoff from impervious areas via catch basins from the 10-yr storm event. Runoff from less frequent, larger events (> 10-yr) is expected to overflow through storm sewers to outlets (i.e., culvert crossing/downstream development sewer connections);
- Water quality control of runoff from paved surfaces is to be implemented through treatment train approach using catch basin inserts at curb and gutter prior to directing runoff to underground detention chambers to encourage pollutant settling. Any overflows from the underground detention will be treated via end-of-pipe OGS devices prior to discharge to suitable outlets; and
- Additional water quantity and quality control may be provided by proposed downstream storm water management ponds in Block 51-2 for runoff from portions of the road ROW sewer sheds connected to downstream development storm sewers.

4.6 Active Transportation

The analysis of Active Transportation alternatives is based on the procedure detailed in the Ontario Traffic Manual (OTM) Book 18. Book 18 directs choice of structure through the use of a nomograph to choose the desired cycling facility. For Mayfield Road, the nomograph suggests that with the corridor speed and traffic volume, designers choose an alternate route or separated facility for cyclists in the corridor.

Illustration 3 – Selection of a Cycling Facility

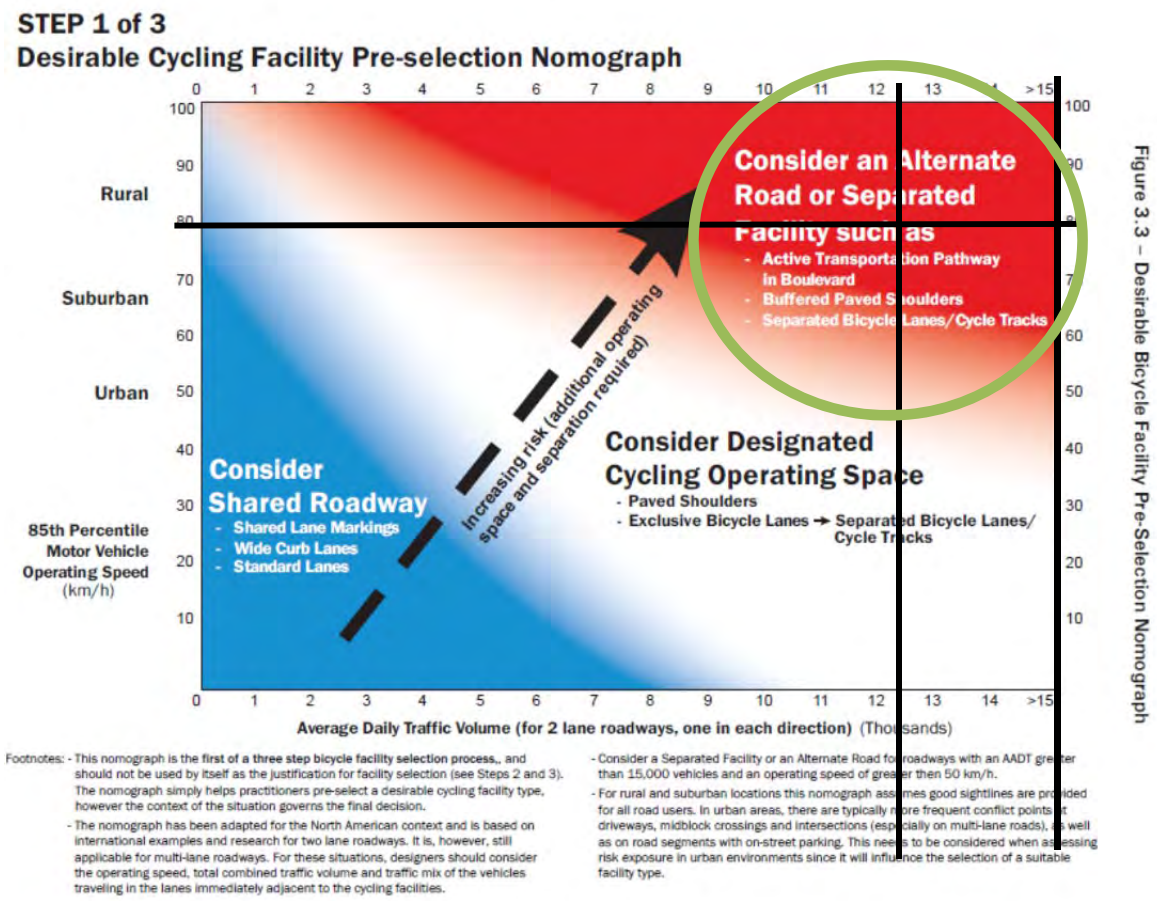


Figure 3.3 – Desirable Bicycle Facility Pre-Selection Nomograph

4.7 Public Information Centre (PIC) No. 2

The public was invited to review the project information including the recommended design and mitigation measures at the second Public Information Centre.

A Technical Advisor Committee (TAC) meeting was held prior to the first PIC that gave agency stakeholders such as MNRF, CVC, Hydro One Networks, Hydro One Brampton, Halton Hills Hydro, the Town of Caledon, the City of Brampton and Halton Region an opportunity to discuss the recommended design and review the content of the PIC information boards. The TAC meeting details are available in **Appendix N**.

The second PIC was held on Thursday, October 8, 2015 at the Peel Police Association Banquet Hall in Brampton. Following the PIC the stakeholder list was updated to include any changes. Interest in the project was considered to be any feedback received from a stakeholder indicating that they could be directly affected during the planning, construction and/or operation of the proposed undertaking. Notices are available in **Appendix A** and PIC boards are available in **Appendix P**.

Feedback received from PIC#2 included a request for project and construction timing; requests for bicycle facilities, bike detection and cross ride facilities; and connectivity to destinations in the corridor through AT facilities. The sign-in sheet and comment sheets are provided in **Appendix B.**

5.0 RECOMMENDED DESIGN

5.1 Recommended Design Criteria

Table 6 – Design Criteria for Mayfield Road from Chinguacousy Rd to Winston Churchill Boulevard

DESIGN PARAMETERS	PRESENT CONDITIONS	DESIGN STANDARDS / MINIMUMS		PROPOSED STANDARDS
		TAC	MTO	
Row Width	36m	20 - 45	N/A	50m
Posted Speed	80 km/hr.	80 km/hr	80 km/hr	80 km/hr
Design Speed (D.S.)	90 km/hr	90 km/hr	90 km/hr	90 km/hr
Minimum Stopping Sight Distance	-	130-170 m	160m	160m
Equivalent Minimum 'K' Factor for 90km/hr. design speed	n/a	30 – 40 Sag 32 – 53 Crest	40 Sag 50 Crest	40 Sag 50 Crest
Minimum Radius for 90km/hr design speed		380m	n/a	380m
Lane Width for 90km/hr. design speed	2 x 3.6m	3.5 – 3.7m	3.5m	3.75m Curb Lanes 3.65m Inside Lanes 3.5m Turn lanes
Boulevard Width	N/A	3.0 m	3.0m	5.5m typical
Clear Zone	-	-	6.0m	6.0m from edge of the travel lane
Number of Lanes Construction 2021 for section just west of Mississauga Rd to Winston Churchill Boulevard	2 Lanes Rural	-	-	4 Lanes **rural** profile + flush median
Number of Lanes Interim Condition Construction 2020 for section Chinguacousy Rd to just west of Mississauga Rd	2 lanes	-	-	3 lanes **urban** profile south side built to ultimate road location + flush median + 2 lanes north side **rural** profile
Number of Lanes Final Construction after 2031 - Chinguacousy Rd to just west of Mississauga Rd	5 (after 2020)	-	-	Existing 3 lanes **urban** profile south side + existing flush median + 3 lanes north side **urban** profile (**1 lane added**)

Note: 1. Within 245m of an intersection an additional 5.5m will be protected for a total of 55.5m.

2. For intersections with dual left turns an additional 3.5m will be protected for a total of 59.0m.

5.2 The Proposed Road Design

5.2.1 Existing Conditions

Mayfield Road is currently a two lane undivided rural road with a posted speed limit of 80 km/hr. The existing right-of-way is typically 36m and the designated right-of-way is 50m at the mid-block and 55.5m at intersections. An additional 3.5m is required for the Chinguacousy Road intersection due to dual left turn lanes for a total of 59m.

Mayfield Road has some minor shifts throughout the study area. There is a south shift between Winston Churchill Boulevard to Heritage Road; the road shifts north between Heritage Road to Mississauga Road and between Mississauga Road to Creditview Road. The existing road consists of mostly flat terrain and the proposed profile of the road follows it.

Mississauga Road and Winston Churchill Boulevard are major roads and Chinguacousy Road, Creditview Road and Heritage Road are minor roads. The Winston Churchill Boulevard, Mississauga Road and Chinguacousy Road intersections are signalized. Creditview Rd and Heritage Rd are controlled by 2-way stop signs. No sight line issues were identified along the roadway.

There are 5 intersections within the study area as follows:

- Chinguacousy Rd
- Creditview Rd
- Mississauga Rd
- Heritage Rd
- Winston Churchill Blvd

5.2.2 Proposed Horizontal Alignment

The west project limit is located ±260m west of Winston Churchill Boulevard. For the majority of the study area the existing centreline of Mayfield Road is maintained and the road widening is proposed equally about the centreline. However, the proposed alignment is shifted ± 8m north at the Mississauga Road intersection to match into the Mississauga Road design from the recently completed Mississauga Road

Understanding Road Design Terms

Sight Distance: the length of roadway ahead visible to the driver.

Alignment: road "alignment" is based on the defined center line of the road.

The **horizontal alignment** is the configuration of the roadway as seen in plan and generally consists of straight sections and horizontal curves. Defining a horizontal alignment is the starting point for the road design. It is essentially a control point of which everything is built.

The **vertical alignment** consists of straight line grades and the vertical curves used to connect them. There are two types of vertical curves, crest curves which occurs on hills, and sag curves which occur in valleys. Good road design provides smooth transition between adjacent grades.

Stations: are horizontal distances that are measured along the alignment. They are marked on the design plan in 100m increments.

Profile: is an illustration of what the road would look like if it was cut it in half, right down the centerline, and then picked up and looked at from the side.

Profiles display the road surface and its slopes/curvatures at the top level and the lines of sub-grade, stone base, etc., below. They also commonly show the locations of all drainage and sanitary structures along the roadway and the in/out invert elevations for those structures as well as pipe sizing and slopes.

environmental assessment from Bovaird Dr to Mayfield Rd. The shift occurs at Station 2+680 and ends at Station 3+760. Mayfield Road has a second shift of ± 5m to the south that starts at Station 3+760 and ends at Station 4+040 which were chosen to avoid impacts to the Alloa Public School. The last shift occurs at the Creditview Road intersection to avoid impacts to the Home United Church of Canada, an identified heritage structure. The shift is ± 10m and begins at Station 4+040 and matches back to the existing centreline ± 385m east of Mississauga Road at Station 4+820.

5.2.3 Proposed Vertical Alignment

The proposed vertical alignment was established based on a design speed of 90 km/hr for the rural and urban section. A minimum of 0.5% grade is proposed at the urban section with an absolute minimum of 0.30% grade at some areas where no other alternative was feasible. The rural section has a flatter grade which is acceptable due to no curbs and a crowned road. Provision of minimum road cover protection at each culvert crossing was considered when establishing the proposed vertical alignment.

There are three locations where the grade difference between the existing and proposed road elevation is relatively higher than the rest of the corridor:

1. Between Station 0+280 and 1+360 (up to ± 0.8m);
2. Between Station 2+260 and 4+080 (up to ± 1.3m); and
3. Between Station 4+340 and 5+500 (up to ± 0.7m).

This was done in order to minimize impacts on adjacent properties and provide sufficient cover for the culvert. The K values used for the vertical curves were 40 for the sag and 50 for the crest.

5.2.4 Cross Sections

Mayfield Road will be widened in an interim and ultimate configuration within the designated 50.0m right-of-way. The interim design will be 4-lane cross section with an at grade centre median for left turns between Winston Churchill Boulevard to Mississauga Road and a 5-lane cross section with median between Mississauga Road and Chinguacousy Road. The ultimate design will be a 6-lane cross section with

Cross Sections: show what the roadway would look like if it was cut from curb to curb top down and looked at on end. Cross sections typically show the road surface and all sub-grade construction materials (pavement structure) as well as the position and number of vehicle, transit or bicycle lanes and sidewalks/multi-use trails. Cross sections also show drainage features, utilities and landscaping.

Design Speed: The design speed is a tool used to determine geometric features of a new road. Design speed may be determined by the planned operating speed, legislated speed, traffic volume or road classification and typically is greater than the posted speed.

Vertical Curve: the function of a vertical curve is to provide a smooth transition between adjacent grades along the road. The form of curve used for vertical curve design is a parabola. There are 2 kinds of vertical curves: crest curves (positive) and sag curves (negative). One of the properties of a parabola is that the rate of change of grade with respect to the length is constant. This means that a driver travelling on a crest curve has a constant sight distance throughout the curve.

K Value: The horizontal distance in metres needed to make a 1% change in grade. K is the measure of the flatness of a curve; the larger the K value the flatter the curve.

centre median for left turns between Mississauga Road and Chinguacousy Road.

The project comprises both rural and urban sections of roadway. From Winston Churchill Boulevard to Mississauga Road will be a rural section with a shoulder and ditches. From Mississauga Road to Chinguacousy Road will be an urban section with curbs and gutter and multi-use trail. A 5.5m two-way centre left turn lane is provided throughout the urban section of the corridor to enable safe turning into existing property accesses. A 4m two-way centre left turn lane is provided throughout the rural section. A 3.75m outer lane is also provided throughout the entire corridor to assist goods movement as identified in the Peel Strategic Goods Movement Network Study.

During detailed design construction staff will work with CVC to look at opportunities to reduce any culvert lengths at watercourse crossings. Details of the typical sections are illustrated in **Exhibit 5** and **Exhibit 6**:

5.2.5 Cross Slope and Superelevation

A standard 2% cross fall is proposed along the corridor. There are no areas of superelevation within the corridor because a radius of 3000m is used for the proposed horizontal alignment which is the minimum to obtain normal crown for design speed of 90 km/h.

5.3 Typical Cross Sections and Recommended Design

The following exhibits illustrate the proposed rural and urban cross sections and the recommended design alternative.

Rural and Urban Sections

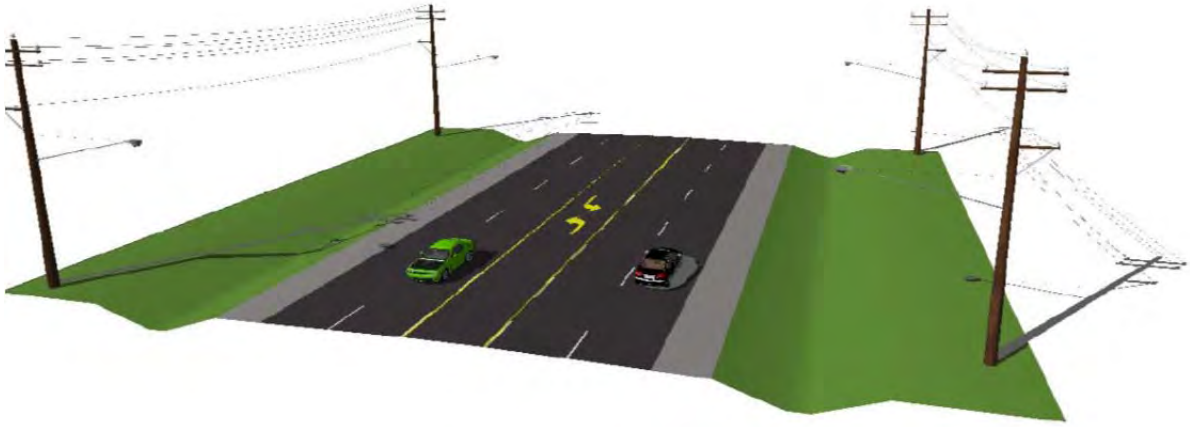
Rural section refers to those portions of road that utilize ditches for storm water drainage and infiltration and typically have a paved shoulder that may be used for safe stopping or for bicyclists.

Urban section refers to those portions of road that utilize curbs and gutters to direct storm water from the road surface and typically have sidewalks and/or multi-use trails for pedestrians.

Cross Slope and Superelevation: On straight sections of normal two-lane roads, the pavement cross section is usually highest in the center and drains to both sides. Cross slope is used to provide drainage so that the water will run off the surface to a gutter or ditch.

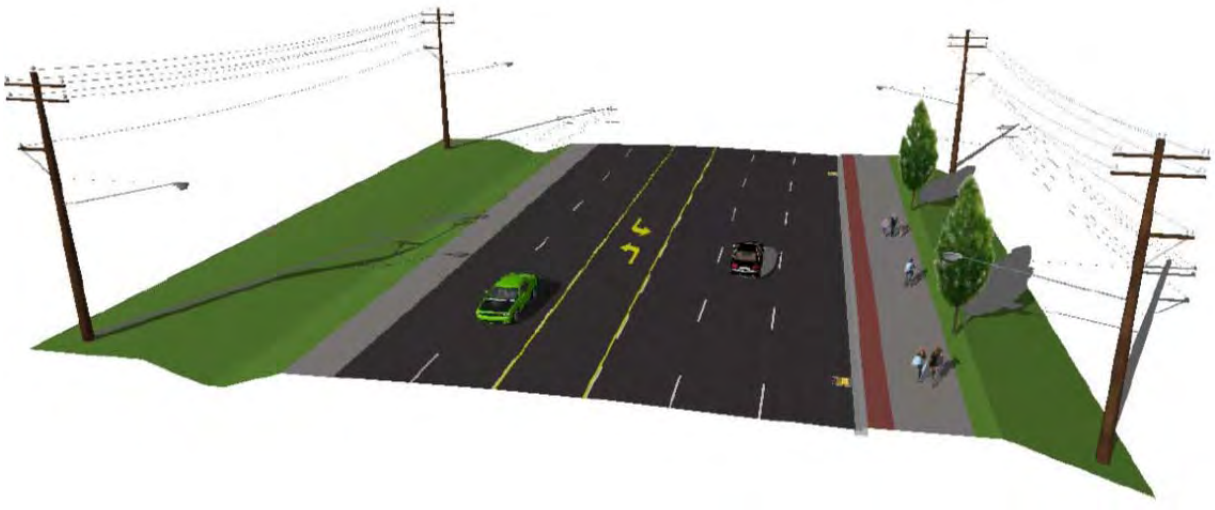
On horizontal curves, the cross slope is banked (**superelevated**) to reduce steering effort and lateral force required to go around the curve.

Exhibit 5 - 4-Lane 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 with ditches on both sides of the road; rural cross section maintained; and a paved shoulder for safe stopping of motor vehicles and for bicycle use on both sides of the road.

Exhibit 6 - 5-lane Interim Cross section of Mayfield Road from Chinguacousy Road to just west of Mississauga Road to 2021 - preliminary recommended design



View is looking east at the mid-block with 5 through lanes, 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.
Design features:

- 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; and
- curb and gutter and storm sewers on the south side.

If the development of the Town of Caledon's Mayfield West Phase II (located on the north side of Mayfield Road between McLaughlin Road and Chinguacousy Road) occurs in advance of the planned 5-lane construction, staff will advance the design and construction of the 6-lane scenario to meet the needs of development and traffic and by-pass the interim 5-lane design.

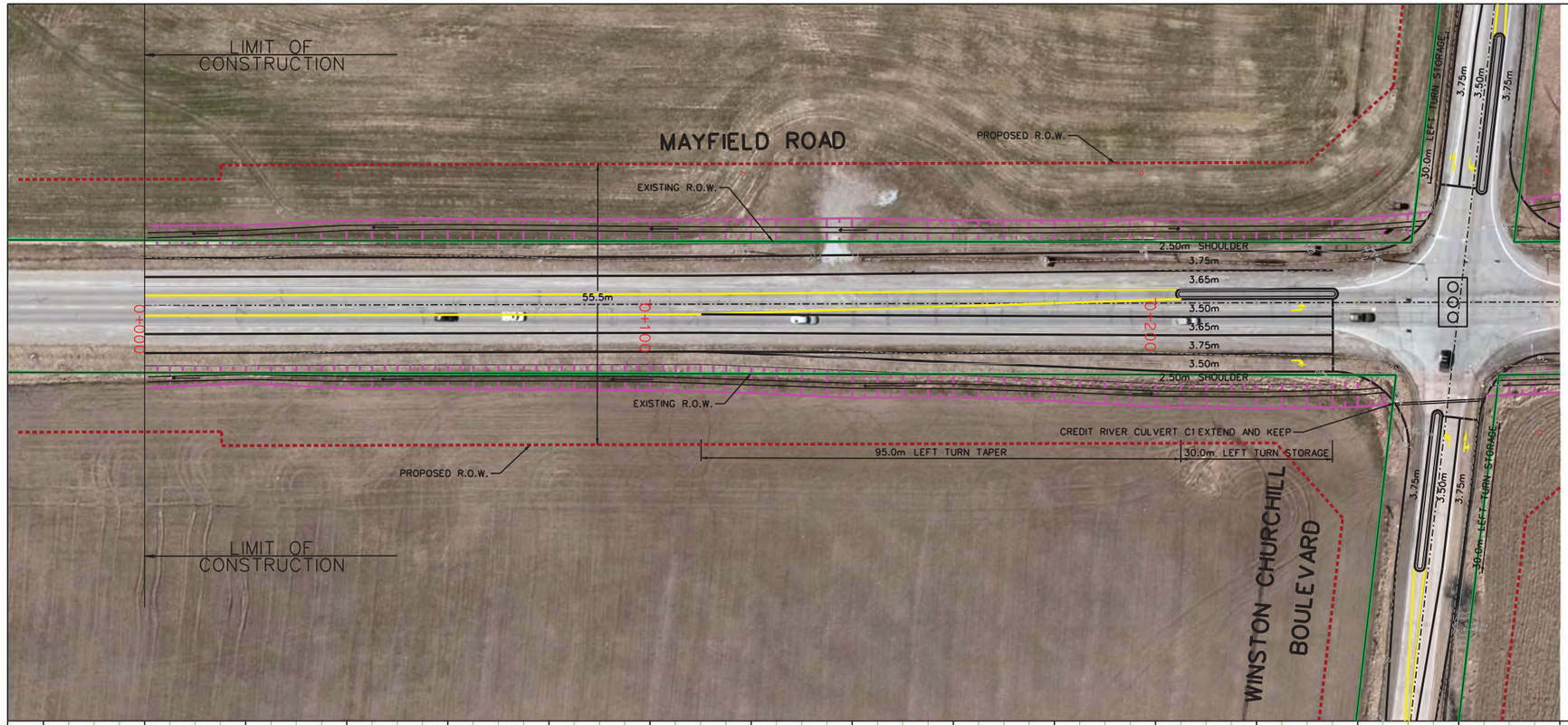
Roundabout Feasibility
Roundabout feasibility was screened for all intersections along Mayfield and 3 intersections were identified as possible roundabout locations:

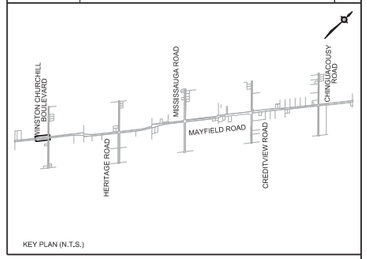
- Heritage Road;
- Proposed Sandalwood Parkway Extension (City of Brampton Road); and
- Winston Churchill Boulevard.

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. The preliminary roundabouts options are shown in **Appendix O**.

The following plates show the recommended design along the corridor.





KEY PLAN (N.T.S.)

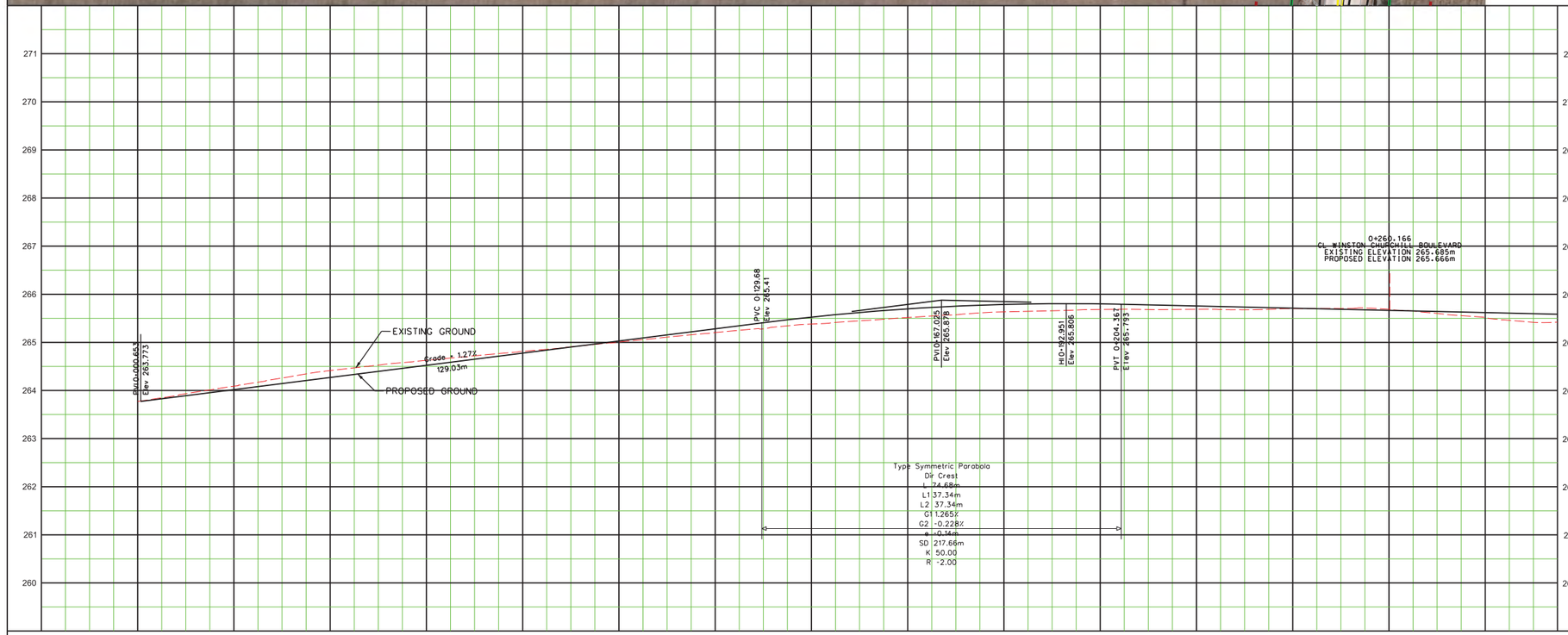
SERVICE DATA

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.			CITY		
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.
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

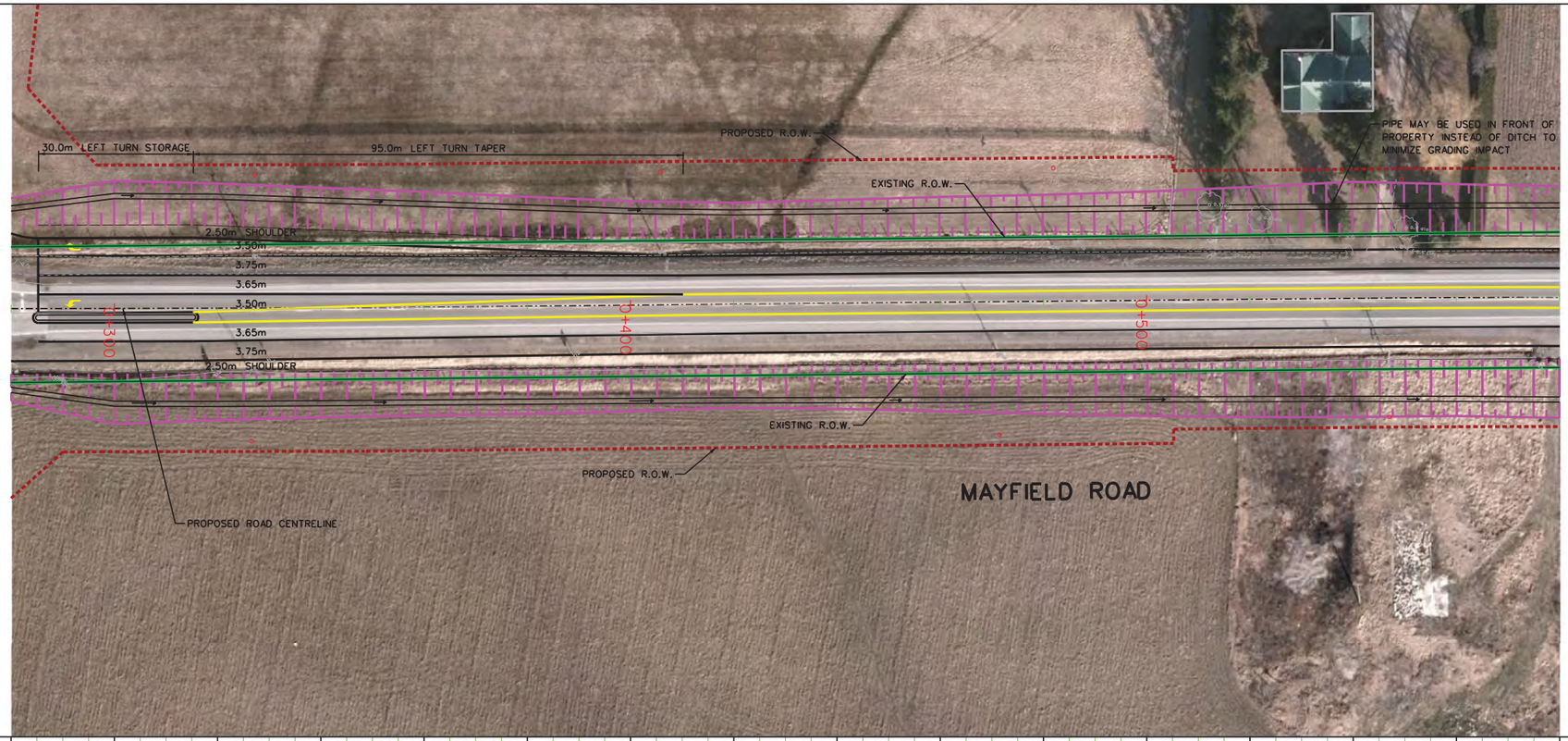
MAYFIELD ROAD

(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.	



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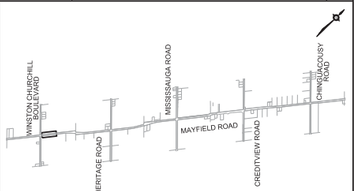

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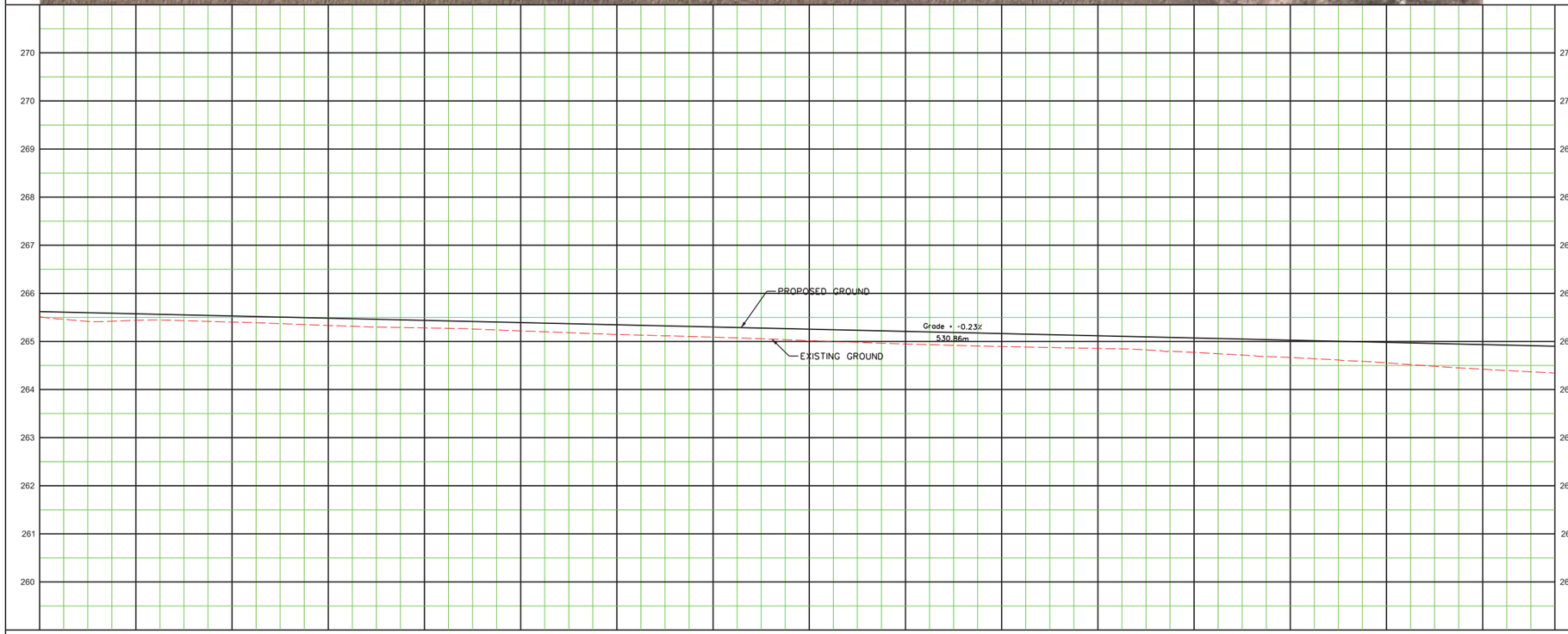
- RELOCATED HYDRO POLES



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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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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

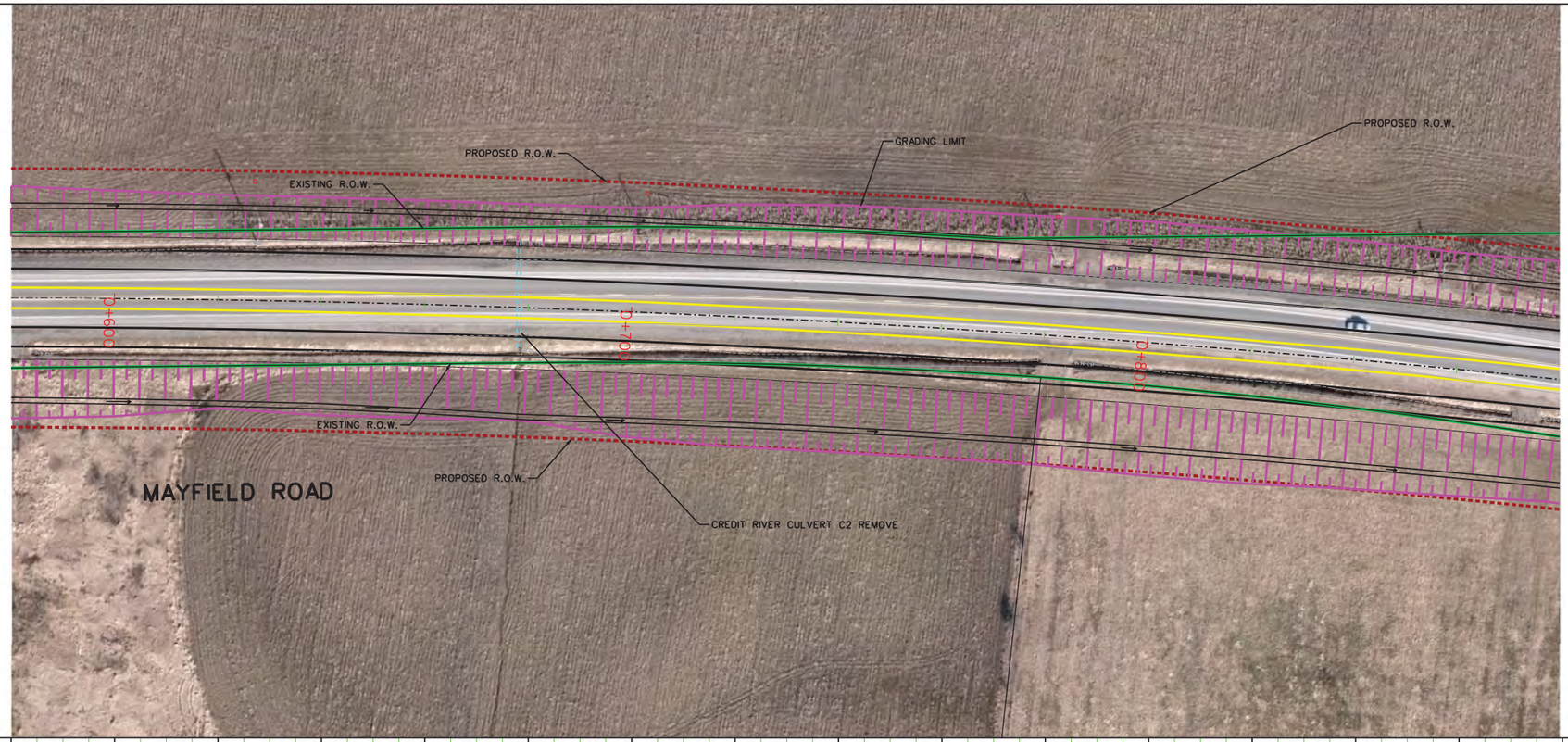
MAYFIELD ROAD

(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.	



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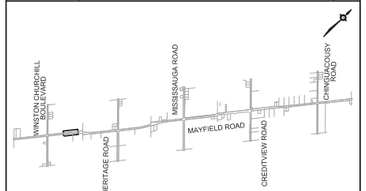
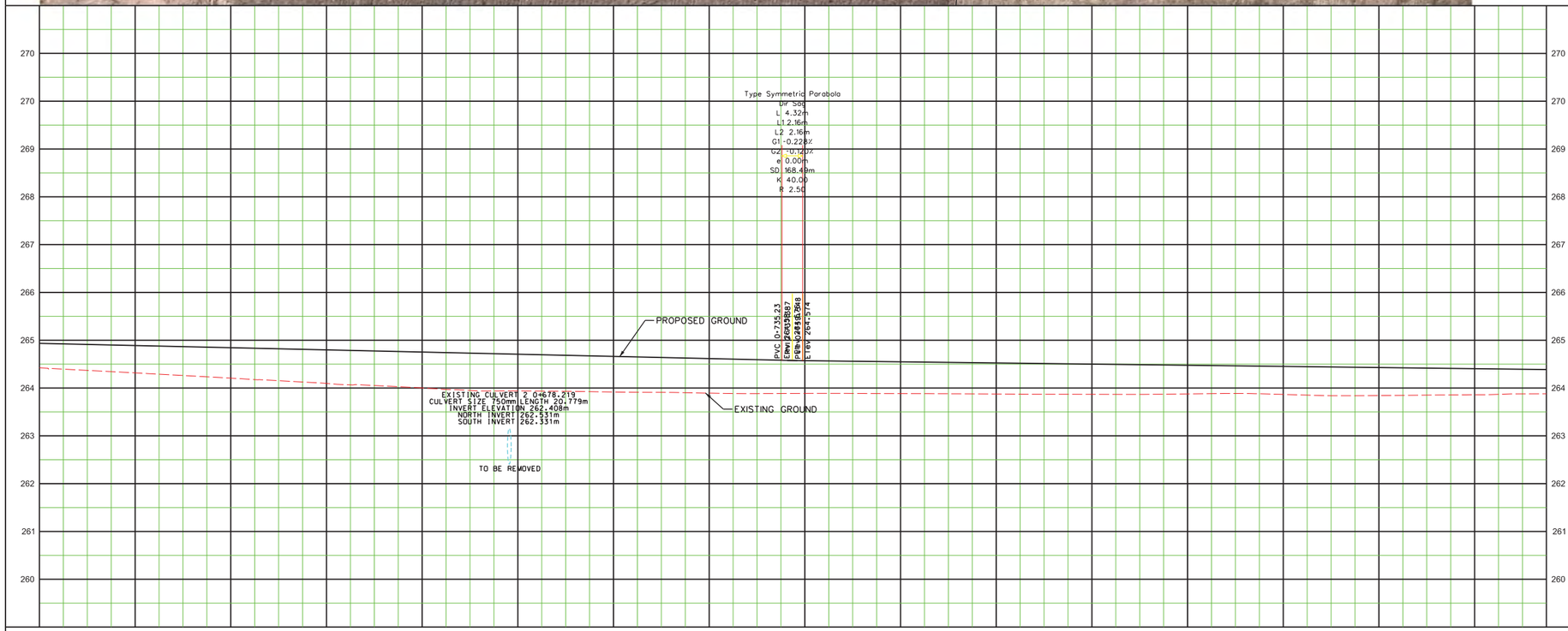
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES



General Notes

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All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
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B.M. No. Elev.
Description
Location
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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
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CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL CANADA
ENBRIDGE INCORPORATED-GAS DISTRIBUTION
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ONTARIO CLEAN WATER AGENCY
HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
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CABLE TELEVISION/FIBREOPTIC PROVIDERS:
BELL CANADA
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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

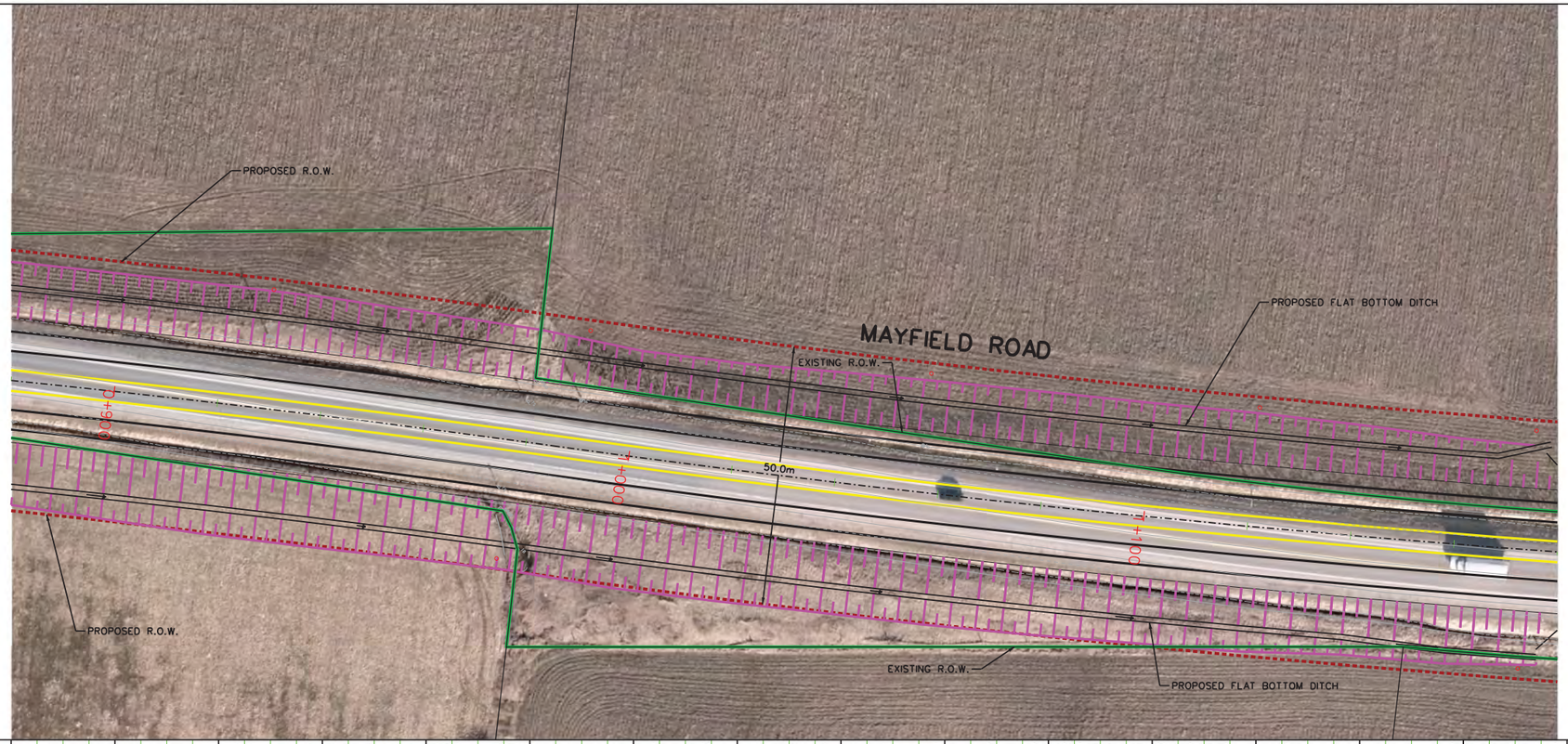
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

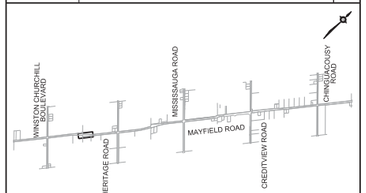
STA. 0+580 TO STA. 0+880

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 3 of 30	Plan No.	



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.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
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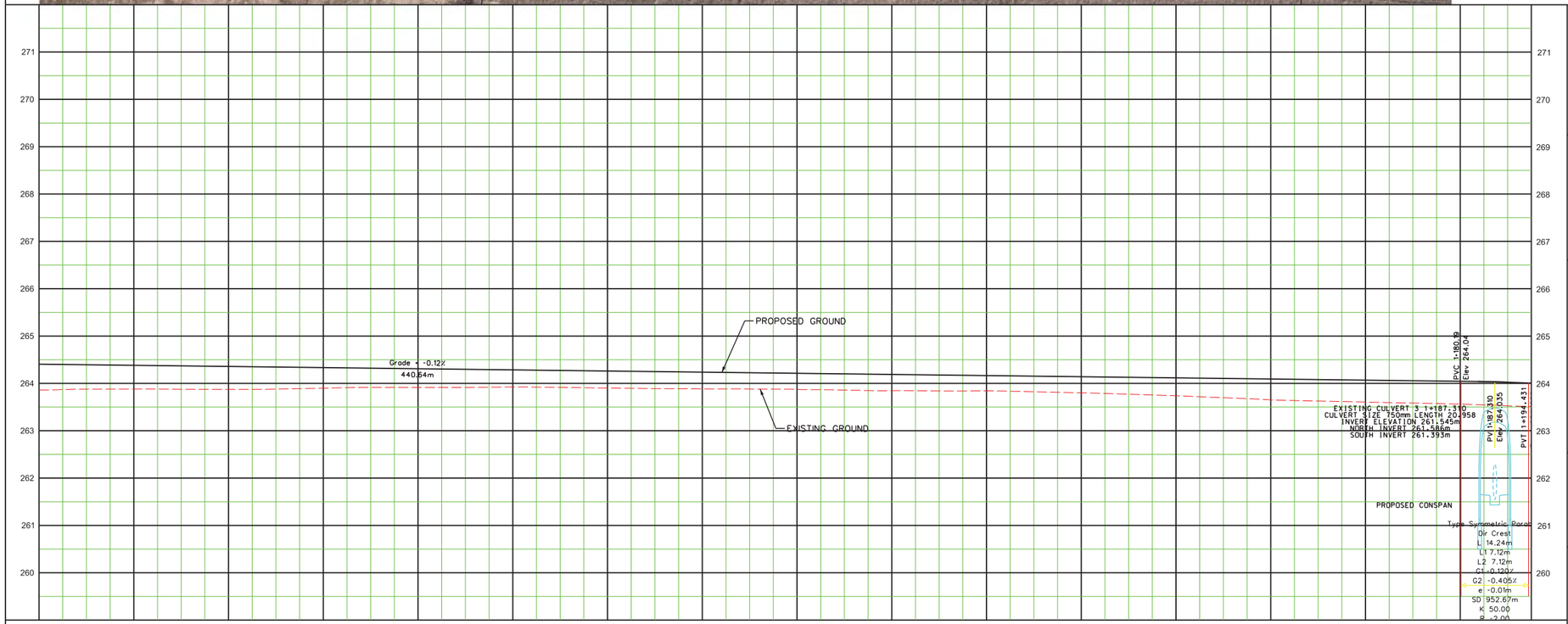
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES



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10m 0 10 20 30m — HORIZONTAL SCALE
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Region of Peel
Working for you

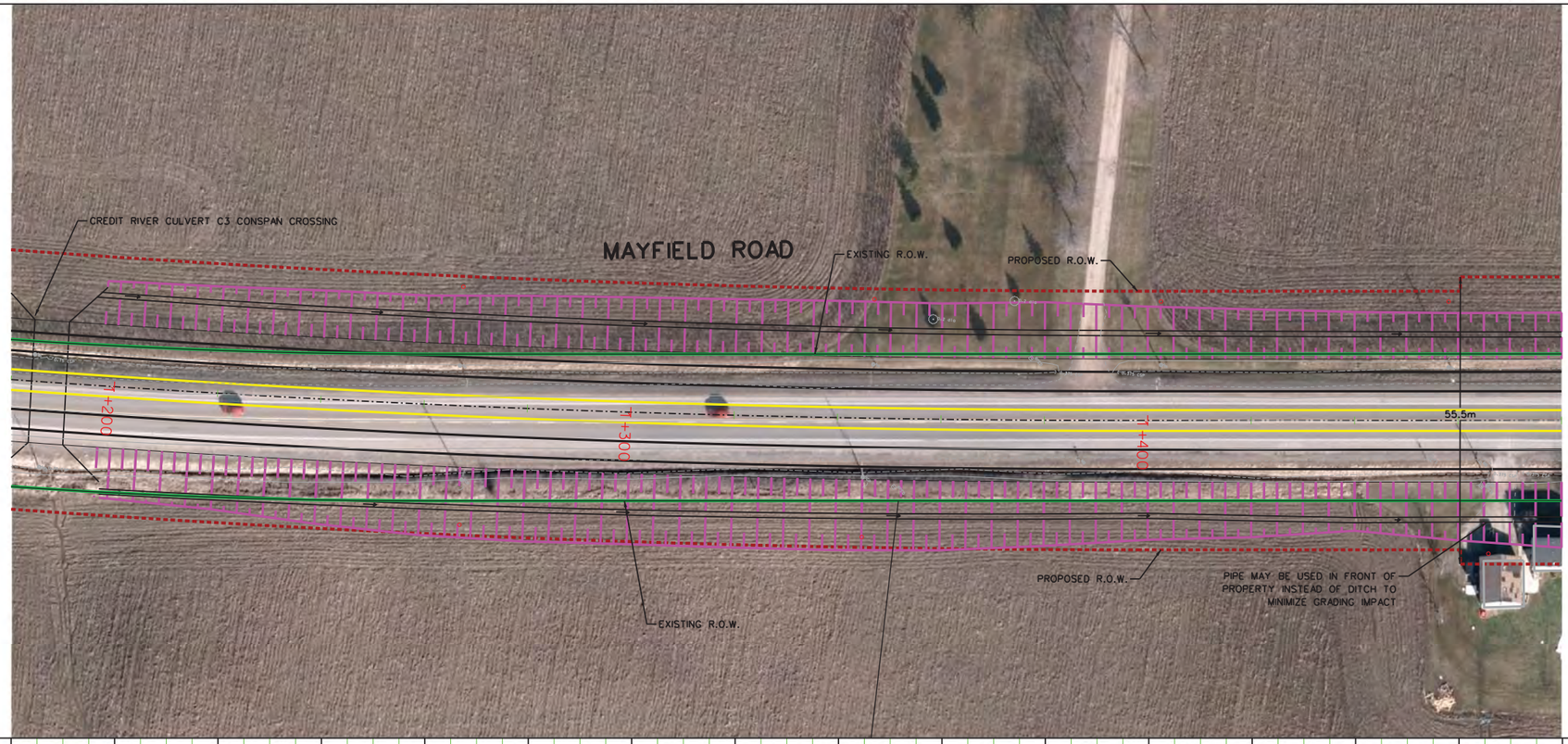
MAYFIELD ROAD

(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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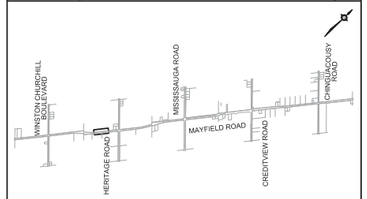
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

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NOTES:
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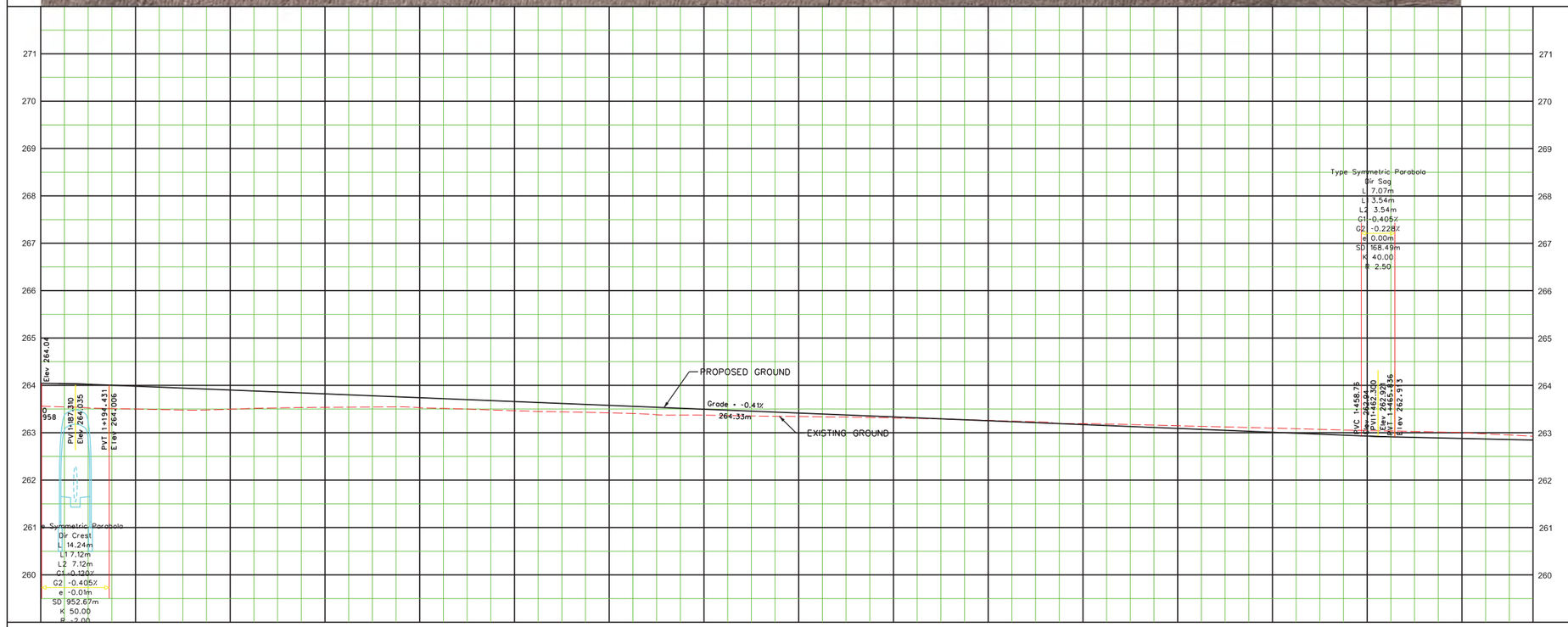

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Region of Peel
Working for you

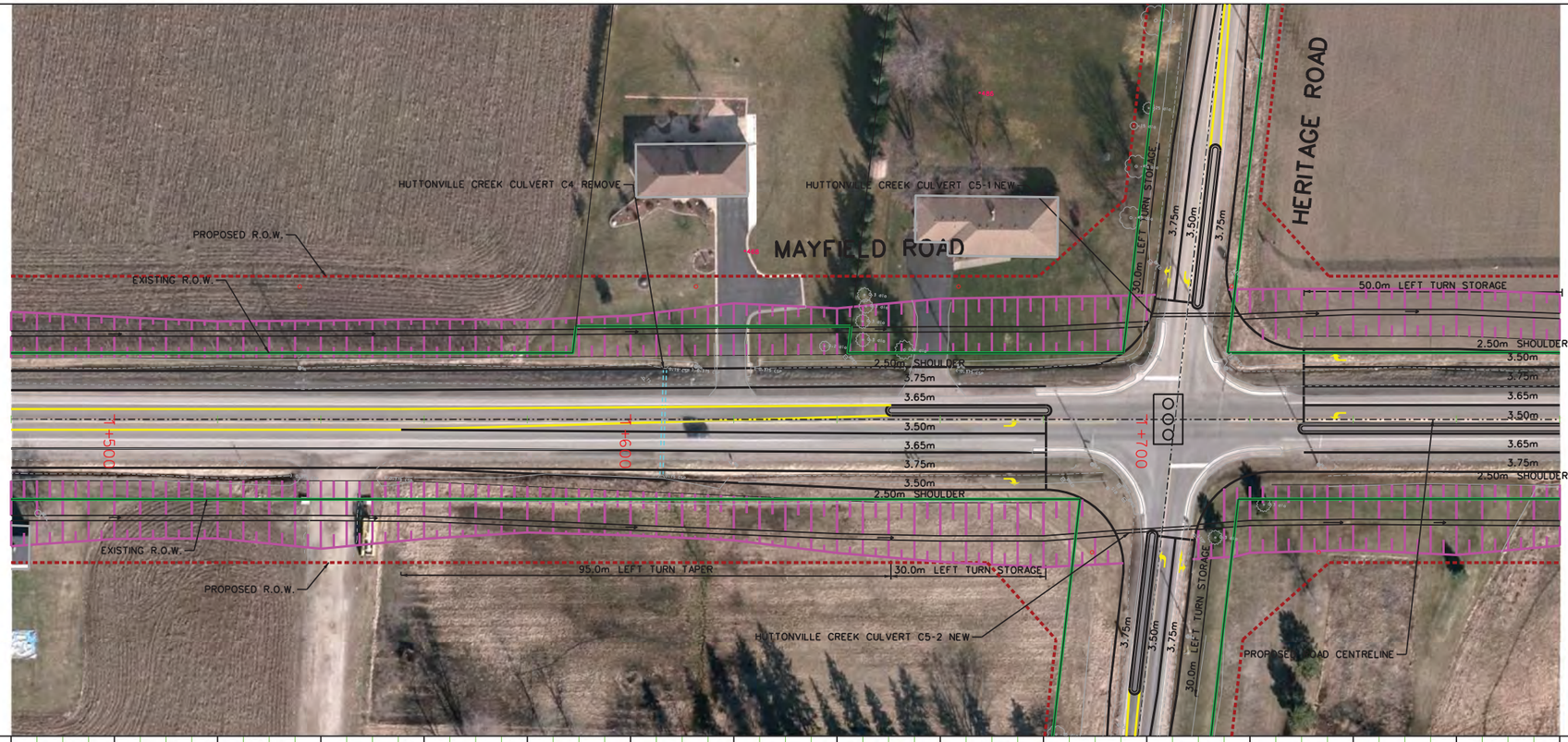
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 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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REVISIONS		
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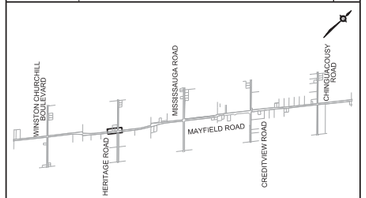

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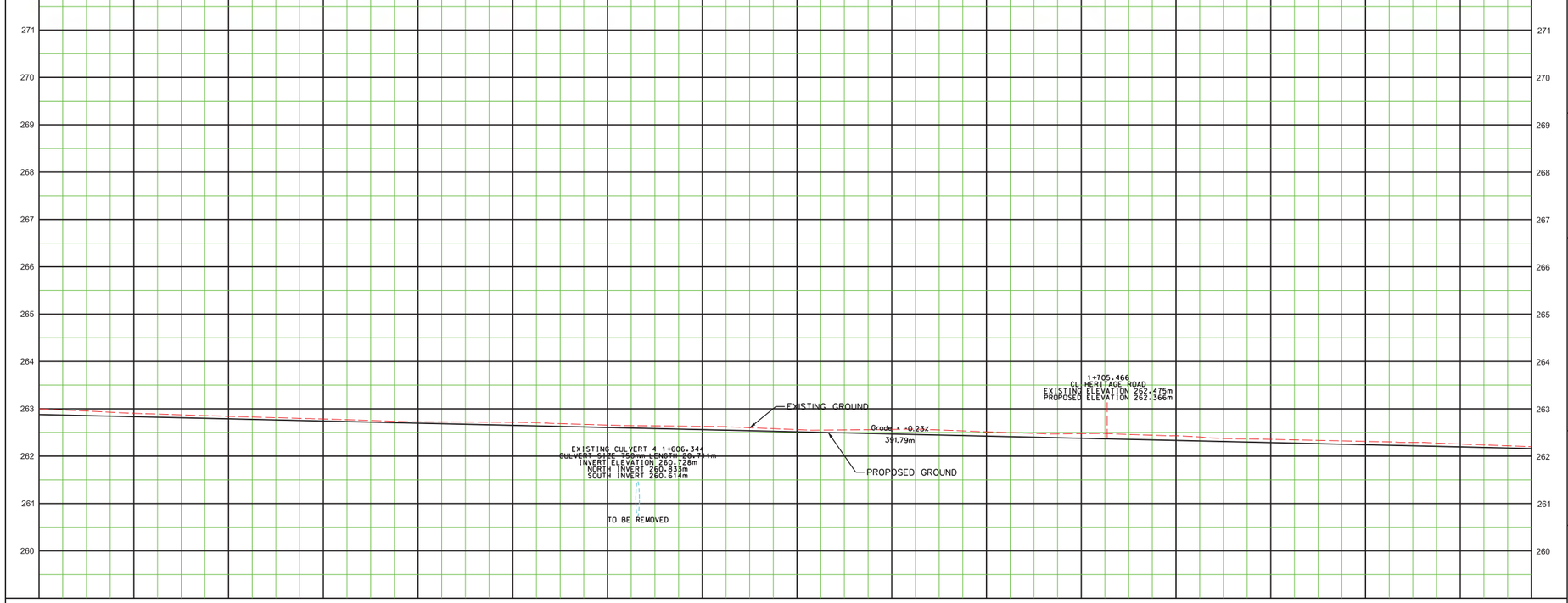

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Region of Peel
Working for you

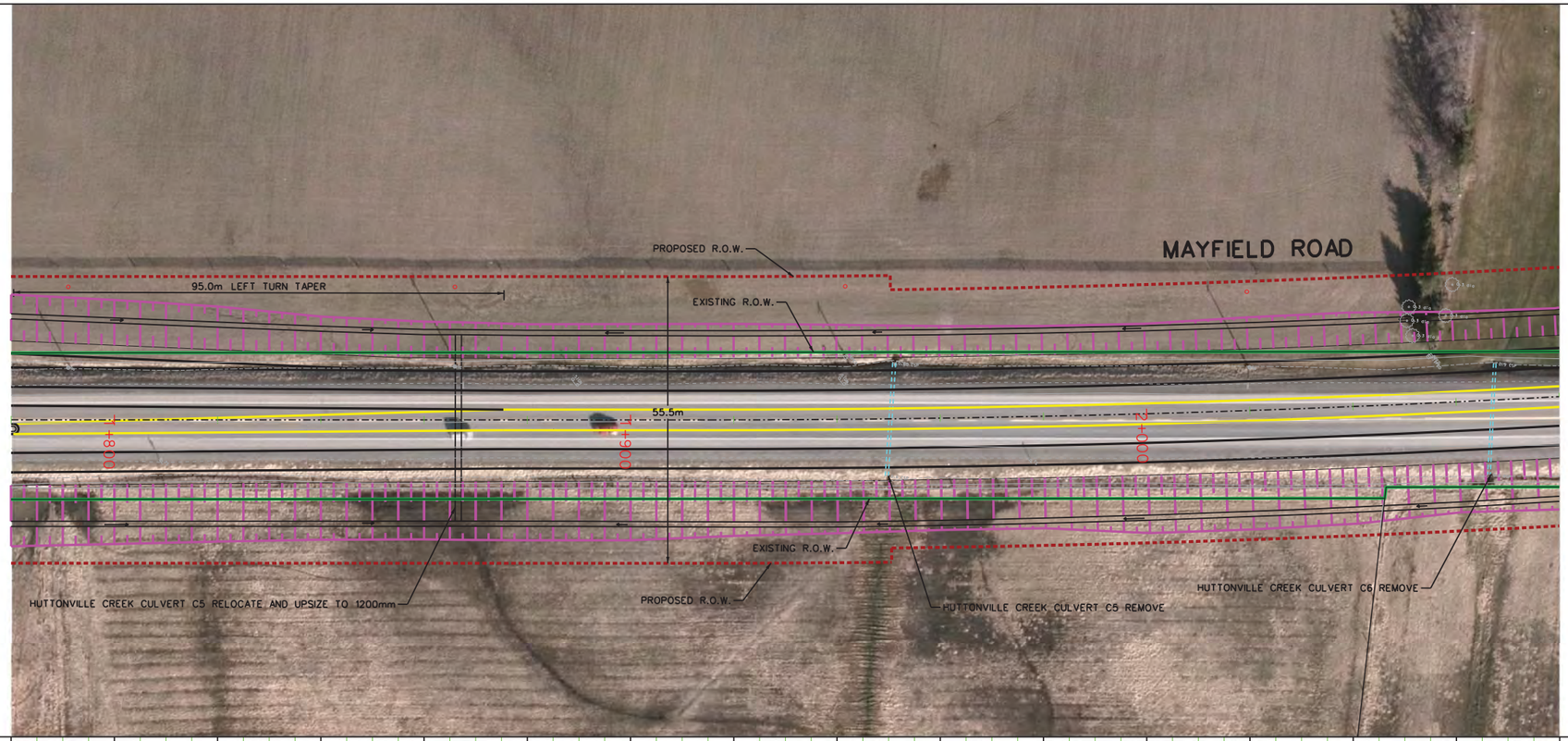
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 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.	



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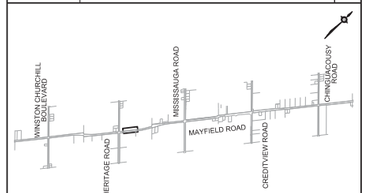

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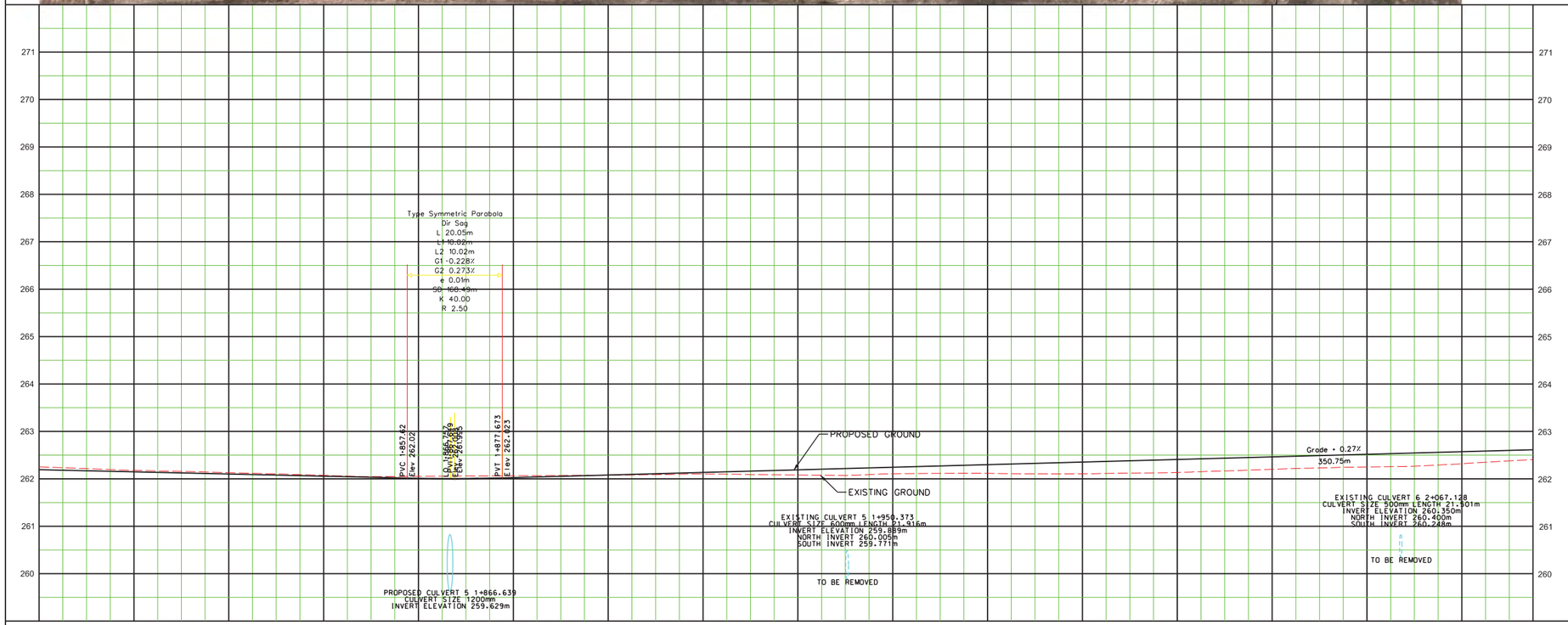

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Region of Peel
Working for you

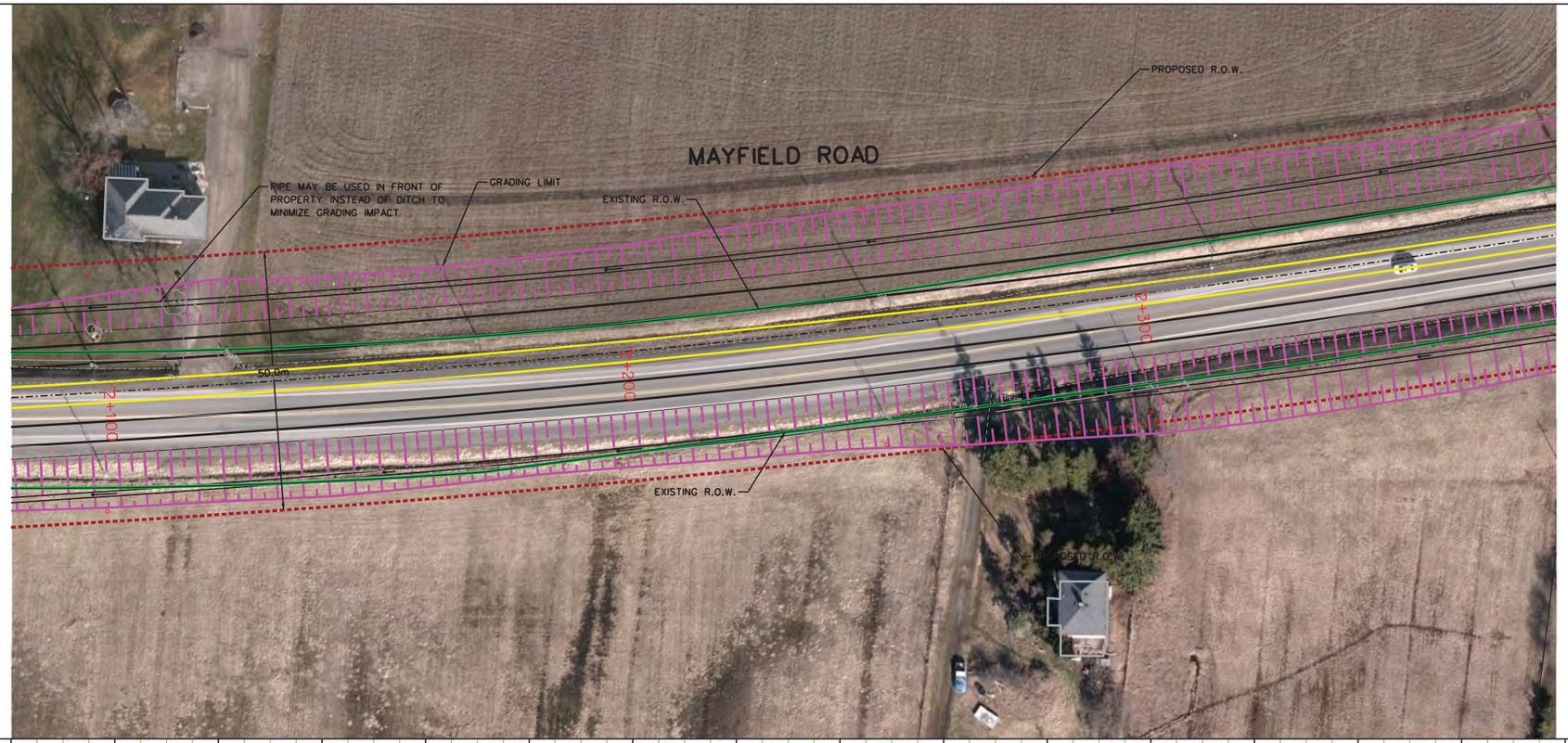
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 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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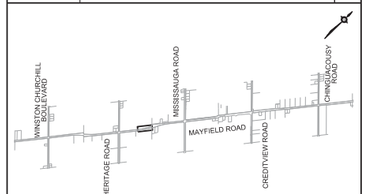
REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

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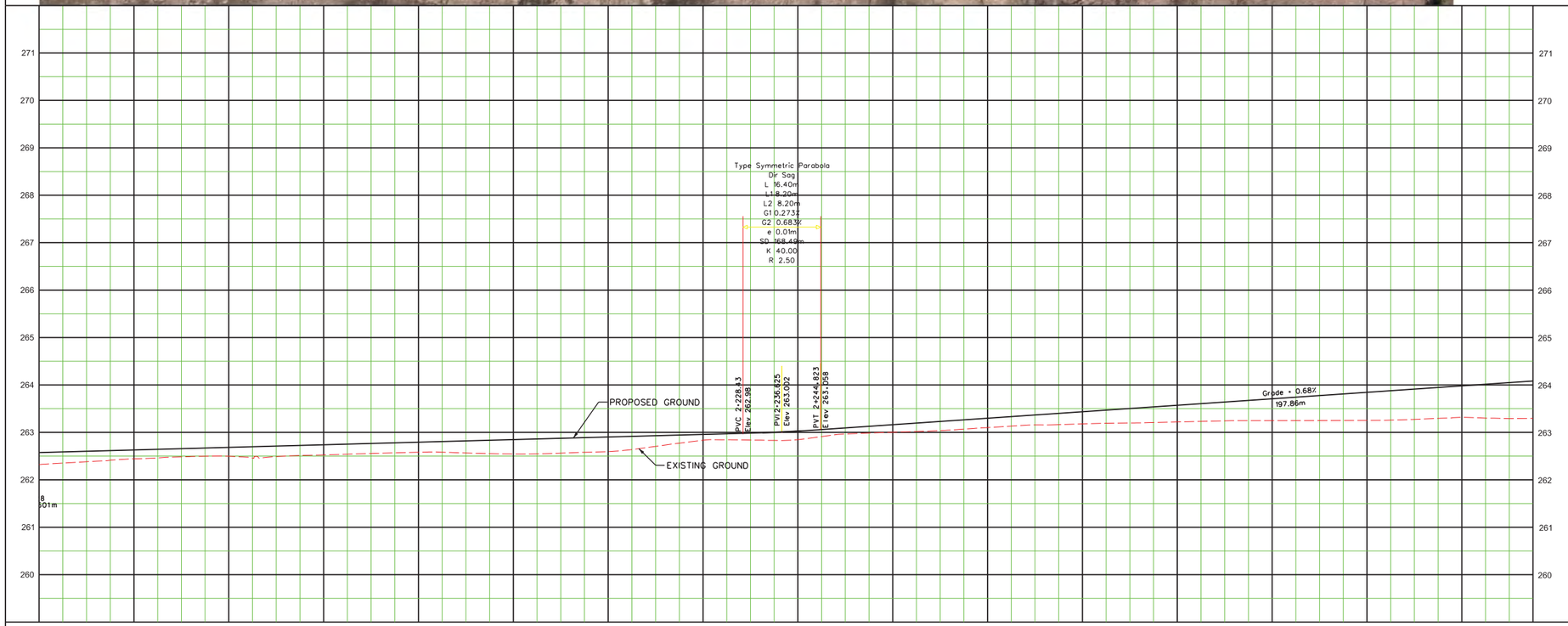

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Region of Peel
Working for you

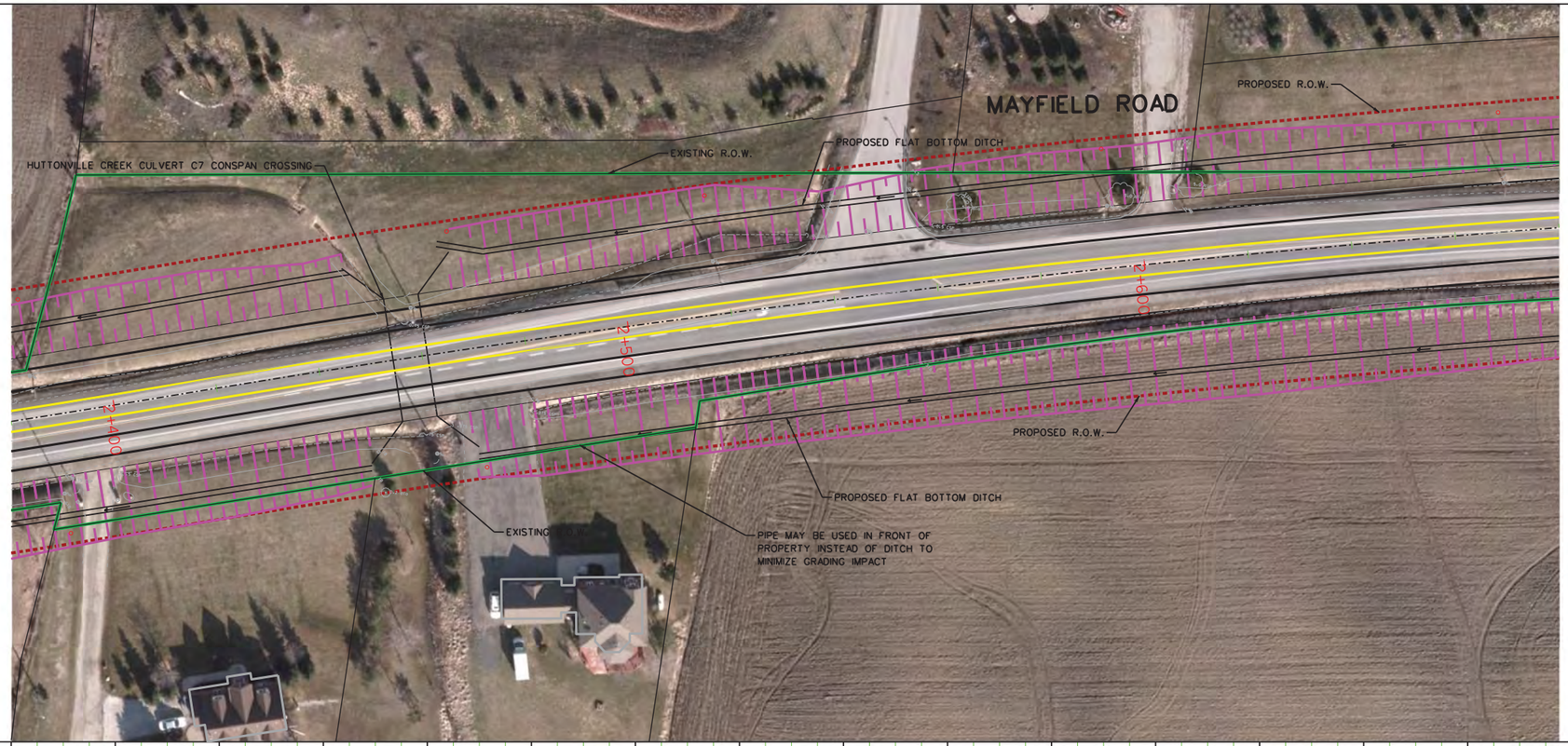
MAYFIELD ROAD

(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.		
Date JANUARY 2015	Sheet 8 of 30	Plan No.	



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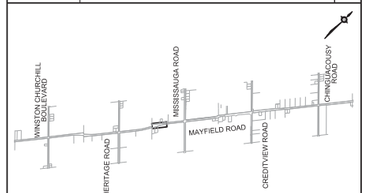

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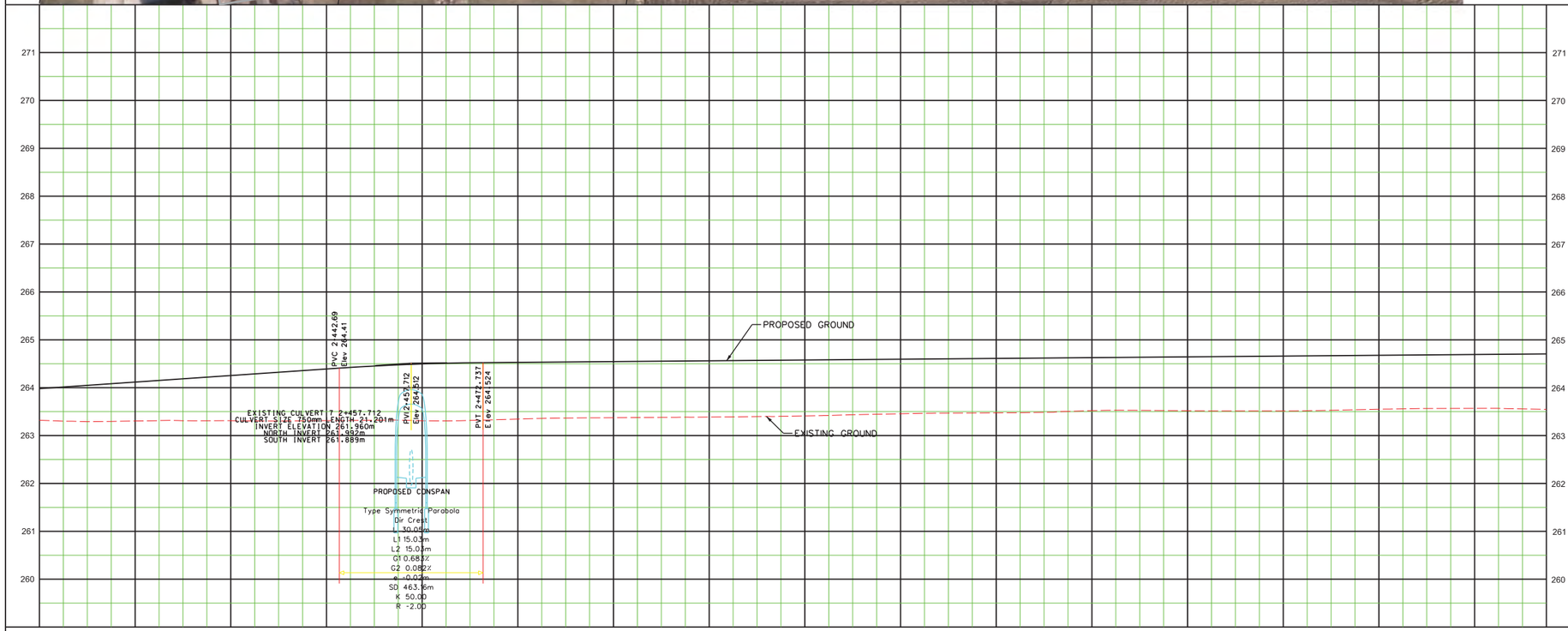

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Region of Peel
Working for you

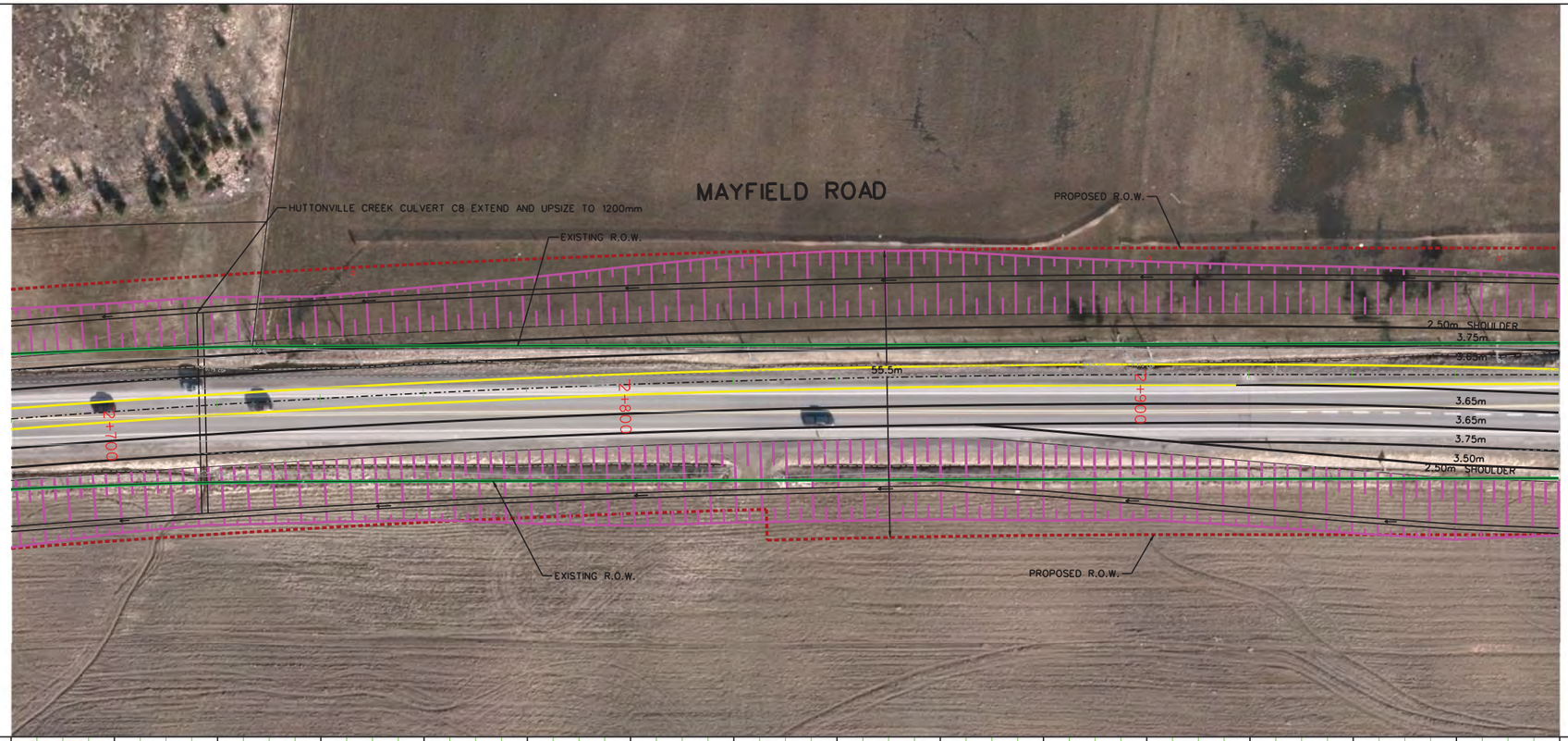
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

STA. 2+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.	



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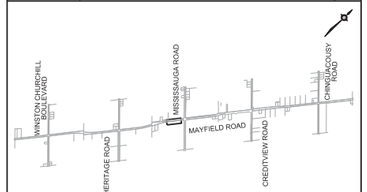

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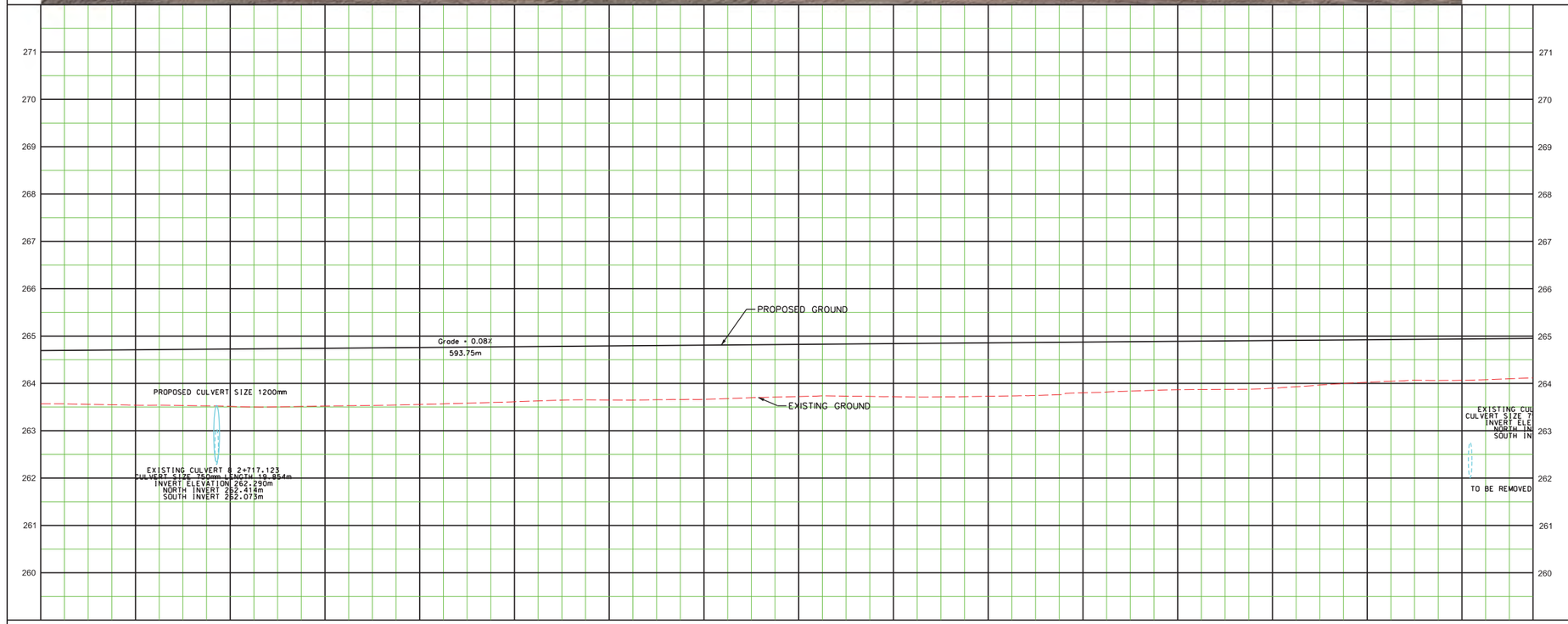

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All Water And Sanitary Service Locations Are Approximate And Must Be Located Accurately In The Field
All Horizontal And Vertical Bends Are In Degrees
All Pipes Size In mm
20C Existing Water Service, Size In mm
WS20 Proposed Water Service, Size In mm
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

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

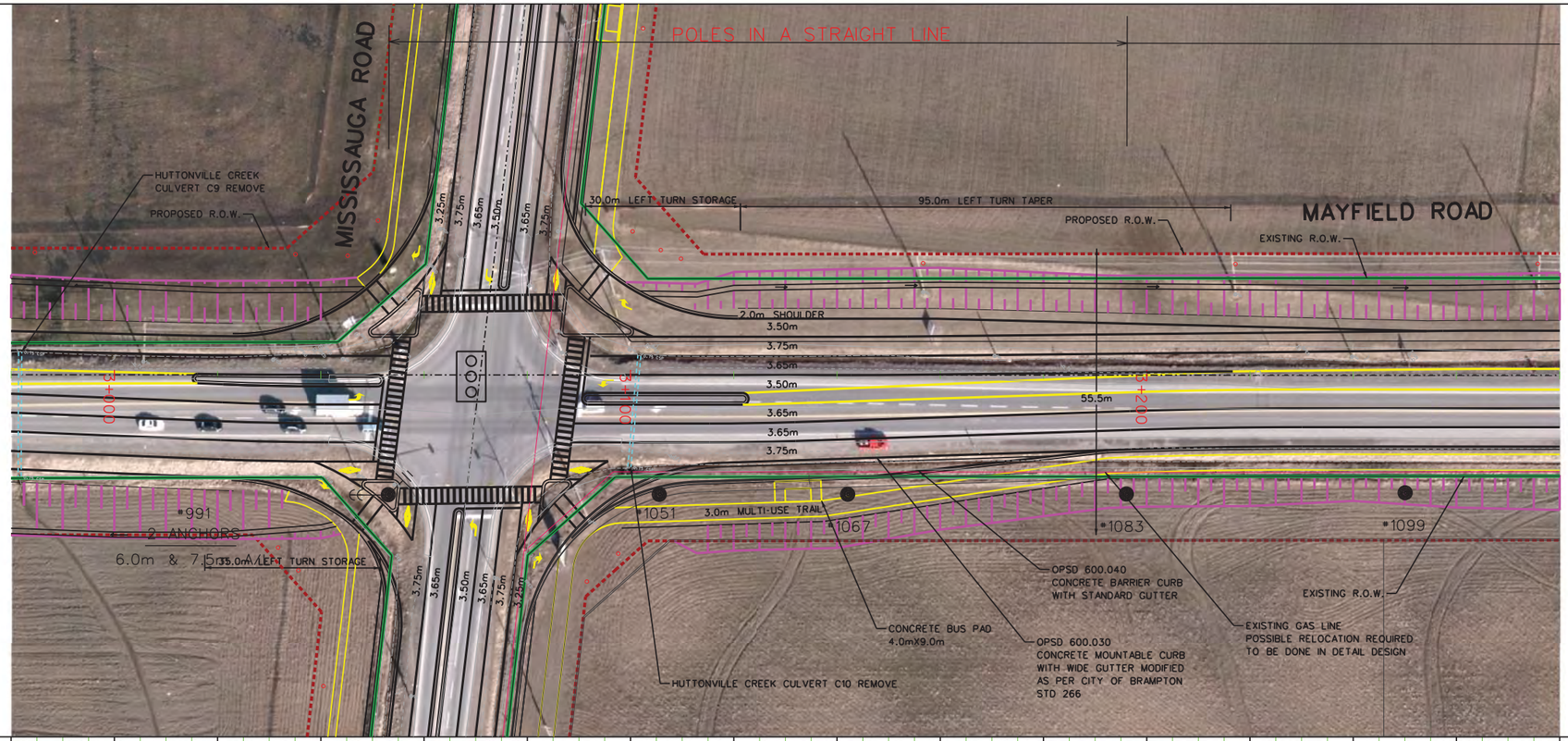
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 4 LANE WIDENING

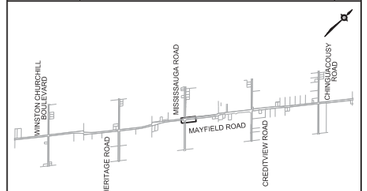
STA. 2+680 TO STA. 2+980

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 10 of 30	Plan No.	



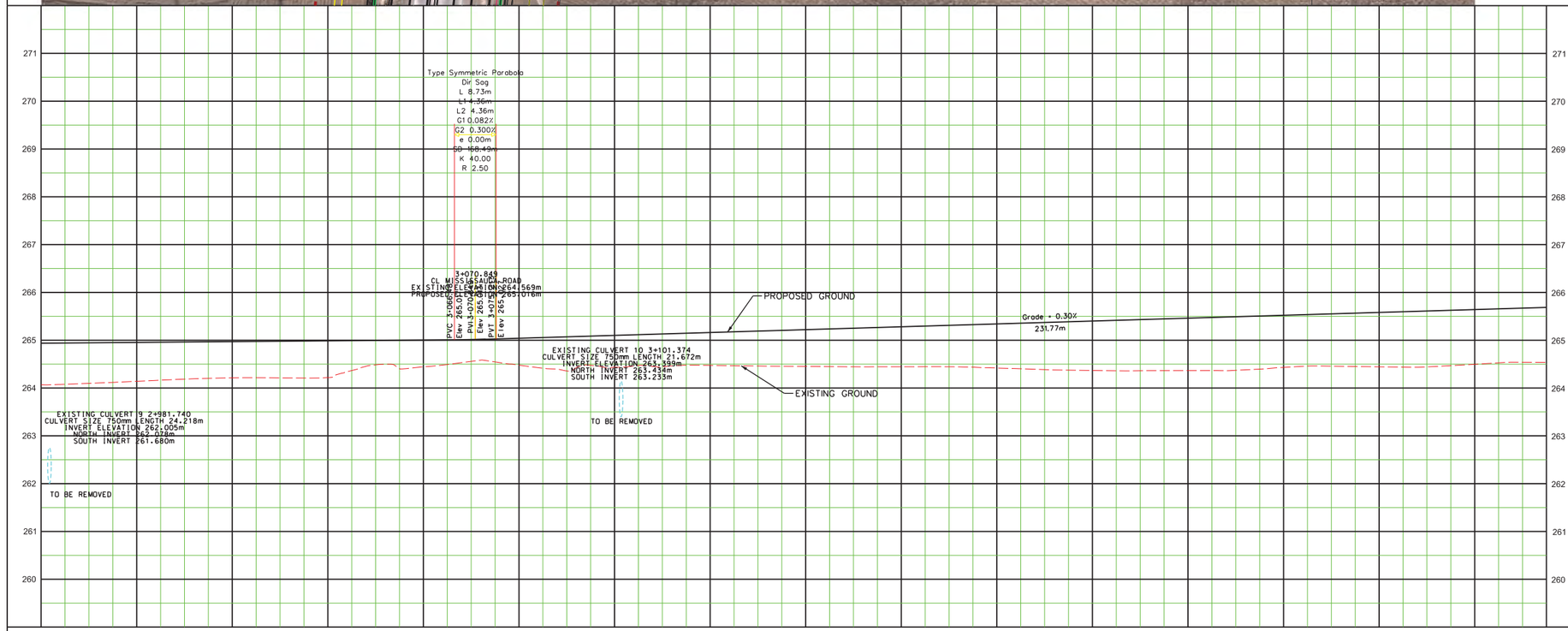
SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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



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Region of Peel
Working for you

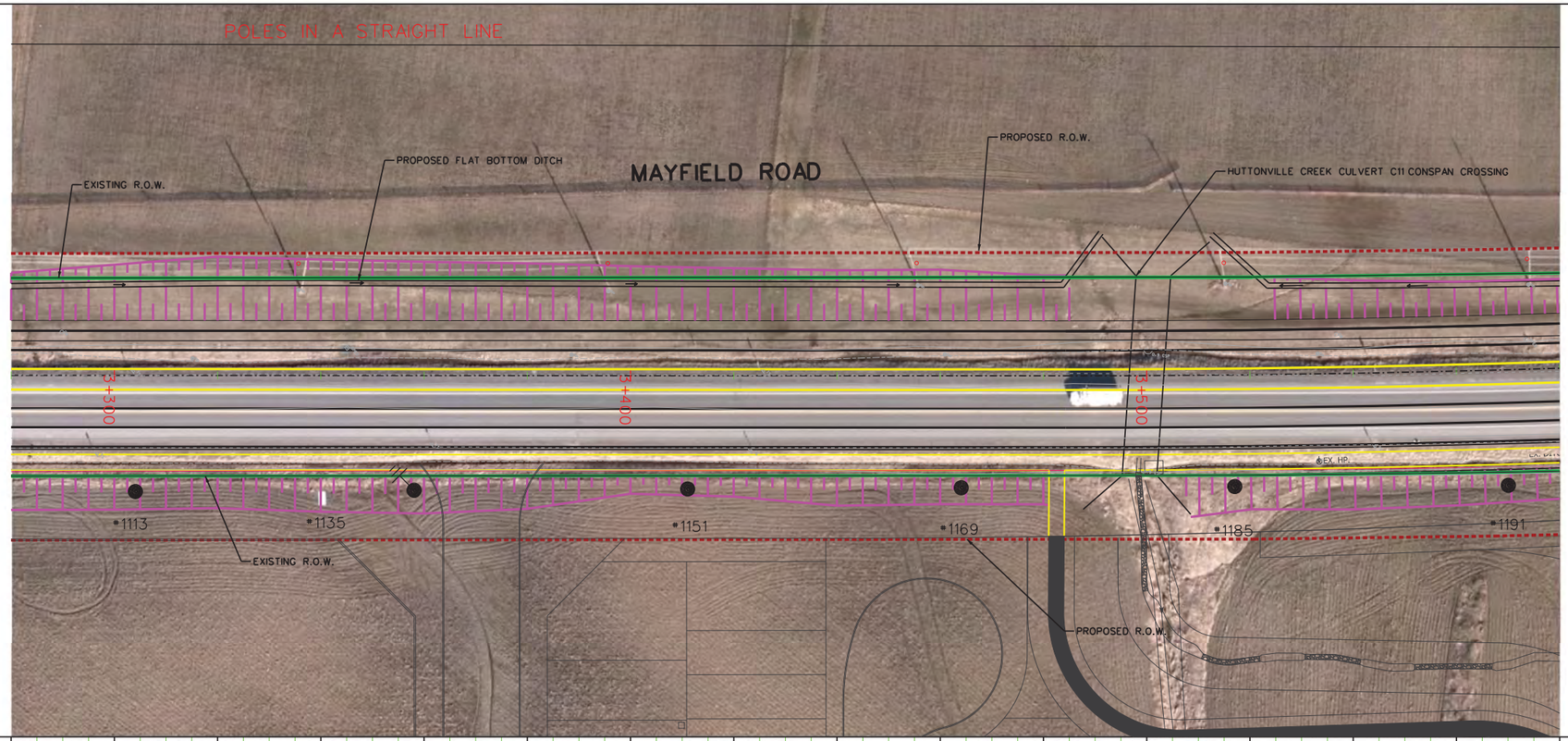
MAYFIELD ROAD

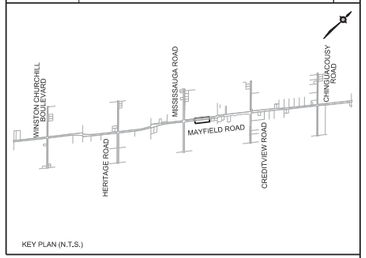
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

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.	





SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
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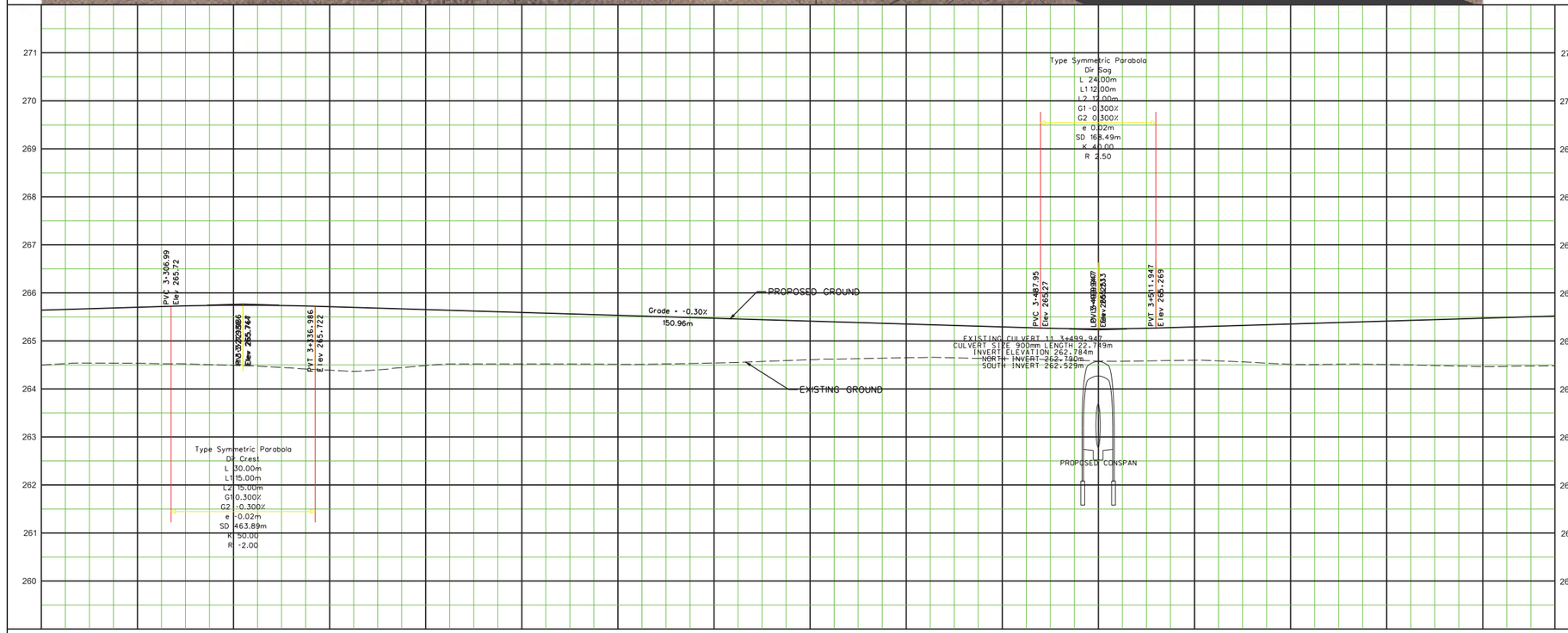
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES
- HYDRO ONE BRAMPTON PROPOSED POLE LOCATIONS



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Region of Peel
Working for you

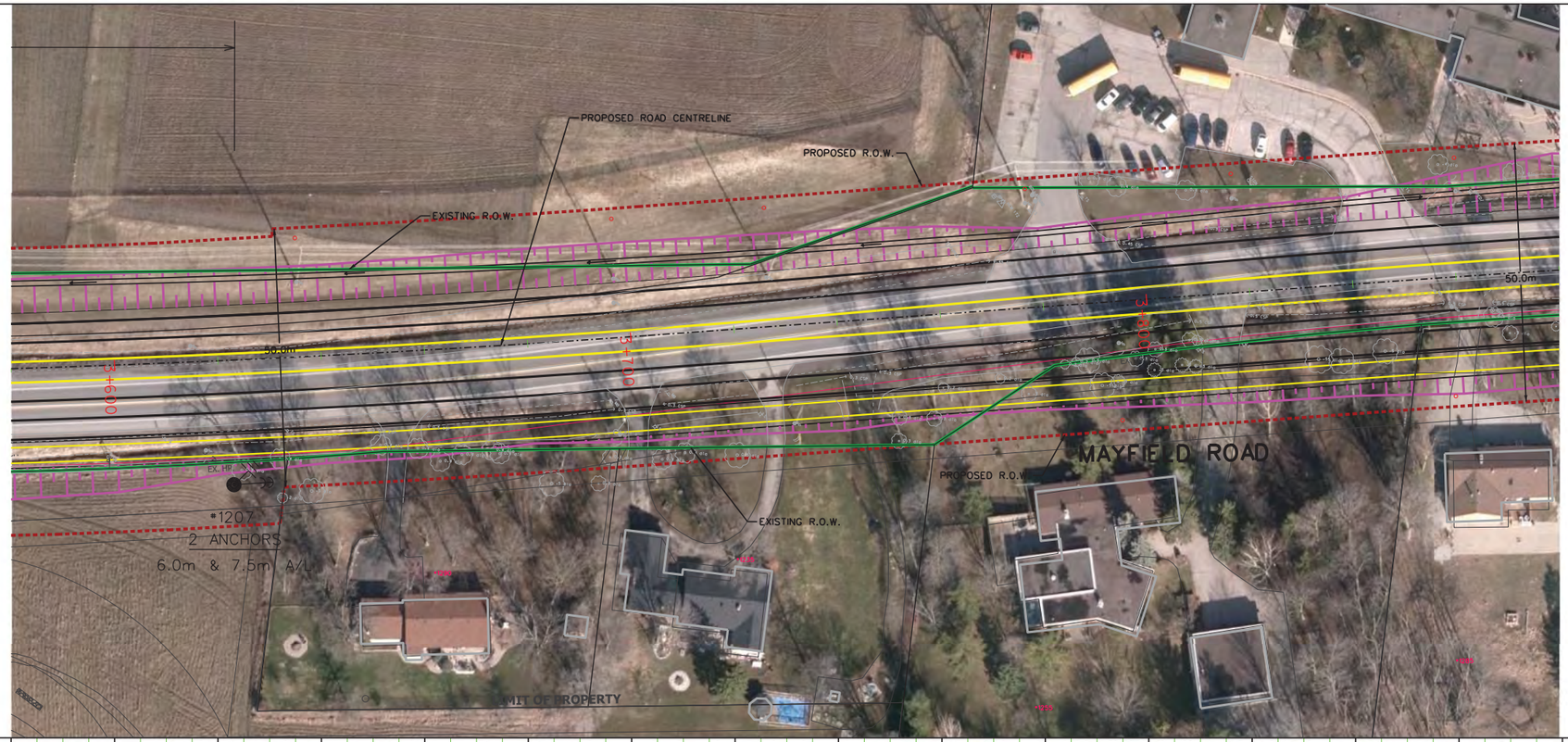
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 3+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.	



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SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
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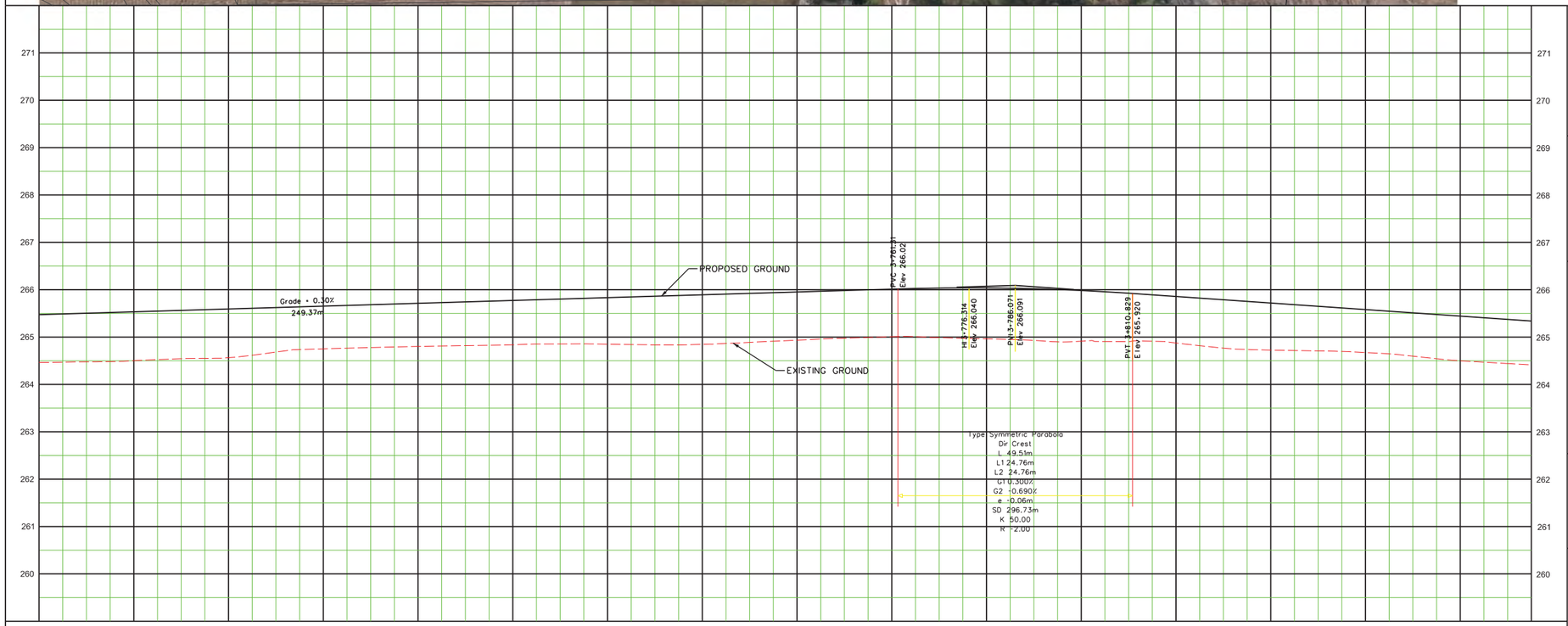
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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



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10m 0 10 20 30m — HORIZONTAL SCALE
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Region of Peel
Working for you

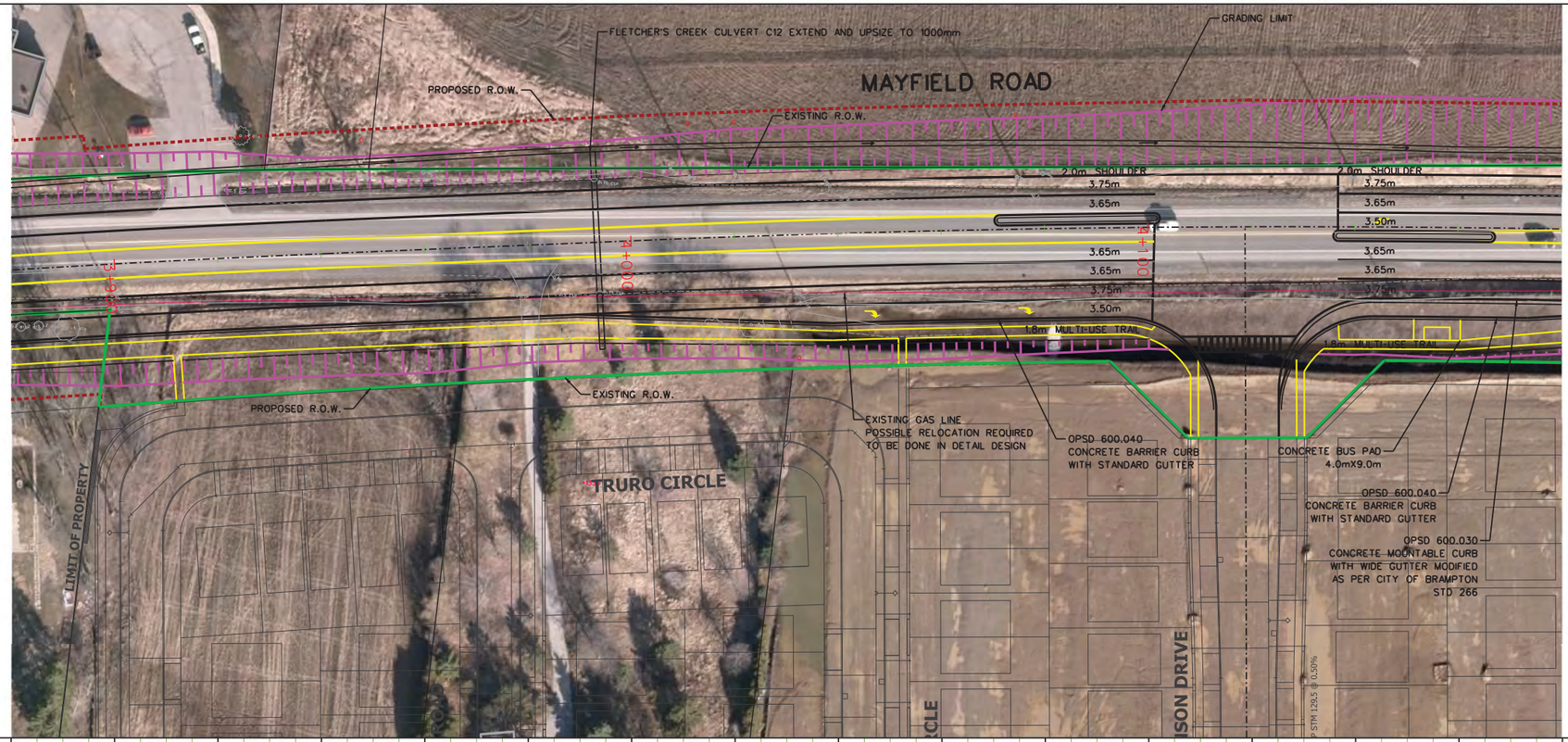
MAYFIELD ROAD

(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
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 13 of 30	Plan No.	



SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
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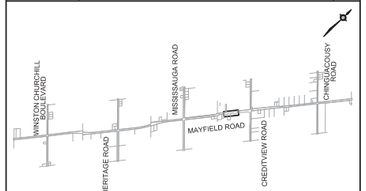
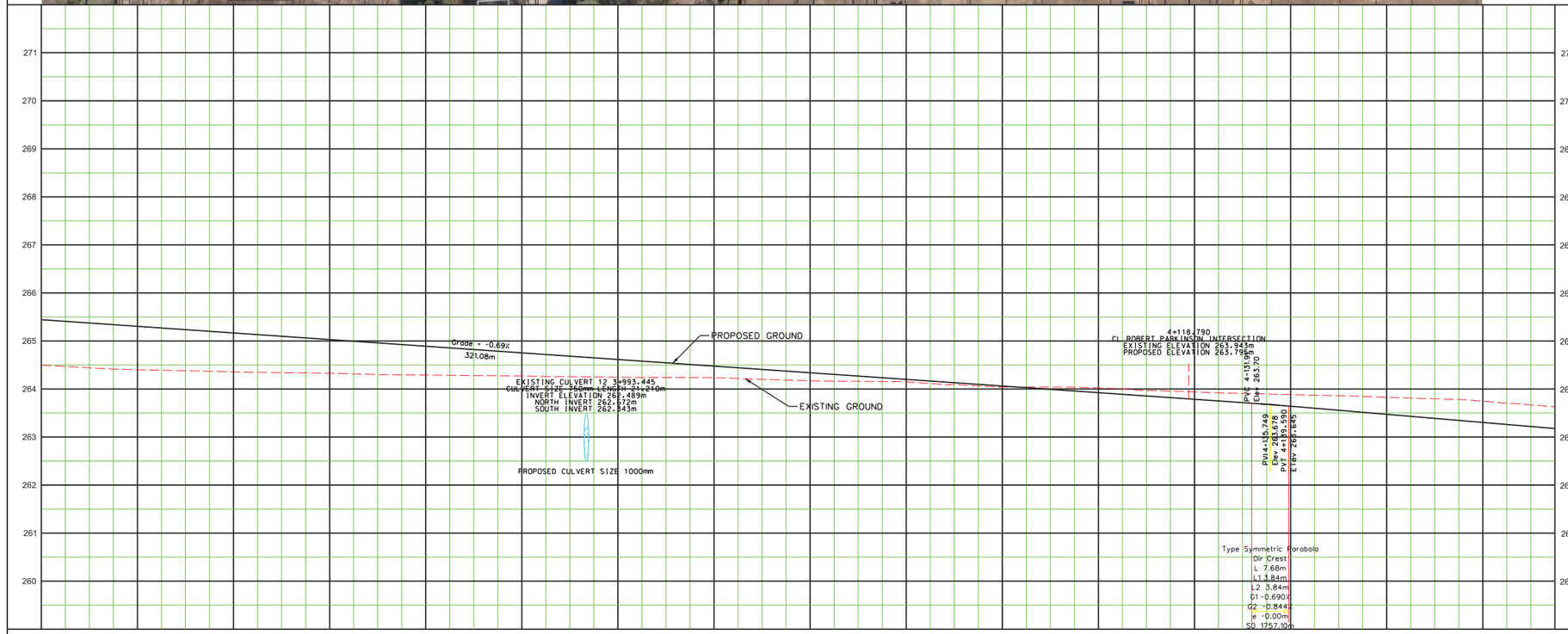
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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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FUTUREWAY (FCI BROADBAND)

1Om 0 10 20 30m HORIZONTAL SCALE
1m 0 1 2 3m VERTICAL SCALE

Region of Peel
Working for you

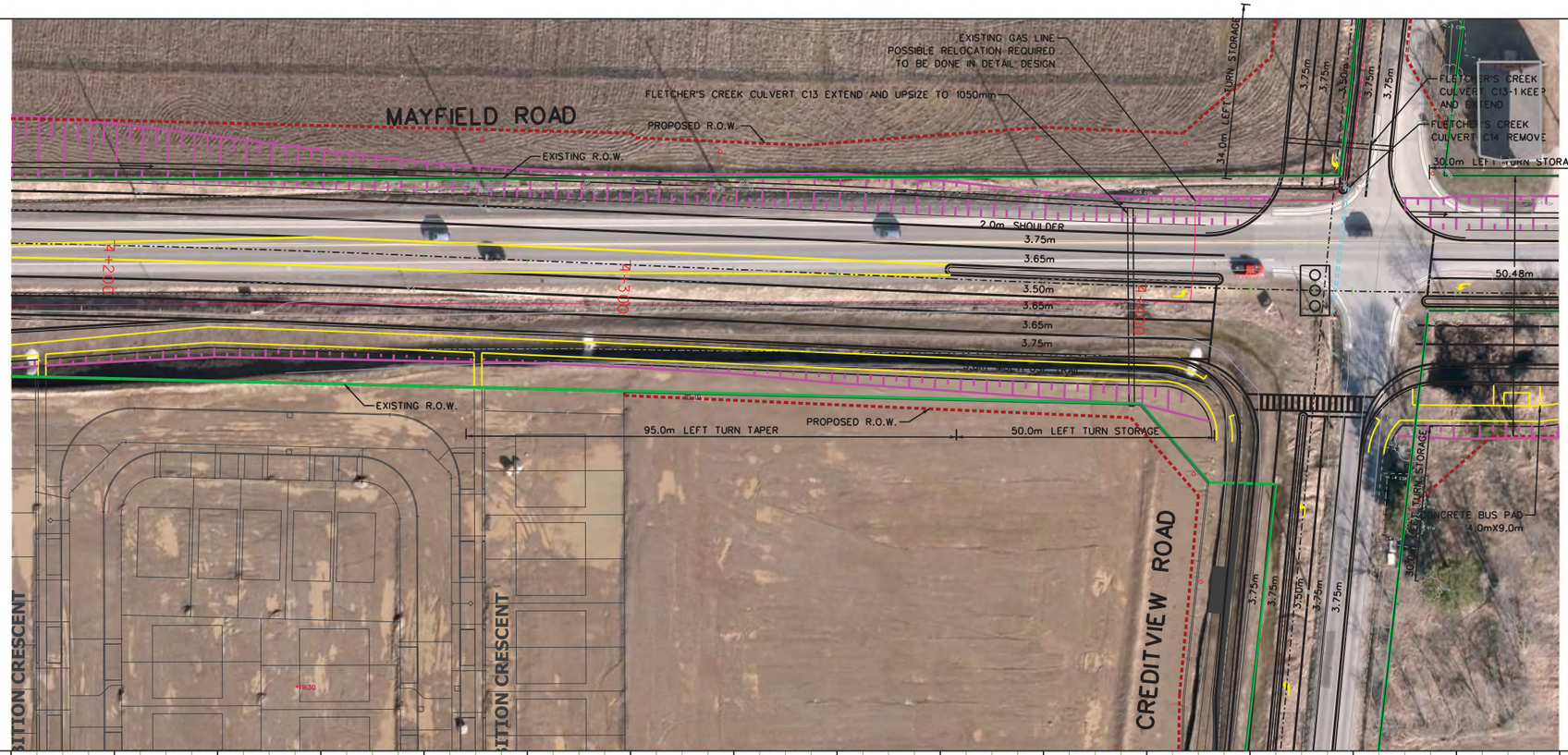
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

STA. 3+880 TO STA. 4+180

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 14 of 30	Plan No.	



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SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
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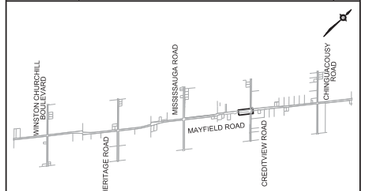
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
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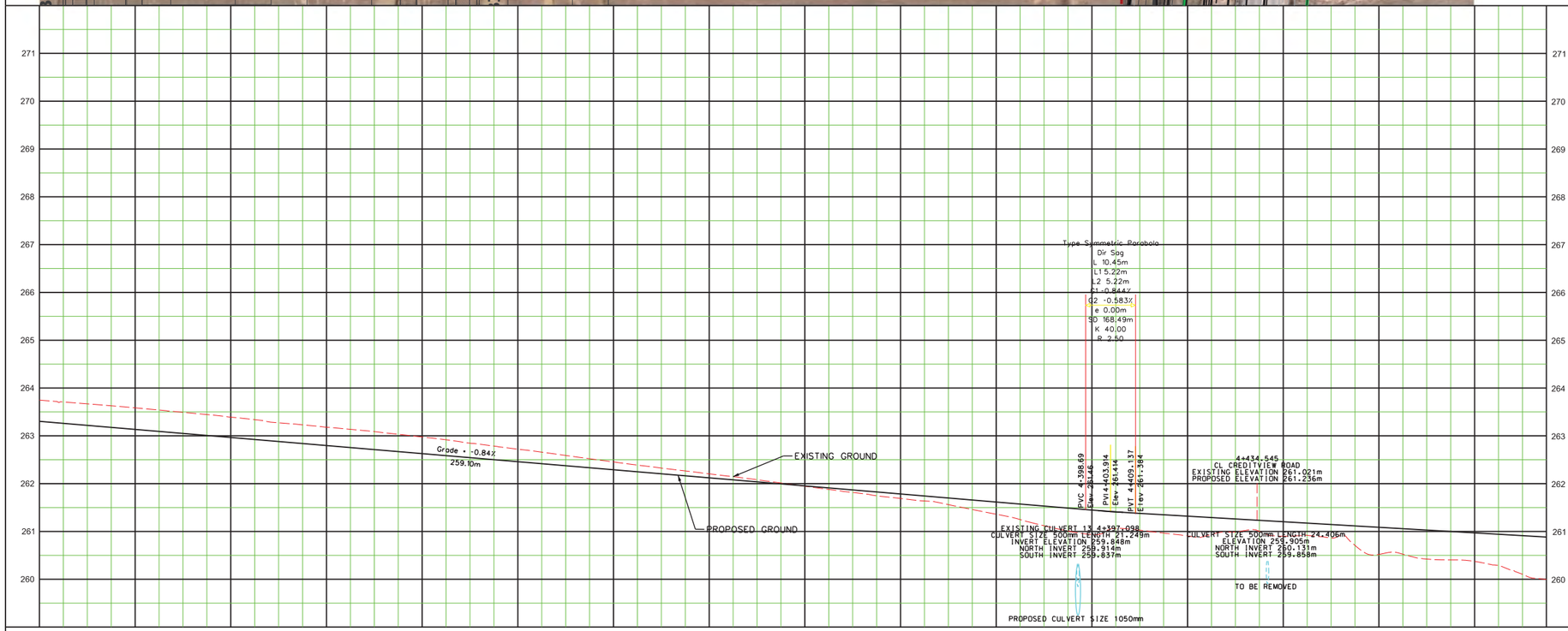
- GRADING LIMIT
- RELOCATED HYDRO POLES



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10m 0 10 20 30m — HORIZONTAL SCALE
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Region of Peel
Working for you

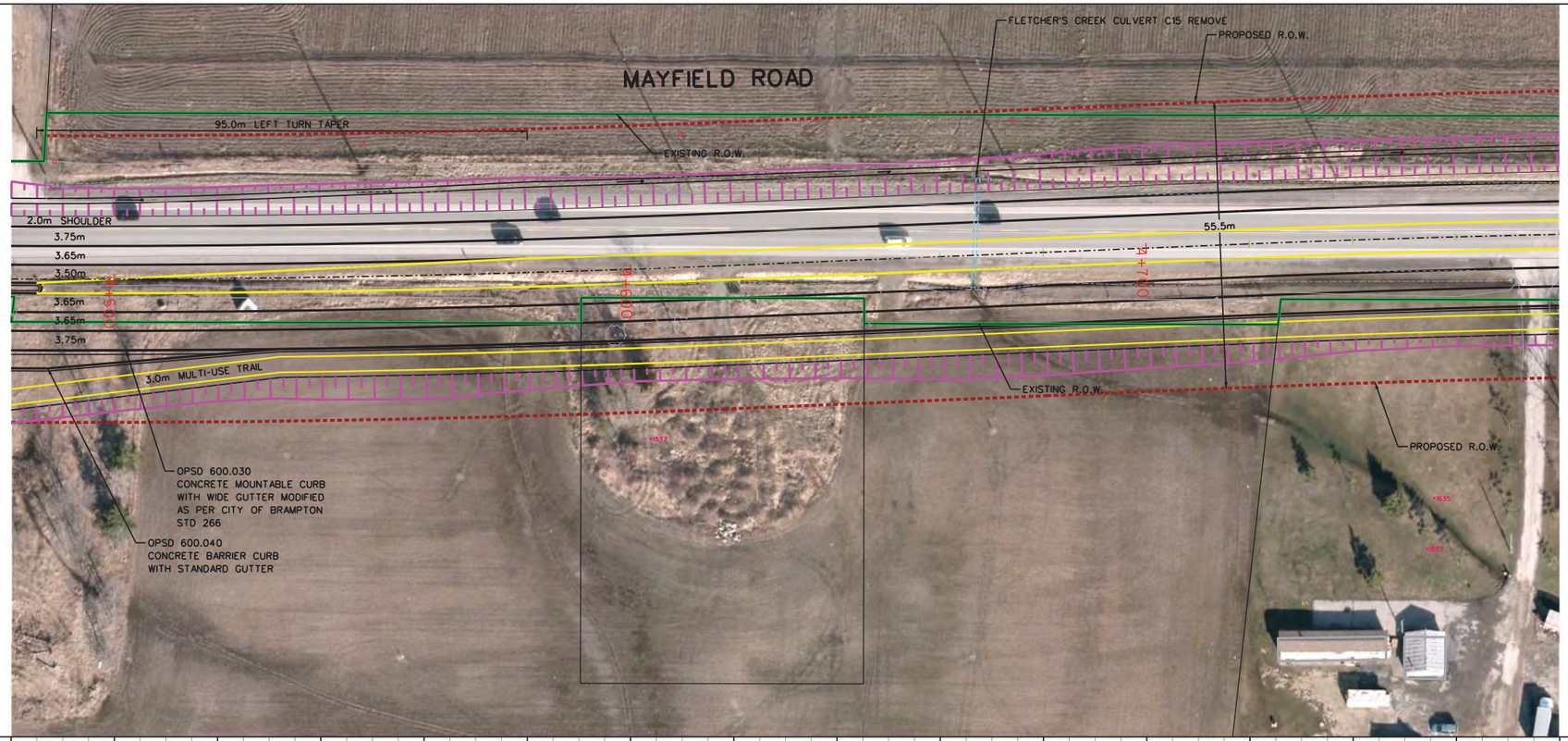
MAYFIELD ROAD

(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.	



KEY PLAN (N.T.S.)

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SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
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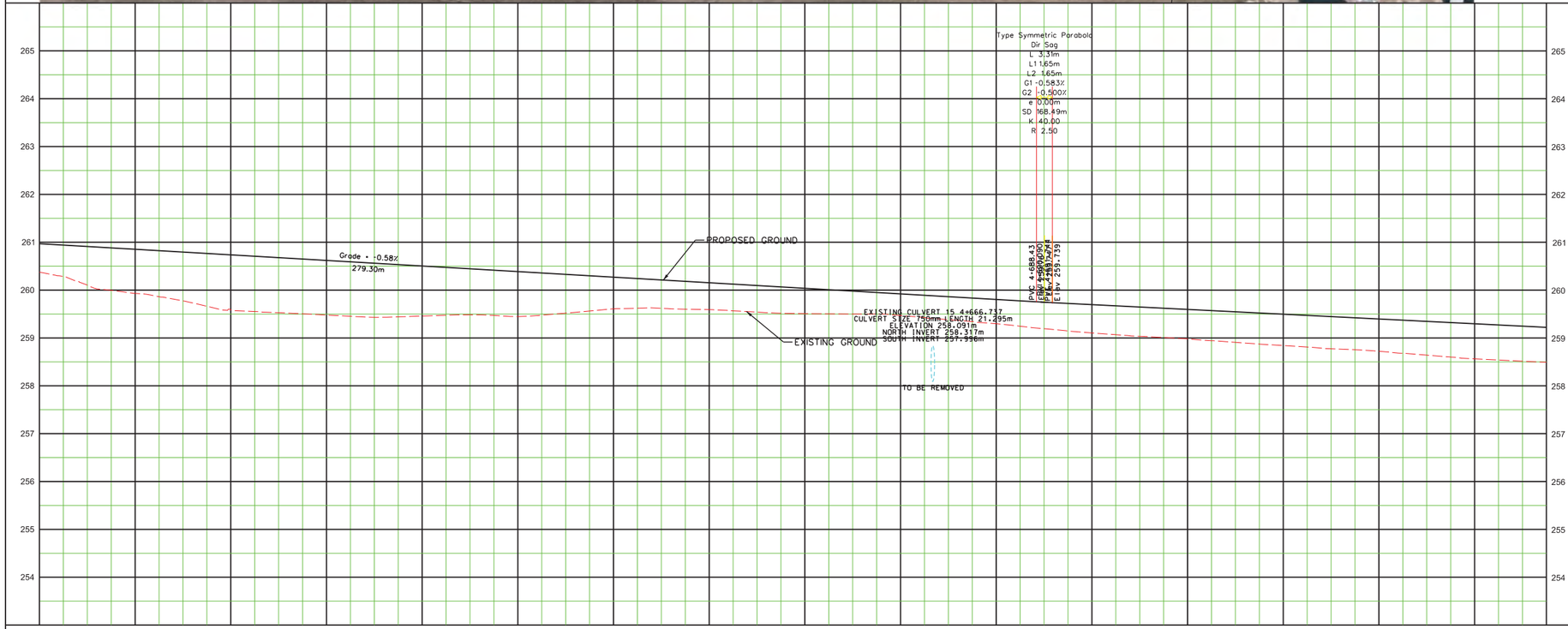
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS

DATE	DETAILS	INIT.

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES



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Region of Peel
Working for you

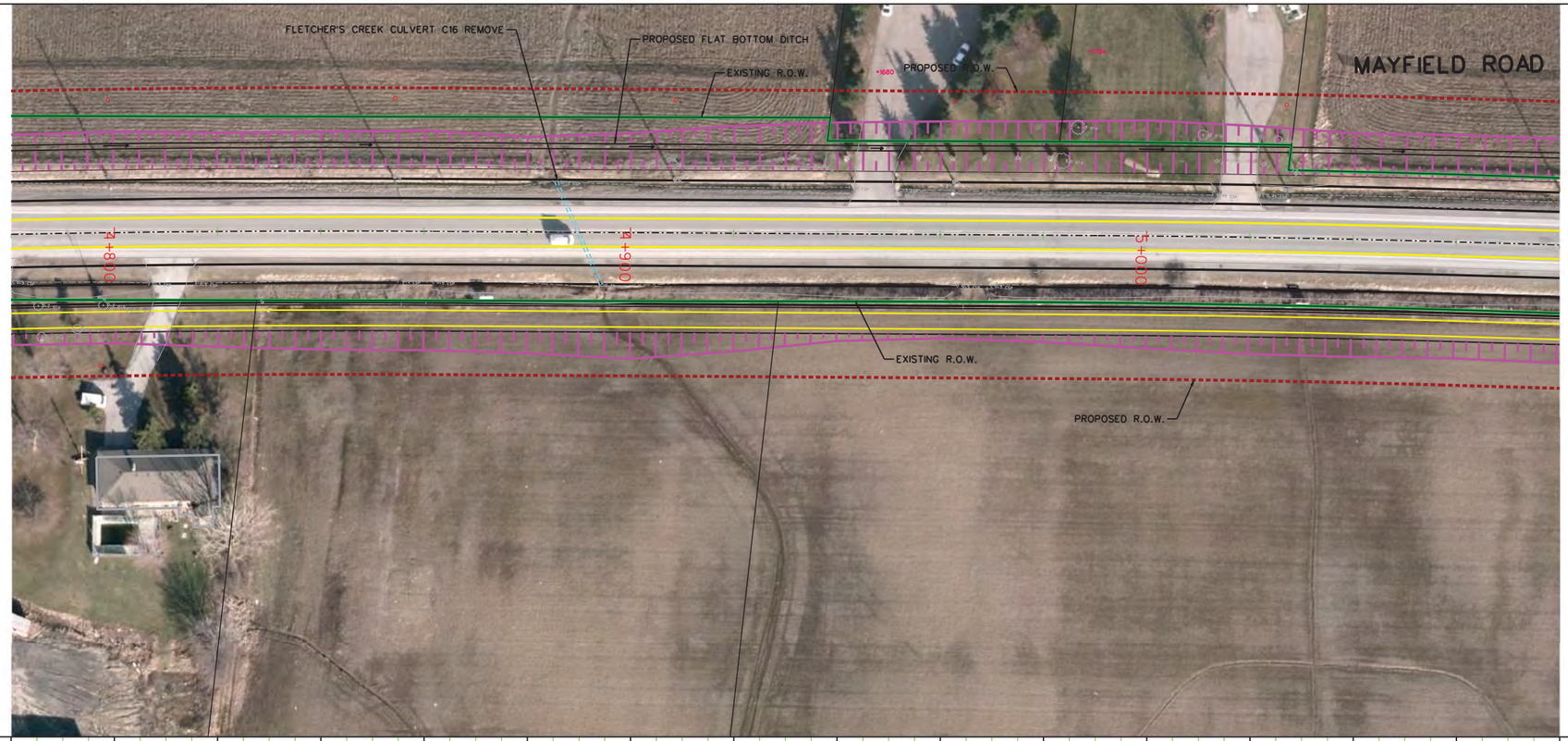
MAYFIELD ROAD

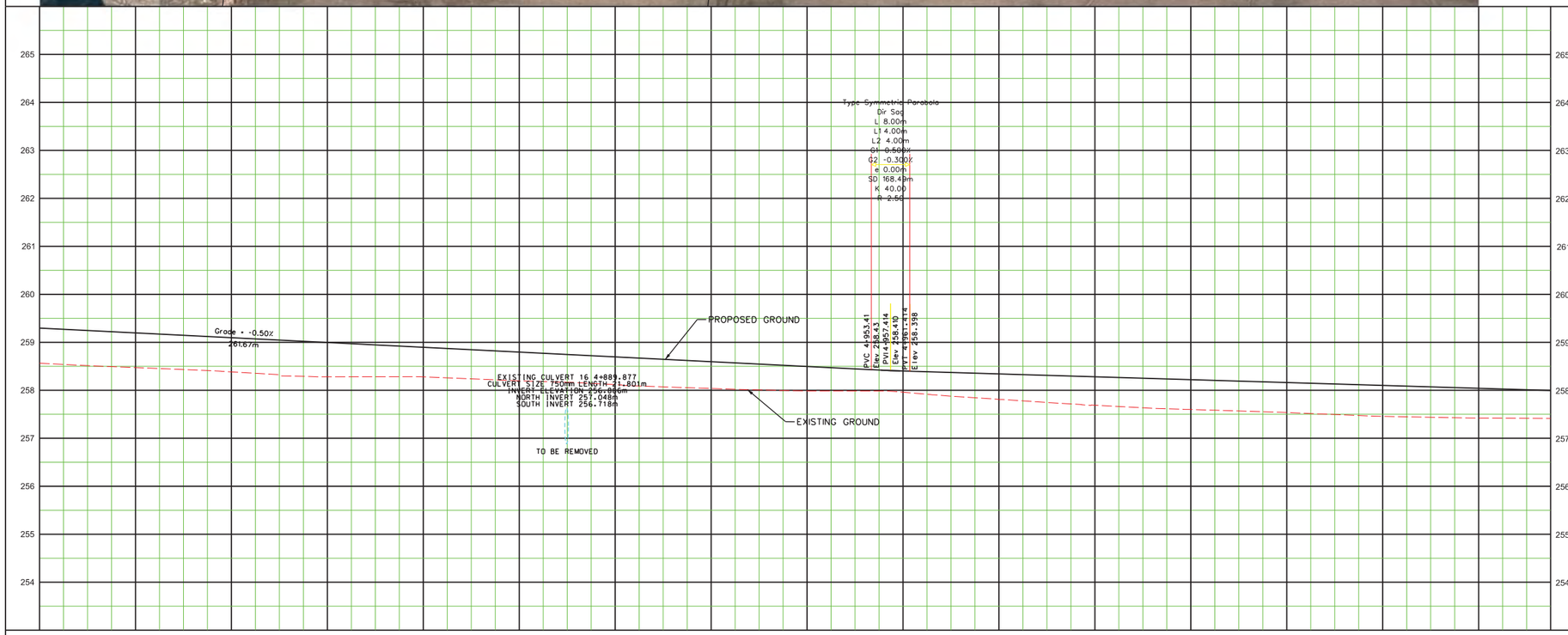
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

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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WATERMAINS			HYDRO U/G CABLE		
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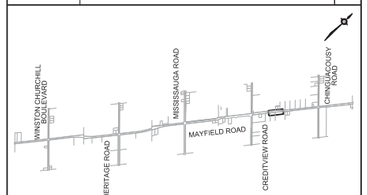
REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

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- EXISTING RIGHT OF WAY
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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

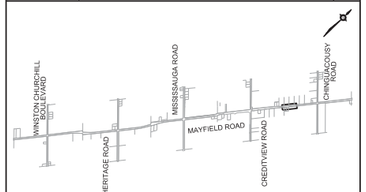
CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 17 of 30	Plan No.	

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.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

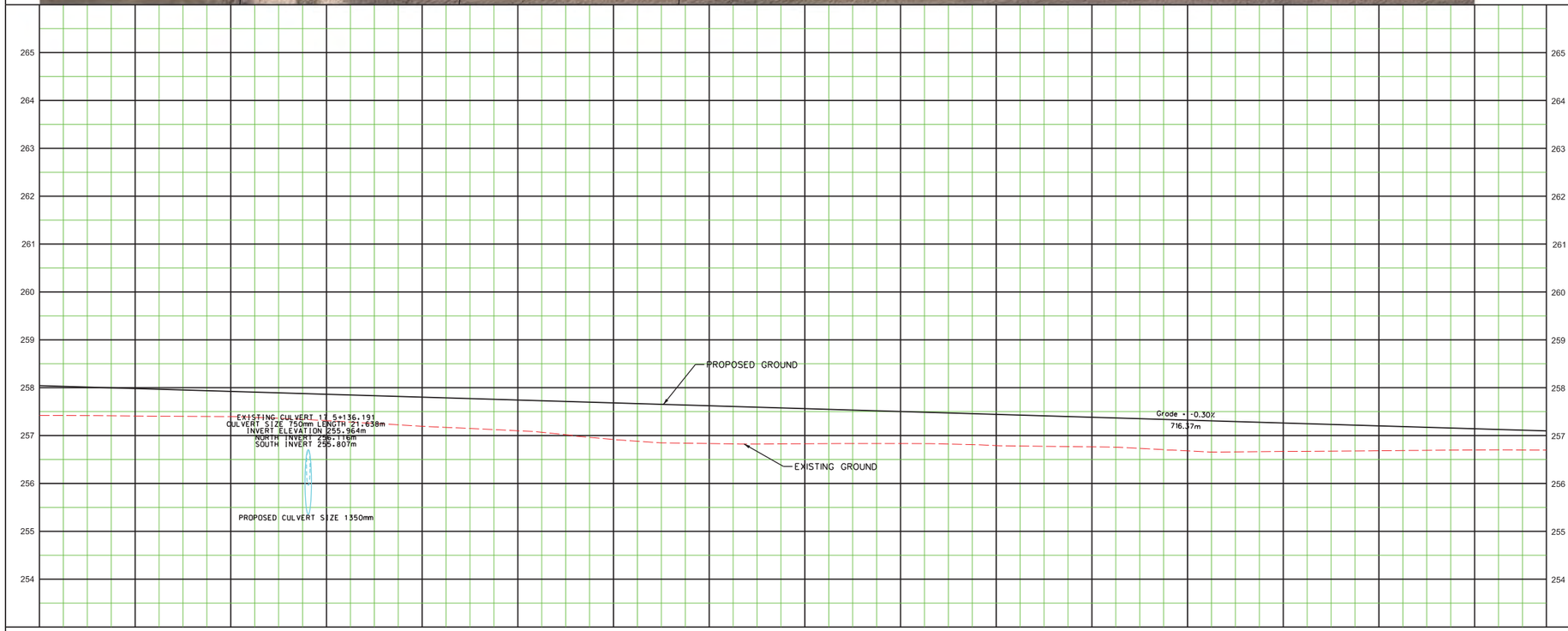
REVISIONS

DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES



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

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

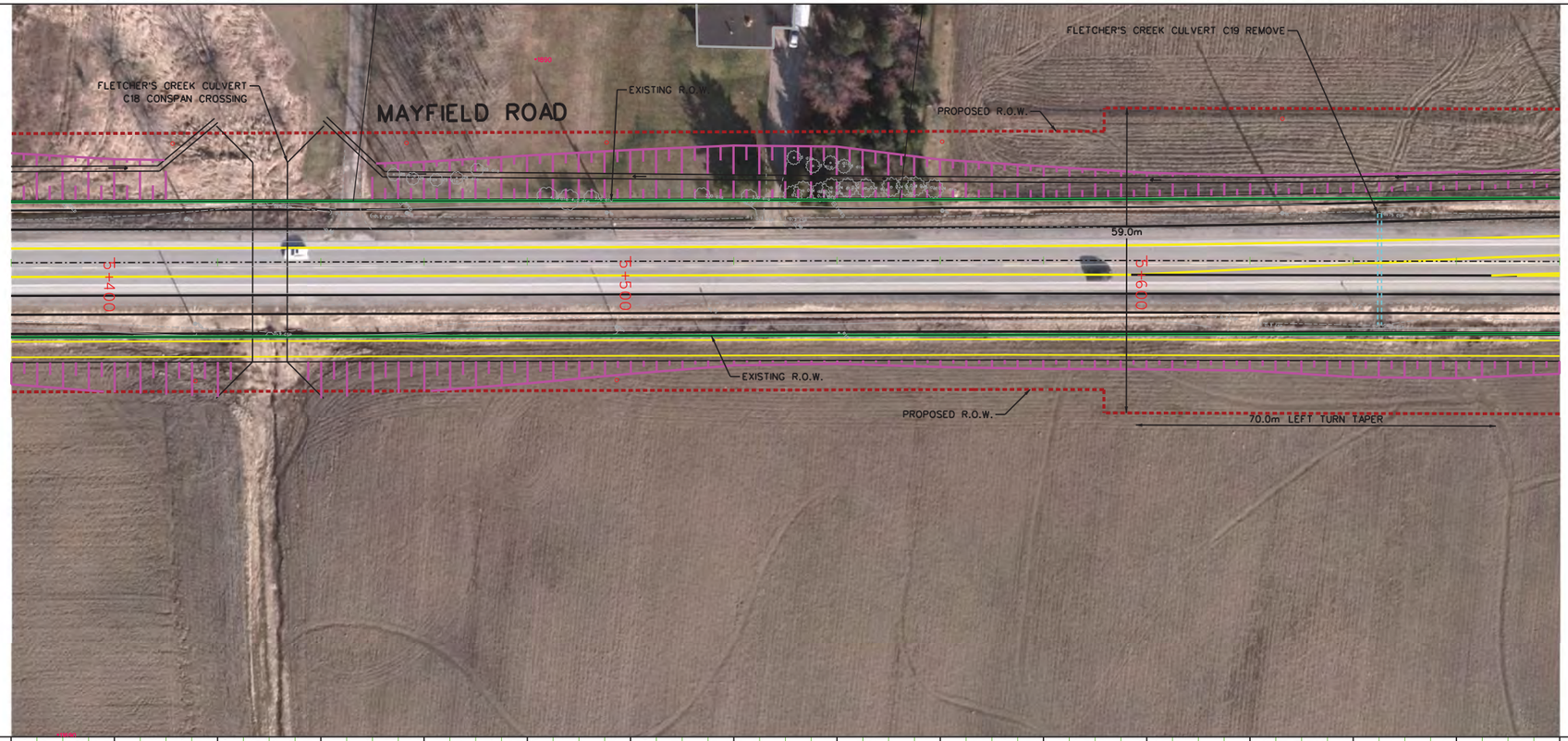
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

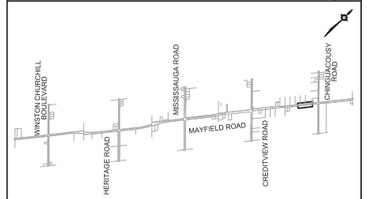
STA. 5+080 TO STA. 5+380

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 18 of 30	Plan No.	



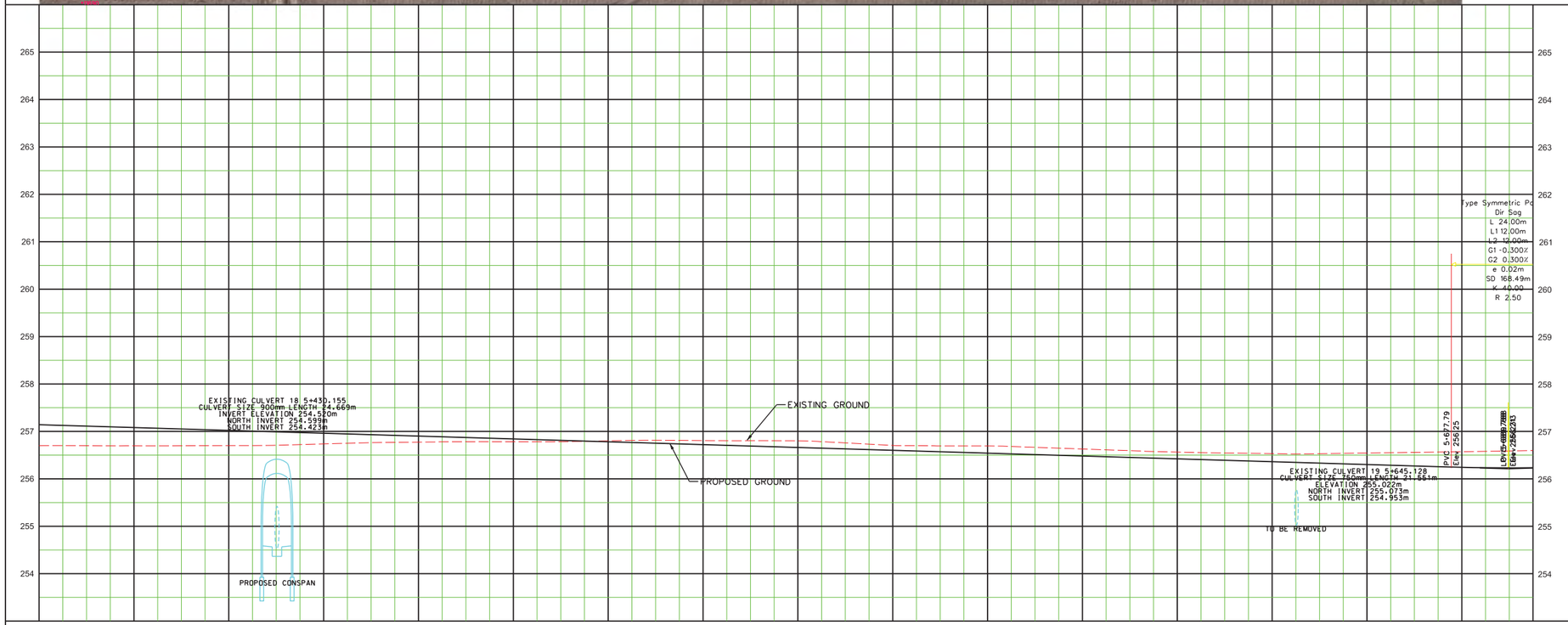
SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES



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

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

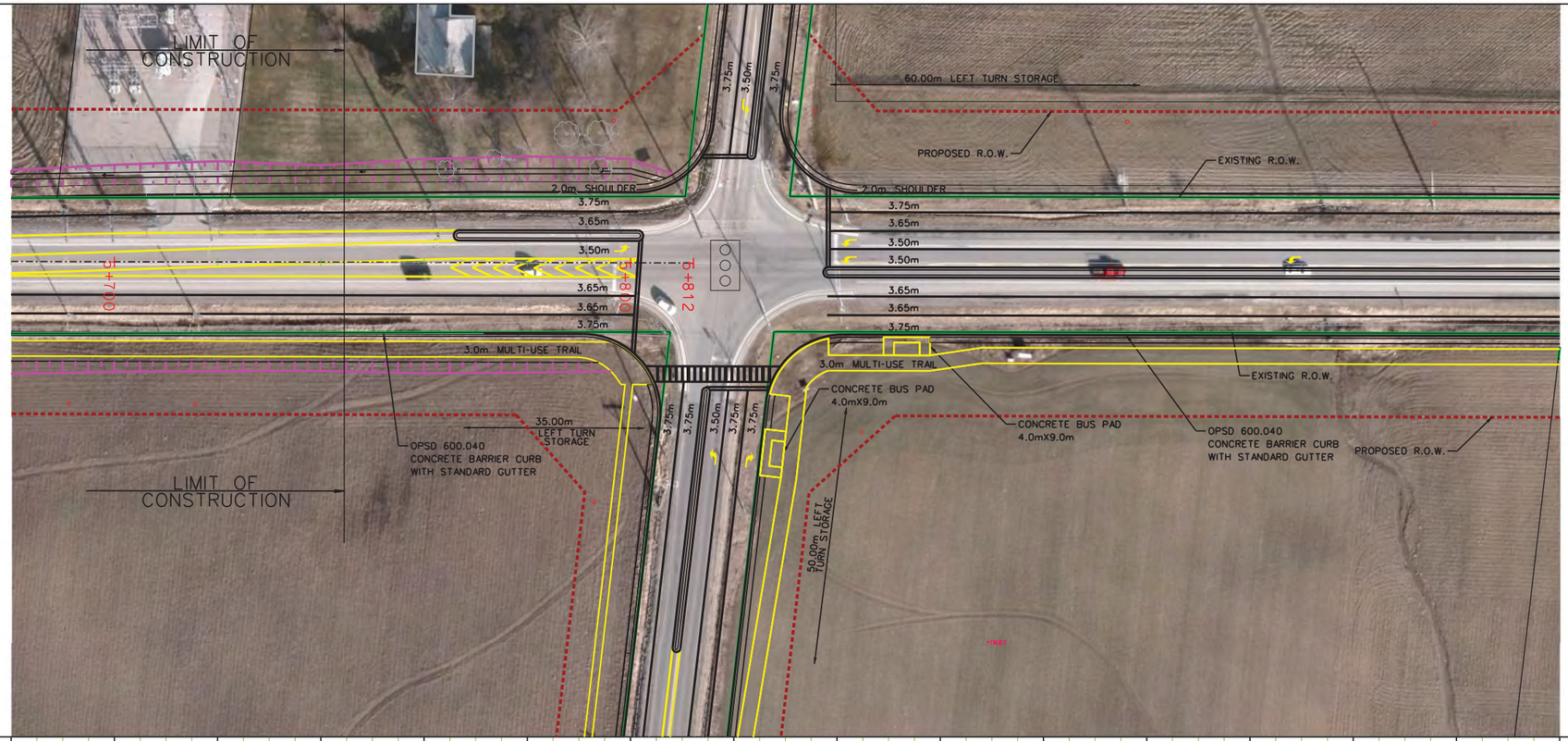
MAYFIELD ROAD

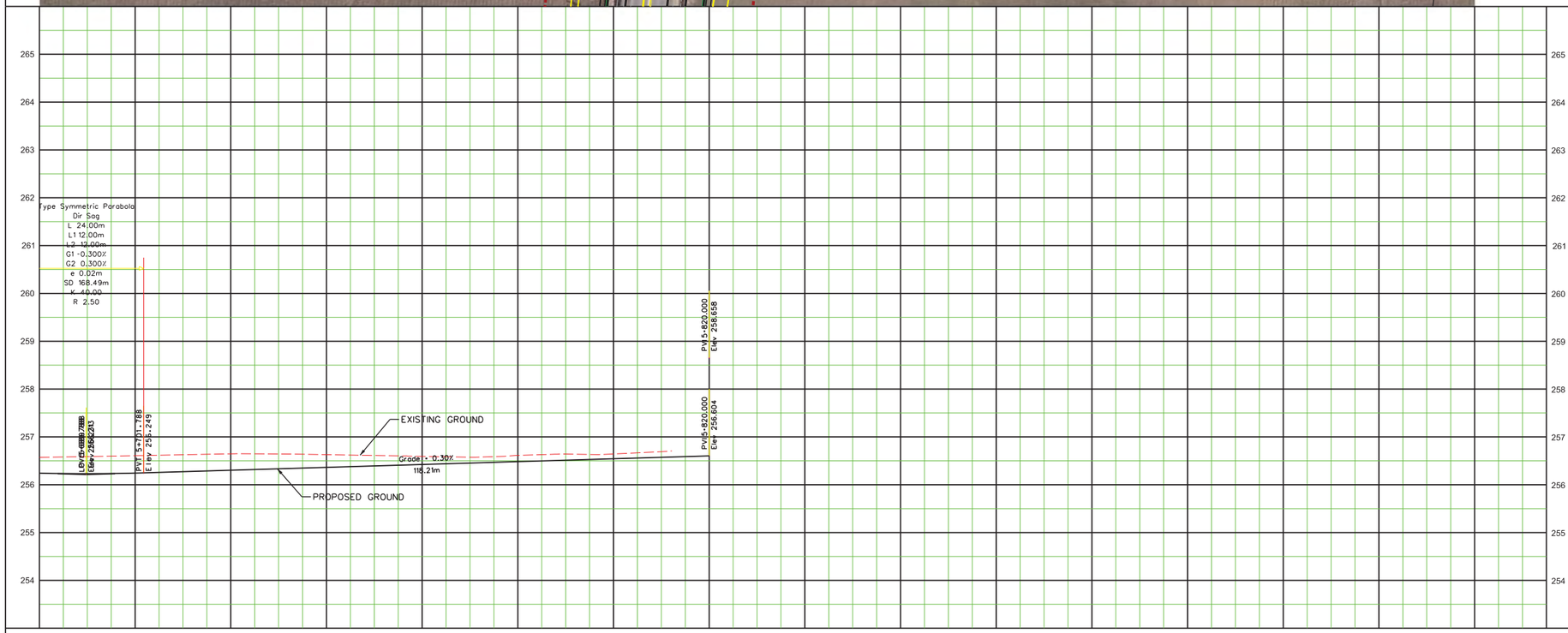
(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 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.	





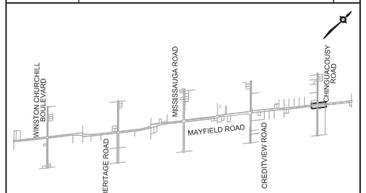
5+680 5+700 5+720 5+740 5+760 5+780 5+800

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.			CITY		
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

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

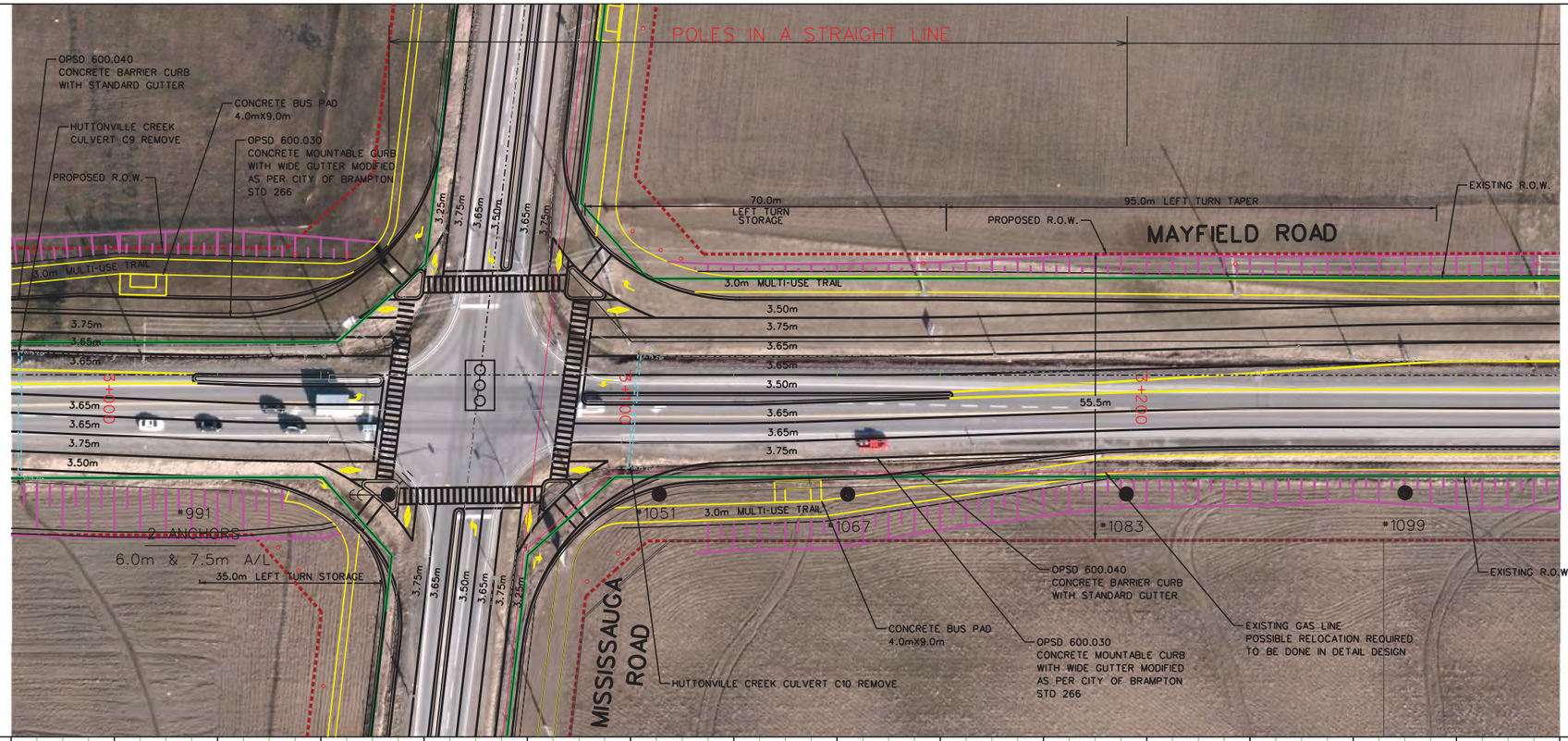
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 5 LANE WIDENING

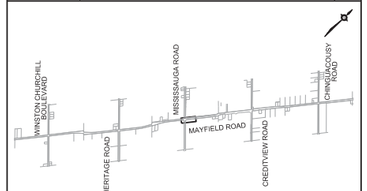
STA. 5+680 TO STA. 5+812

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 20 of 30	Plan No.	



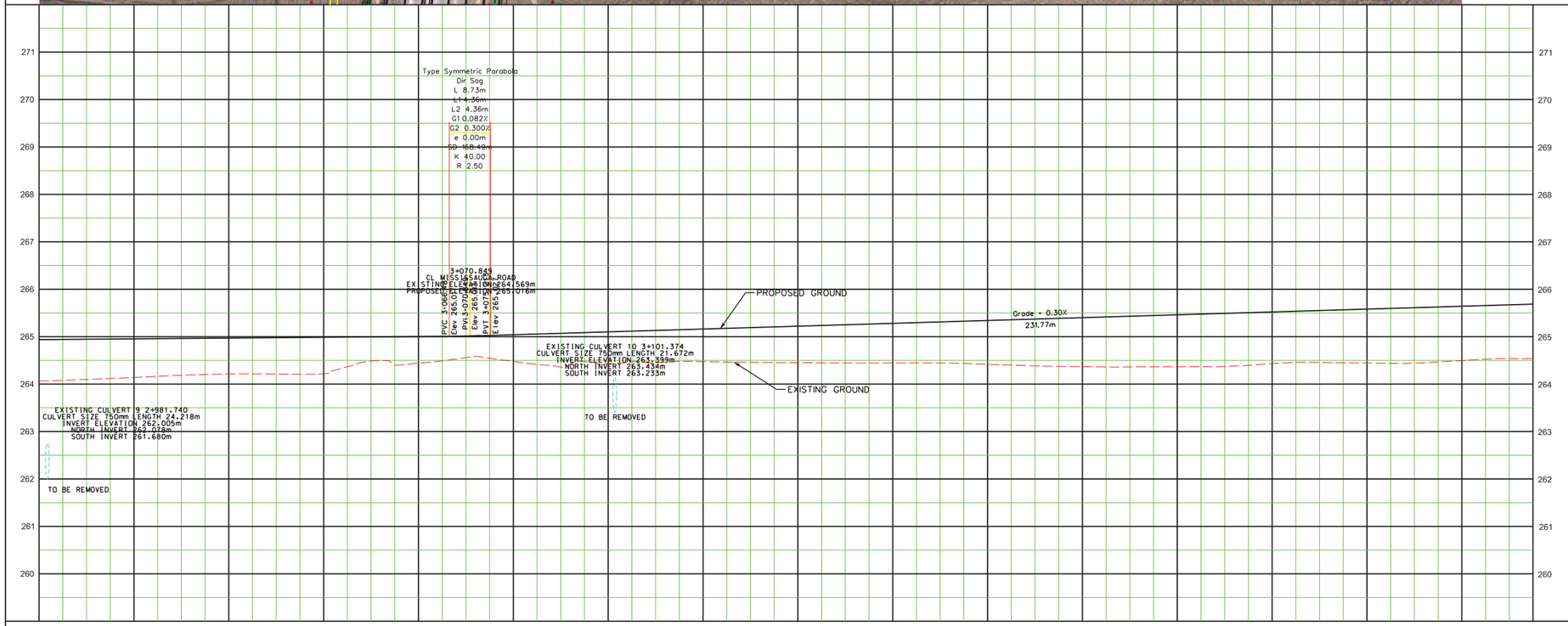
SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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

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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, 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

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
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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

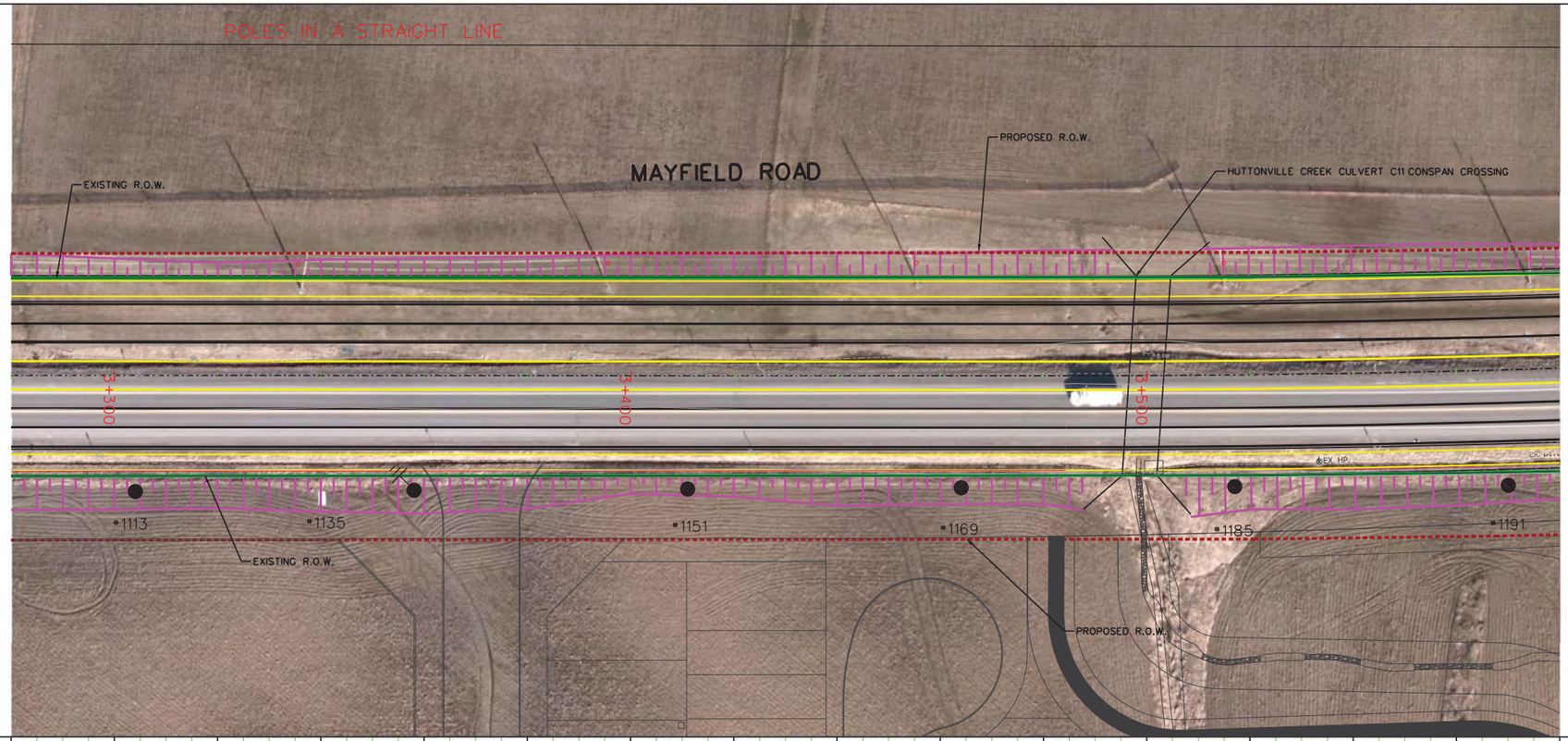
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 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 21 of 30	Plan No.	

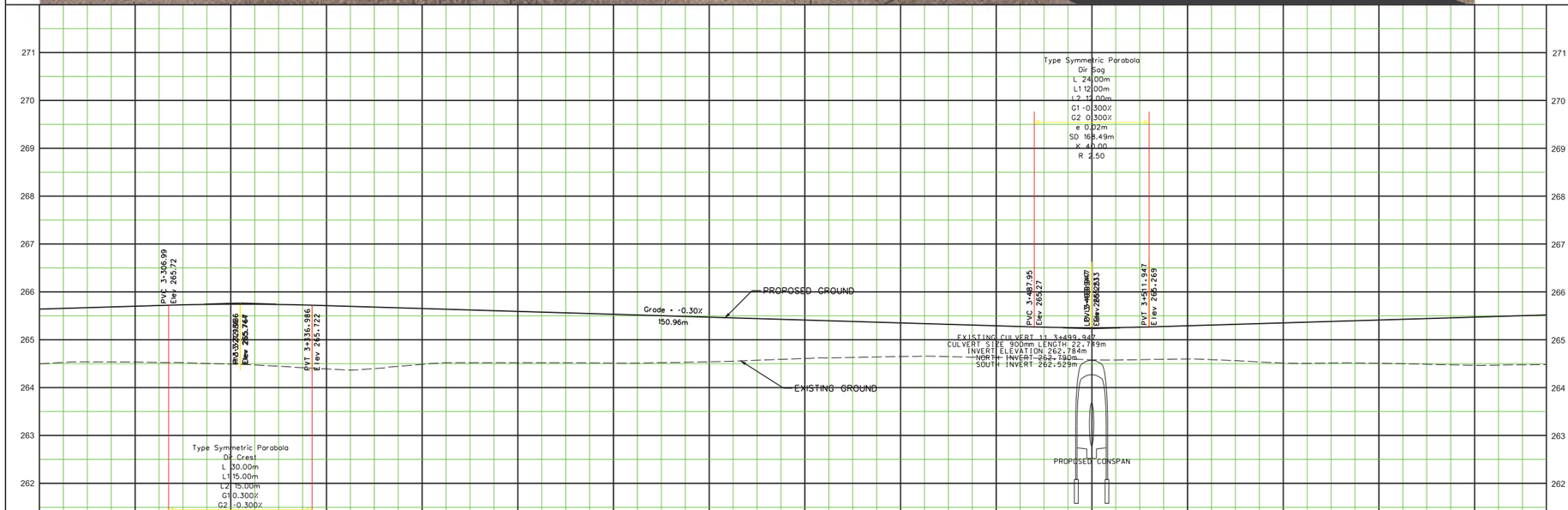


SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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

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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

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

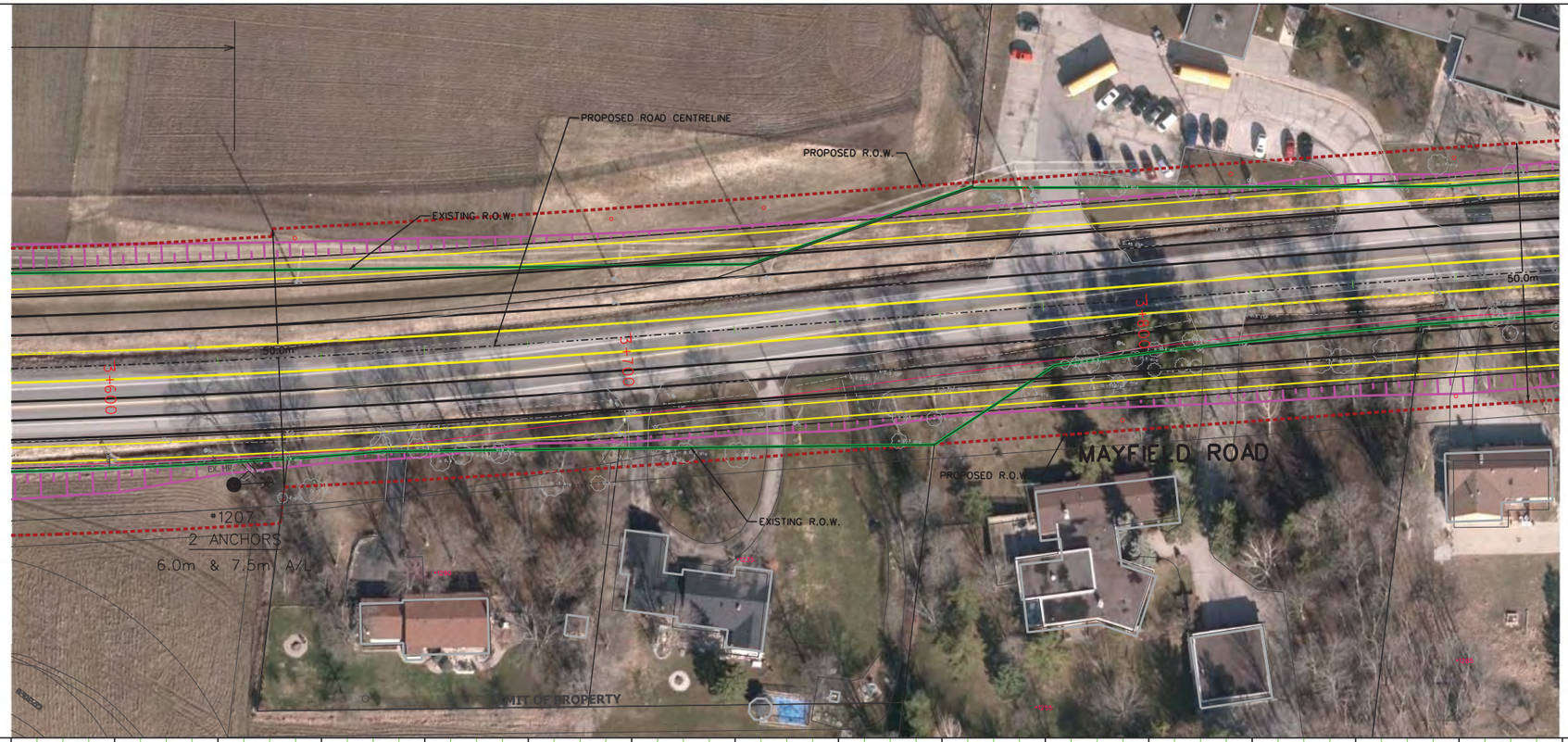
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 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.	

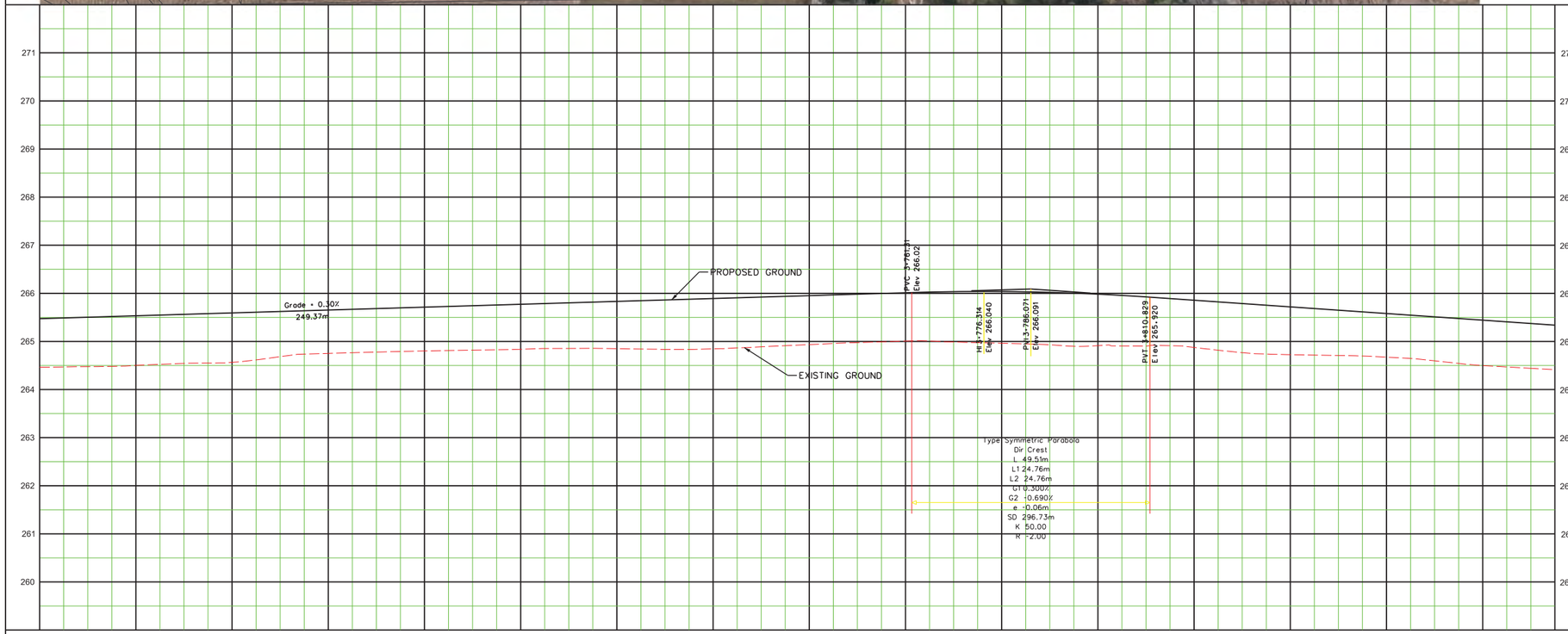


SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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

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

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:
BELL CANADA
ENERSOURCE TELECOM
HYDRO ONE TELECOM
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ALLSTREAM
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FUTUREWAY (FCI BROADBAND)

10m 0 10 20 30m — HORIZONTAL SCALE

1m 0 1 2 3m — VERTICAL SCALE

Region of Peel
Working for you

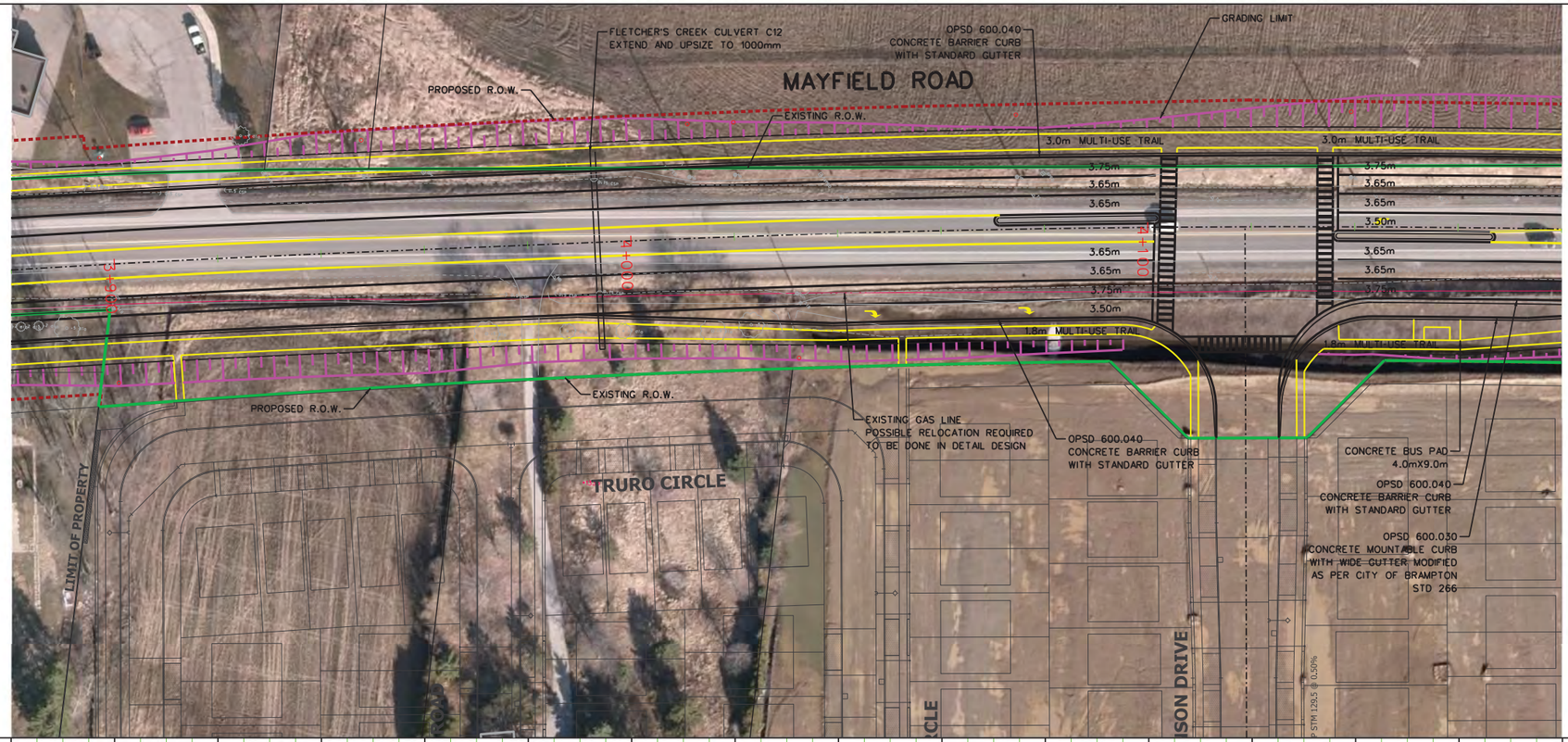
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

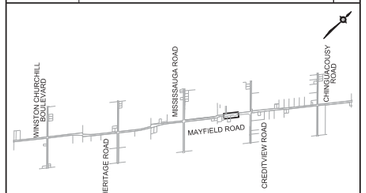
STA. 3+580 TO STA. 3+880

CAD Area	Area		Project No. 12-4390
Checked by	Drawn by	S.S.	
Date JANUARY 2015	Sheet	23 of 30	Plan No.



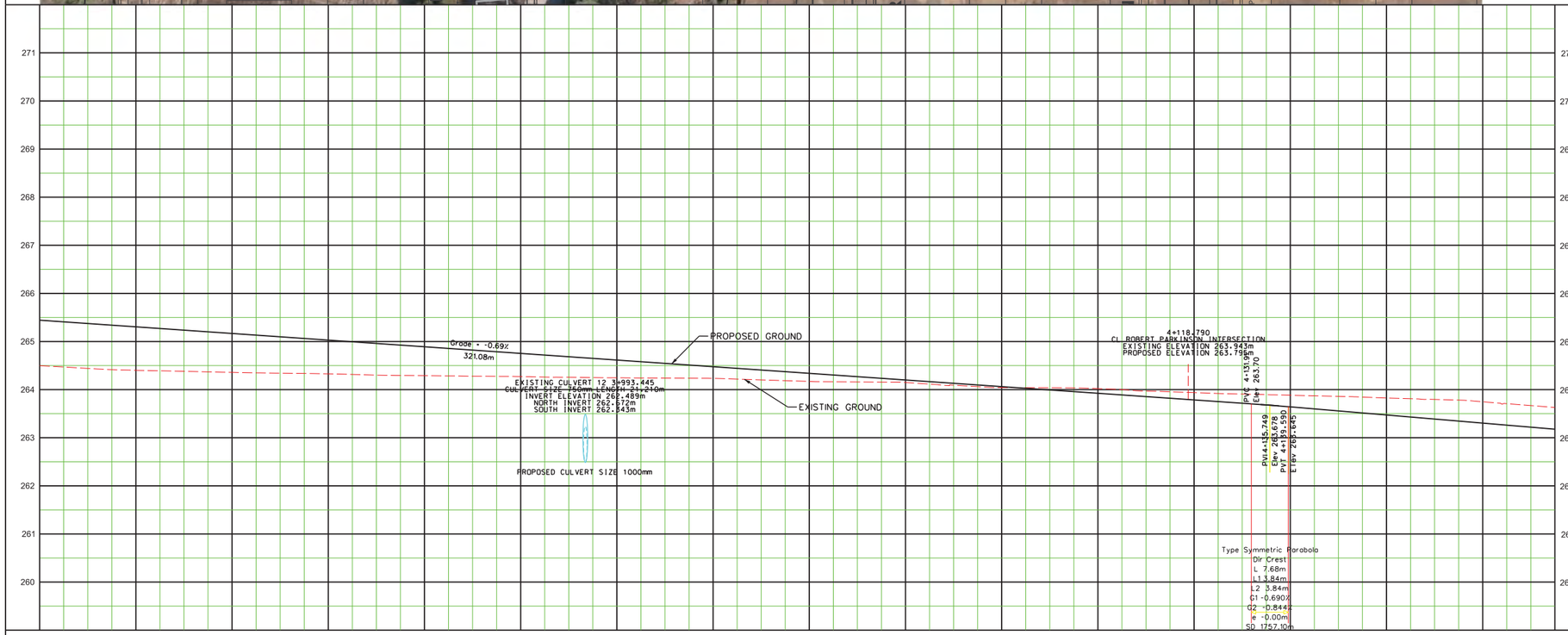
SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

REVISIONS		
DATE	DETAILS	INIT.



KEY PLAN (N.T.S.)

LEGEND:
- PROPOSED RIGHT OF WAY
- EXISTING RIGHT OF WAY
- GRADING LIMIT
- RELOCATED HYDRO POLES



General Notes

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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
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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

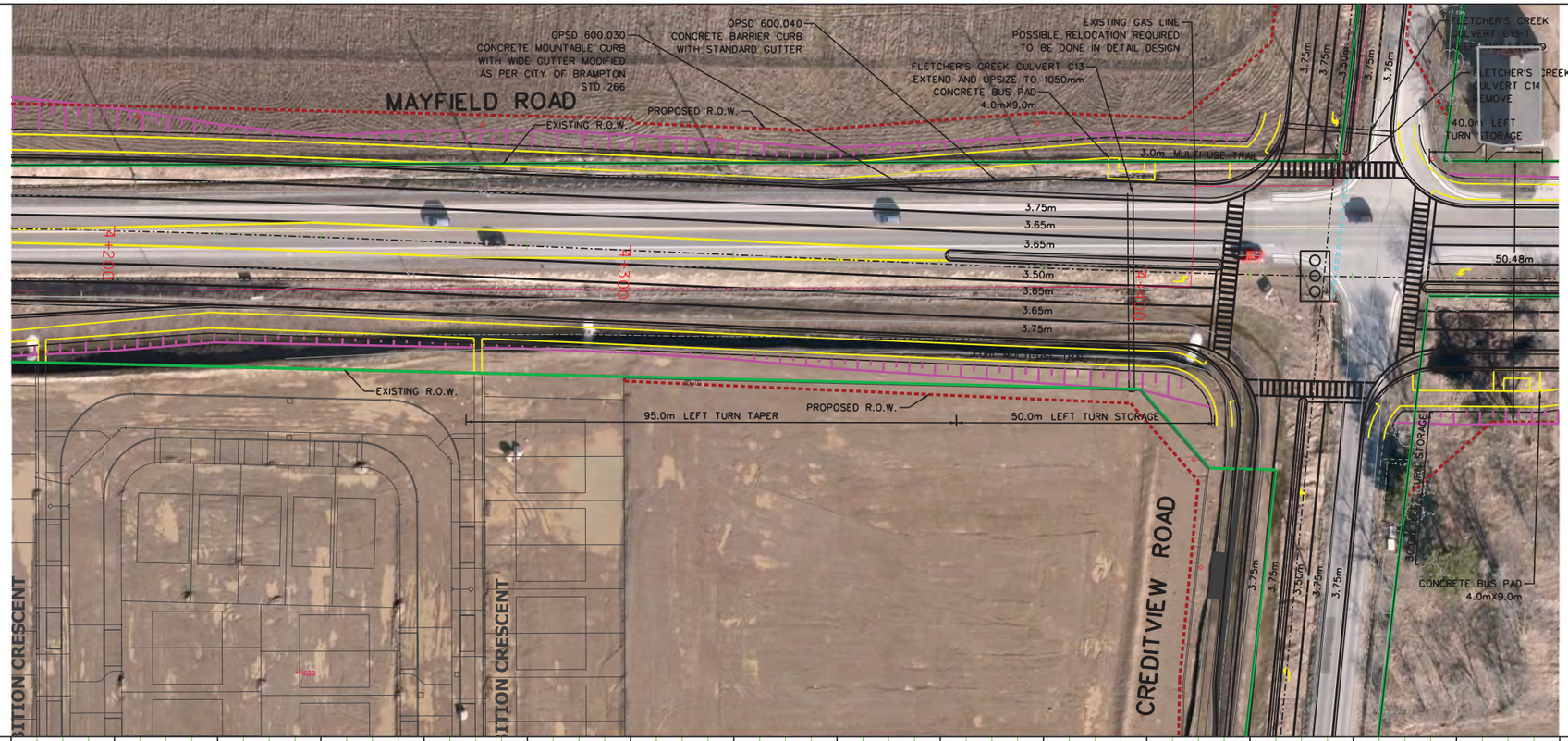
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

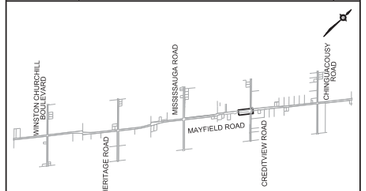
STA. 3+880 TO STA. 4+180

CAD Area	Area	Project No.	12-4390
Checked by	Drawn by S.S.		
Date JANUARY 2015	Sheet 24 of 30	Plan No.	



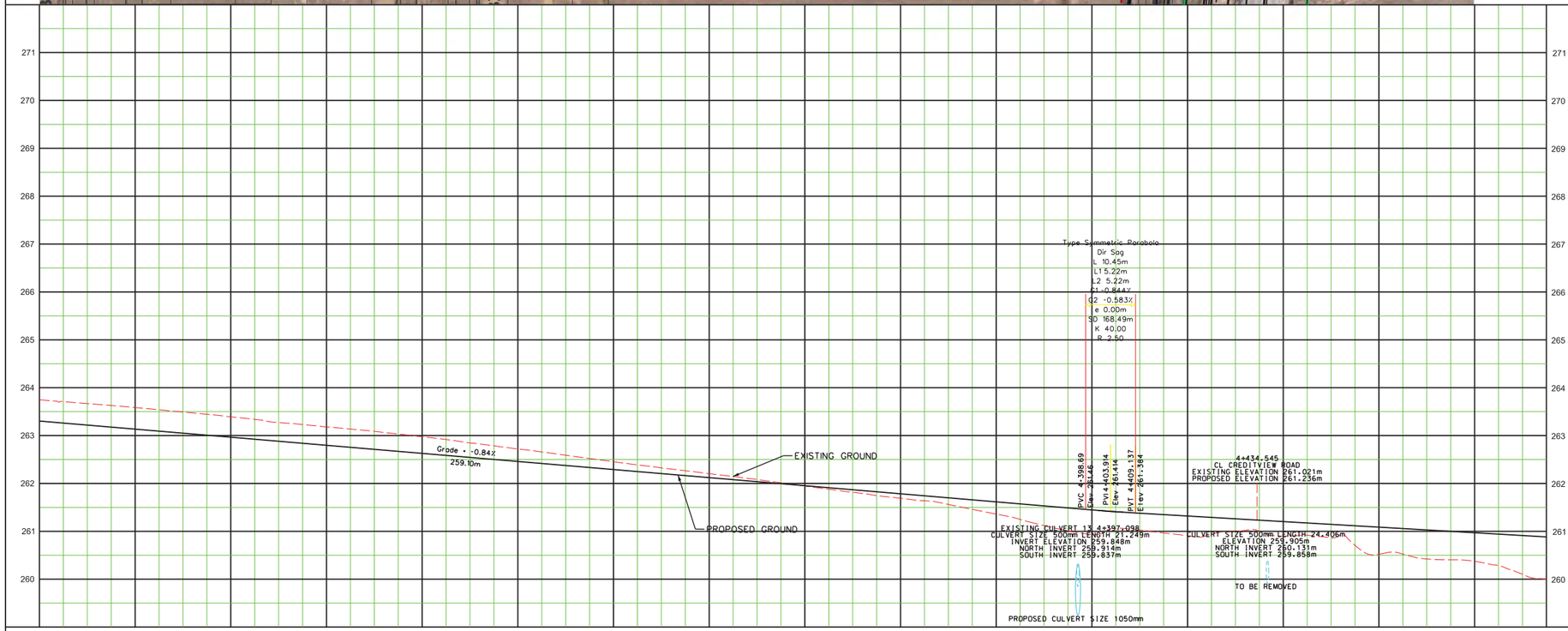
SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CITY		
ONT. CLEAN WATER			COMMUNIC. CABLES		

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, Elev.
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Designed by
Chkd.
Approved by

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HYDRO ONE NETWORKS
ENERSOURCE, HYDRO MISSISSAUGA
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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

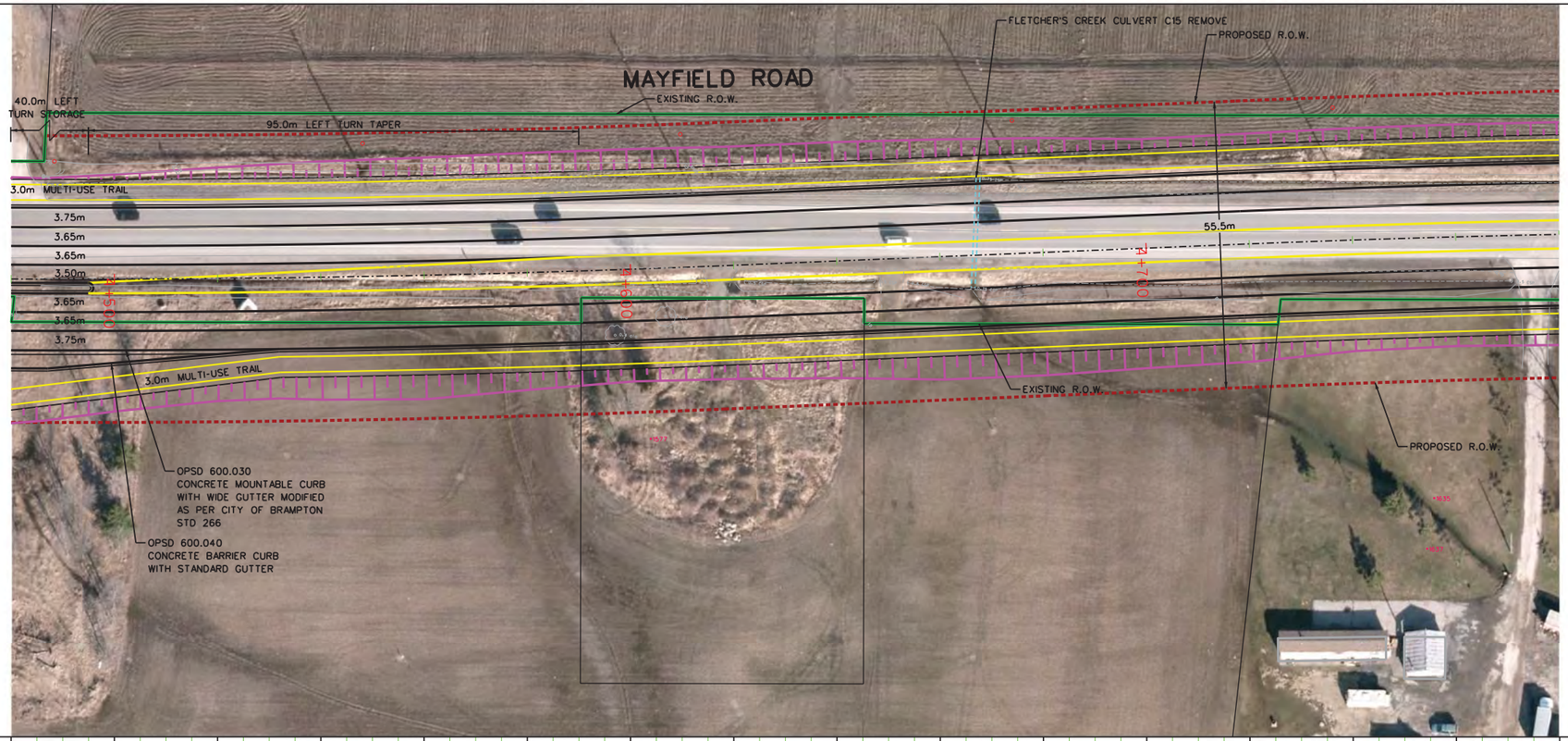
MAYFIELD ROAD

(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 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.	



SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
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WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
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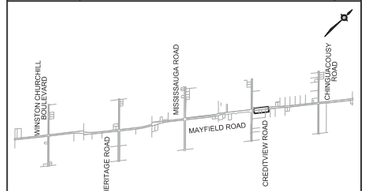

KEY PLAN (N.T.S.)

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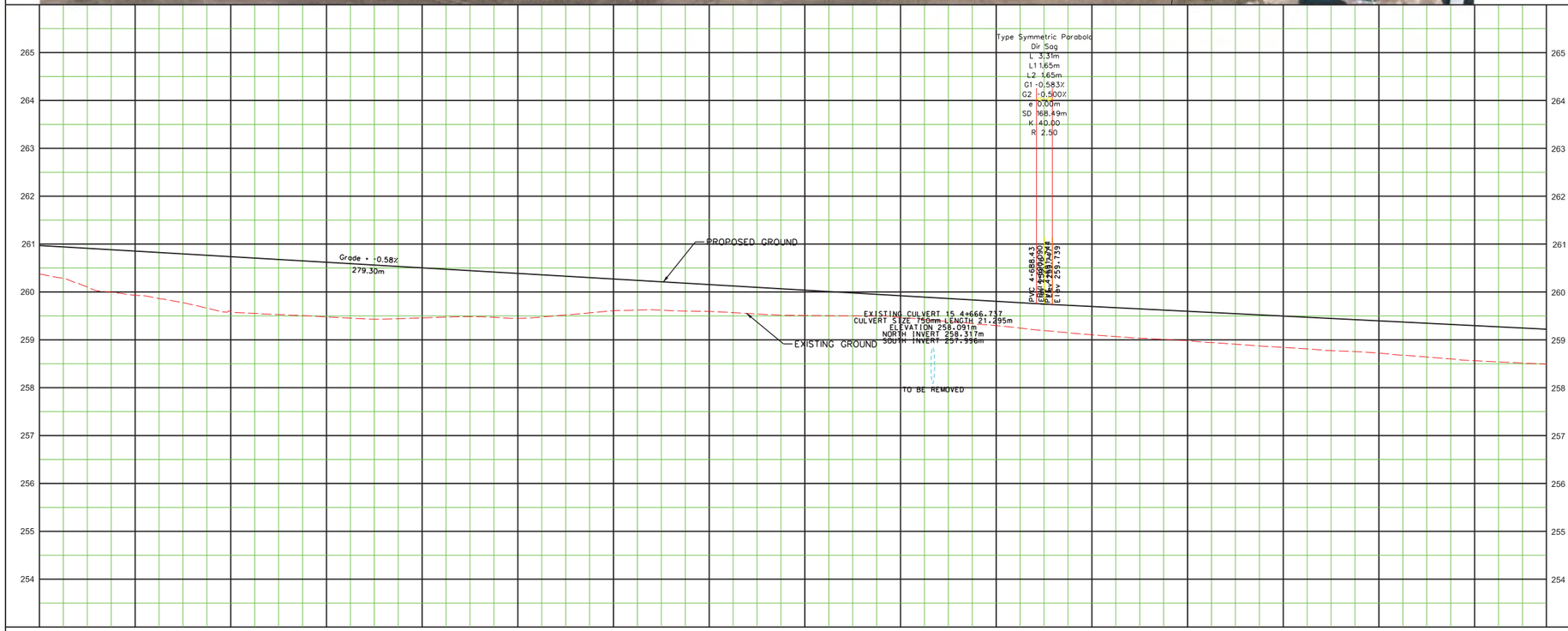

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(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 4+480 TO STA. 4+780

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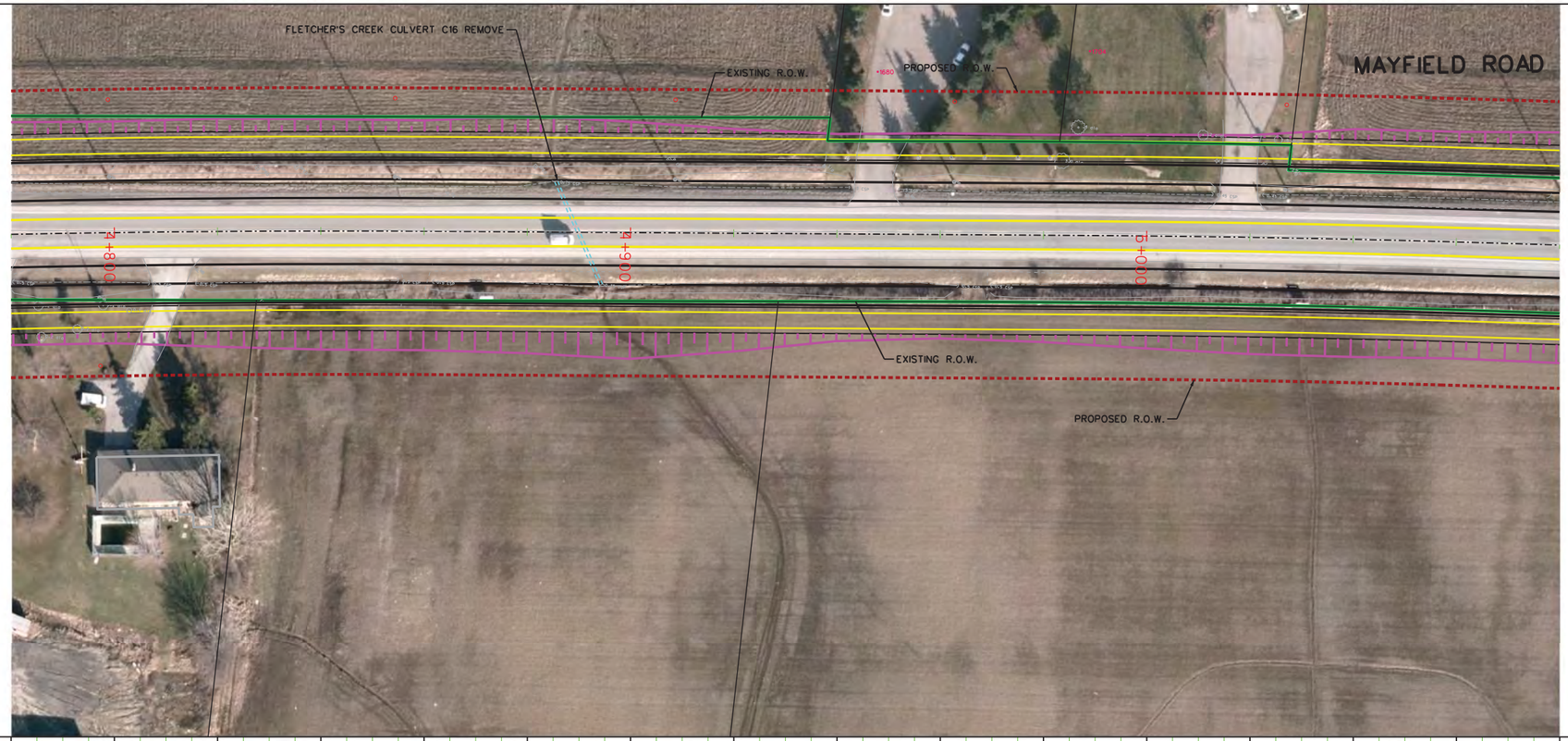

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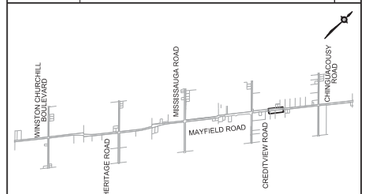

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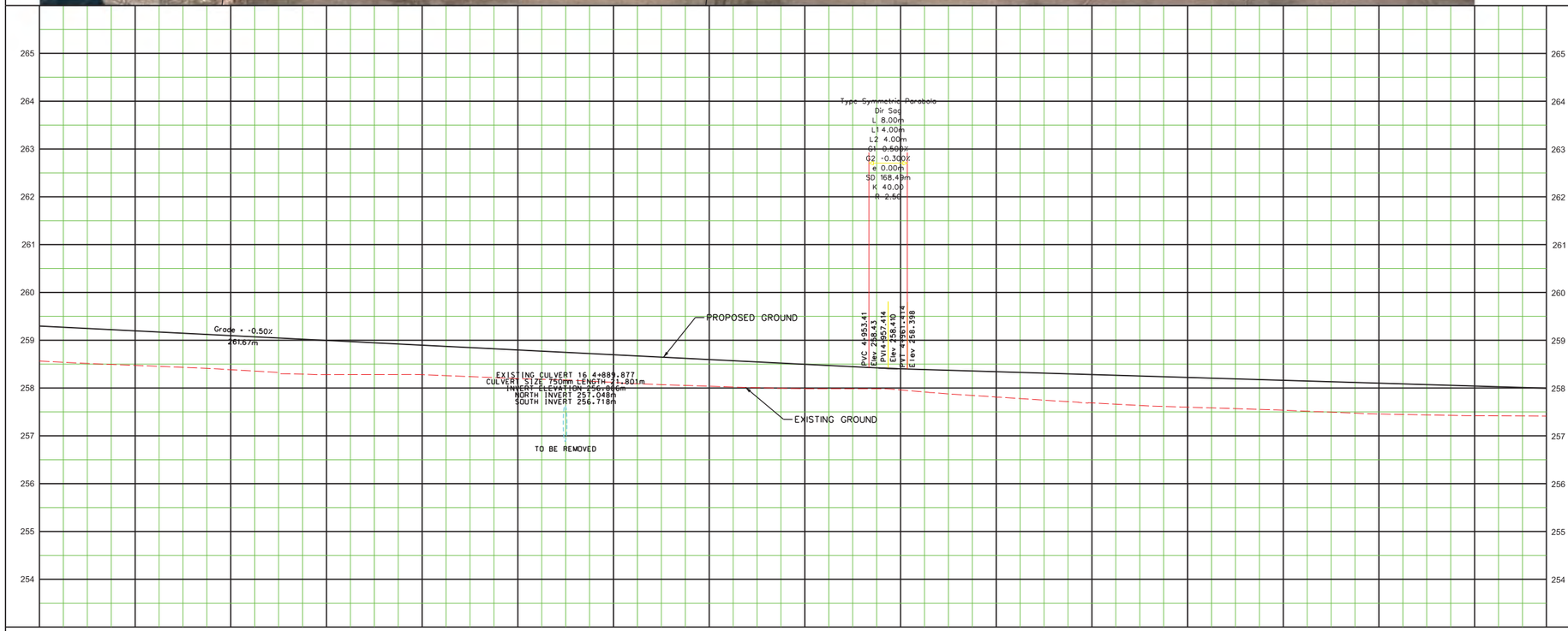

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PROPOSED 6 LANE WIDENING

STA. 4+780 TO STA. 5+080

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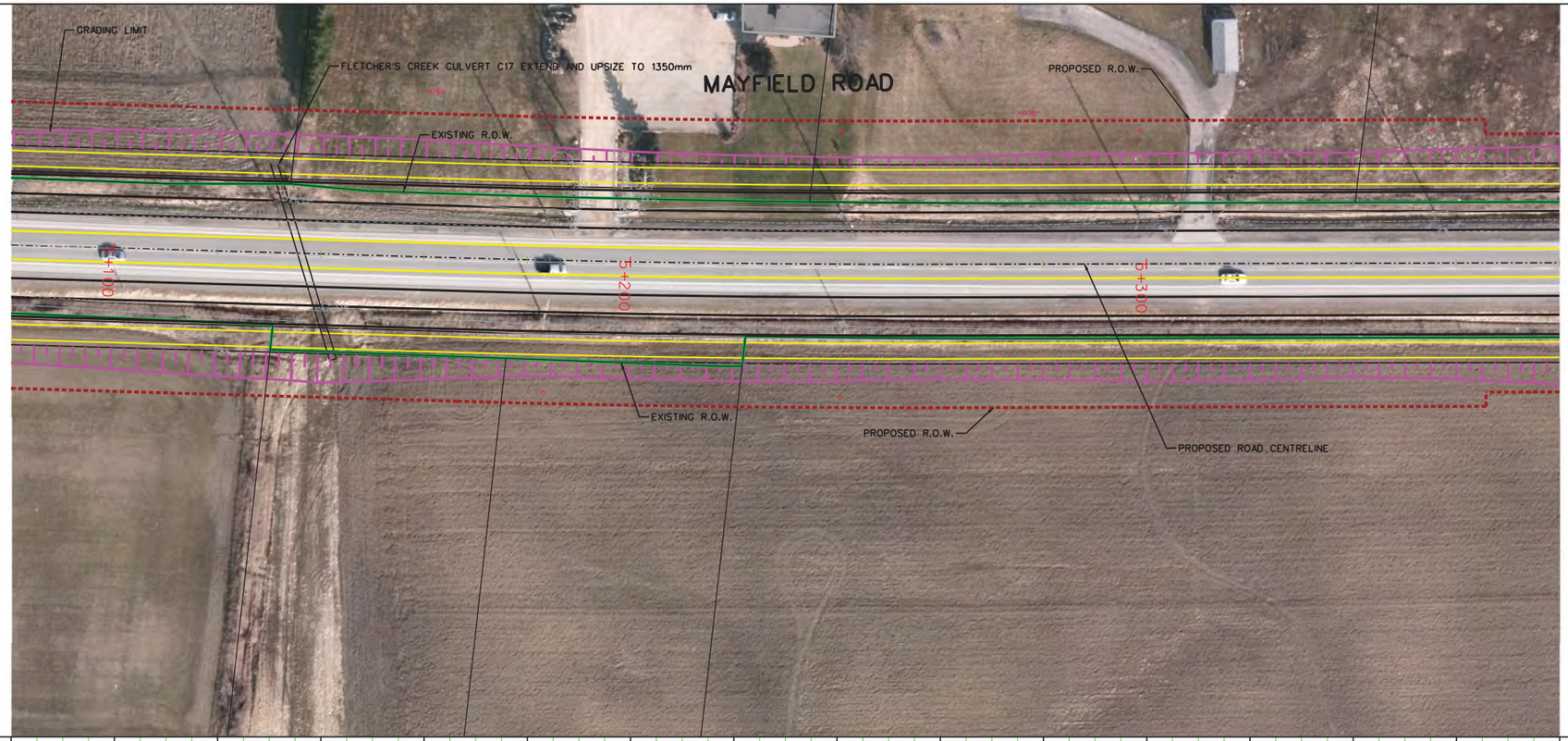

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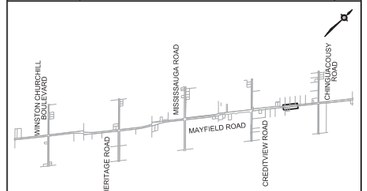

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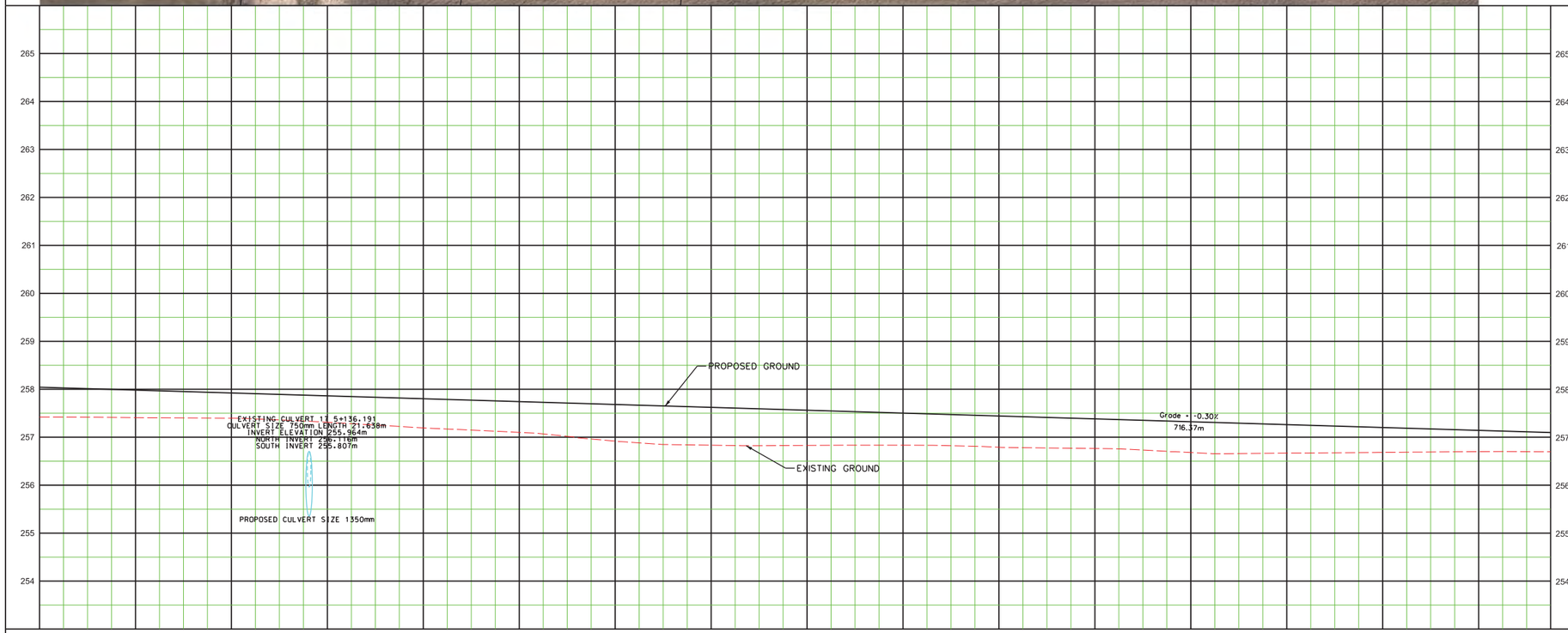

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STA. 5+080 TO STA. 5+380

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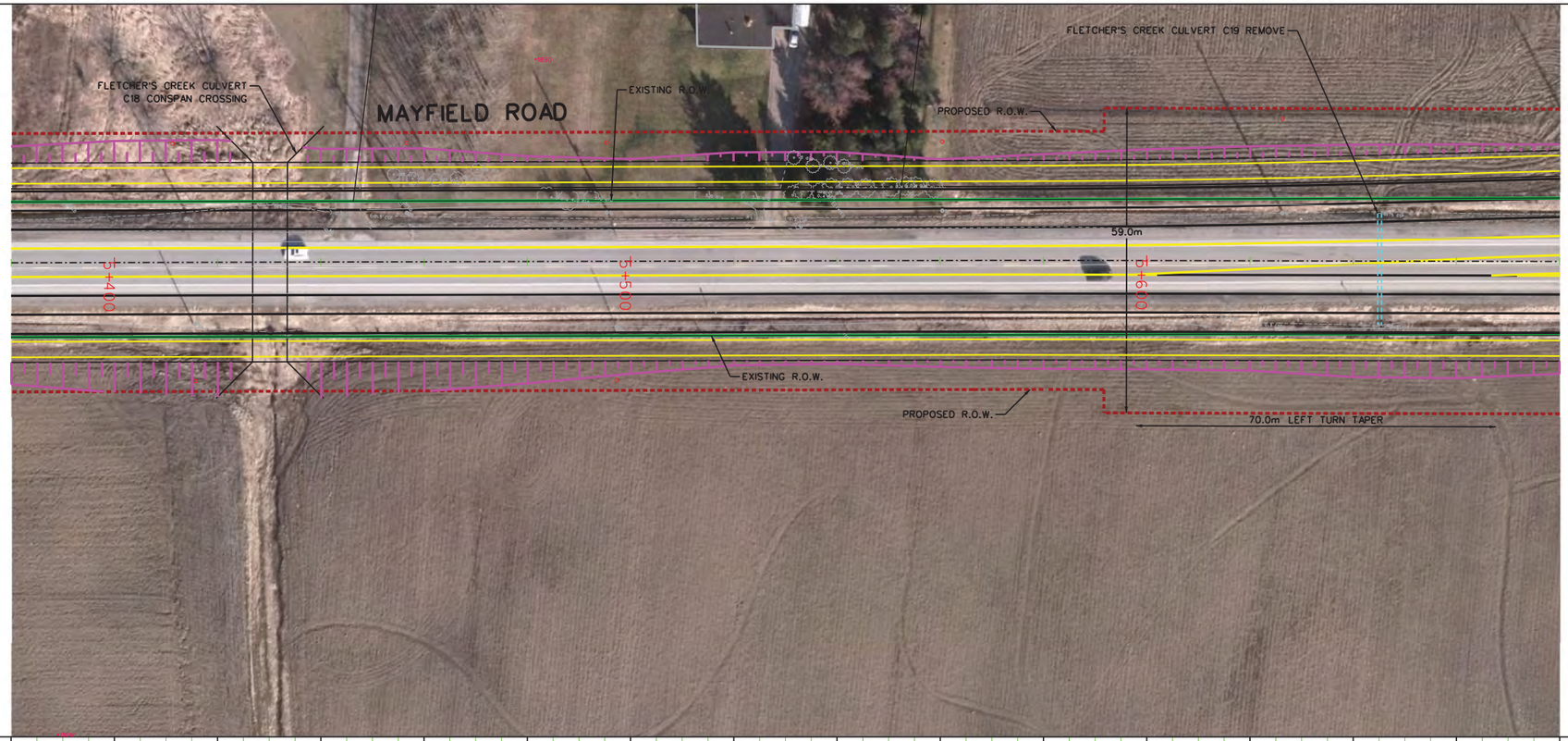

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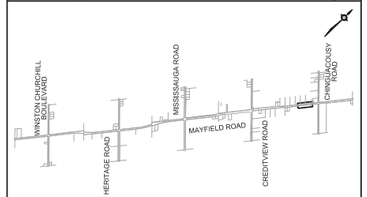

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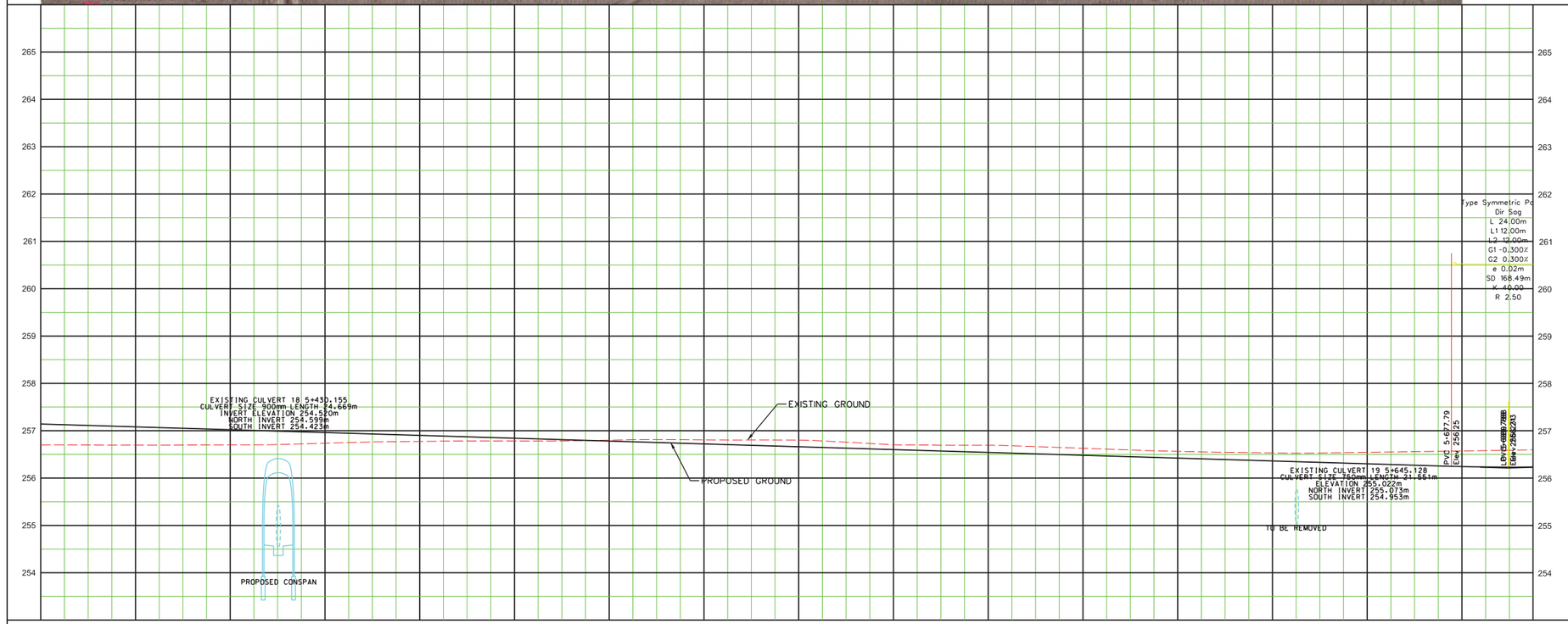

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Region of Peel
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(FROM WINSTON CHURCHILL BOULEVARD TO CHINGUACOUSY ROAD)

PROPOSED 6 LANE WIDENING

STA. 5+380 TO STA. 5+680

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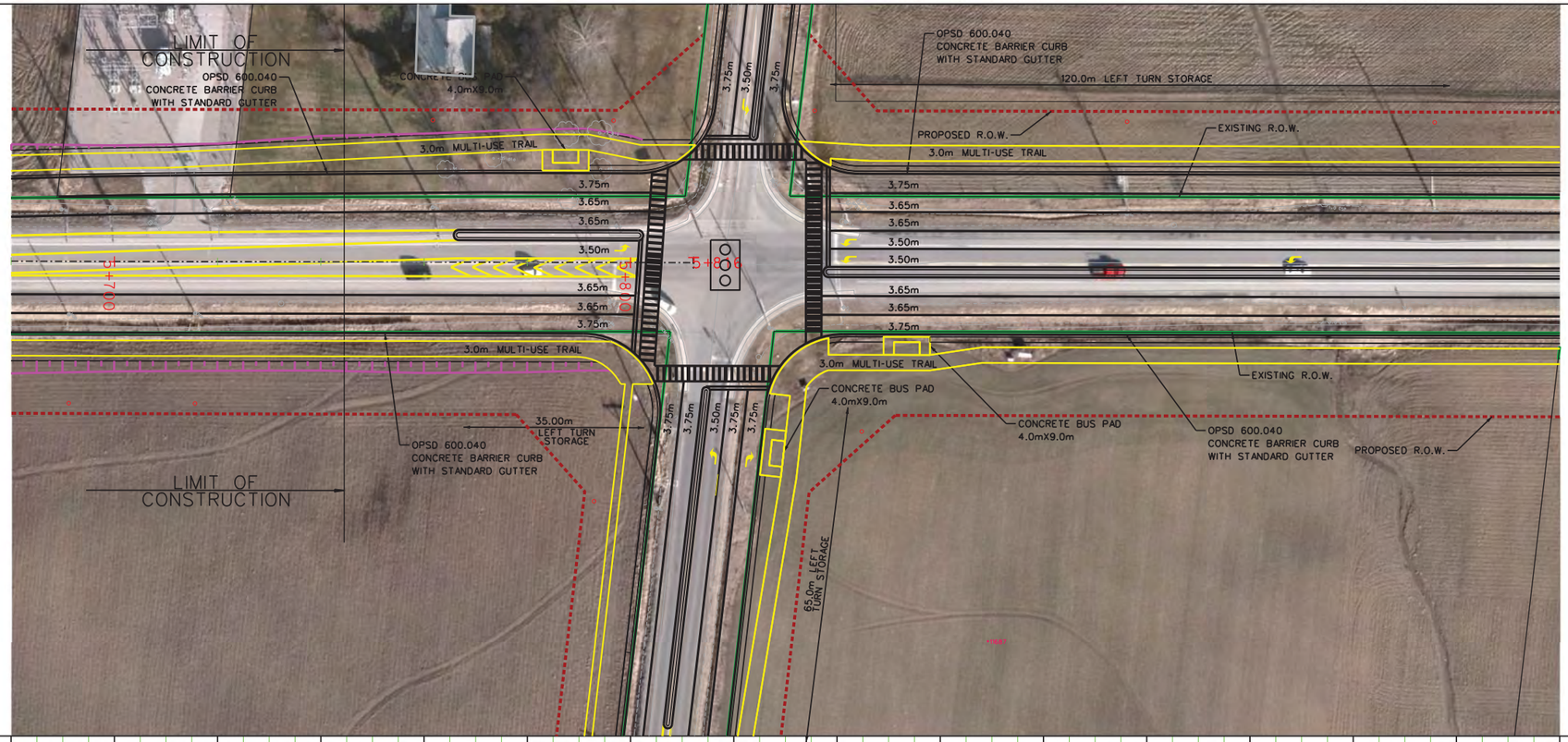

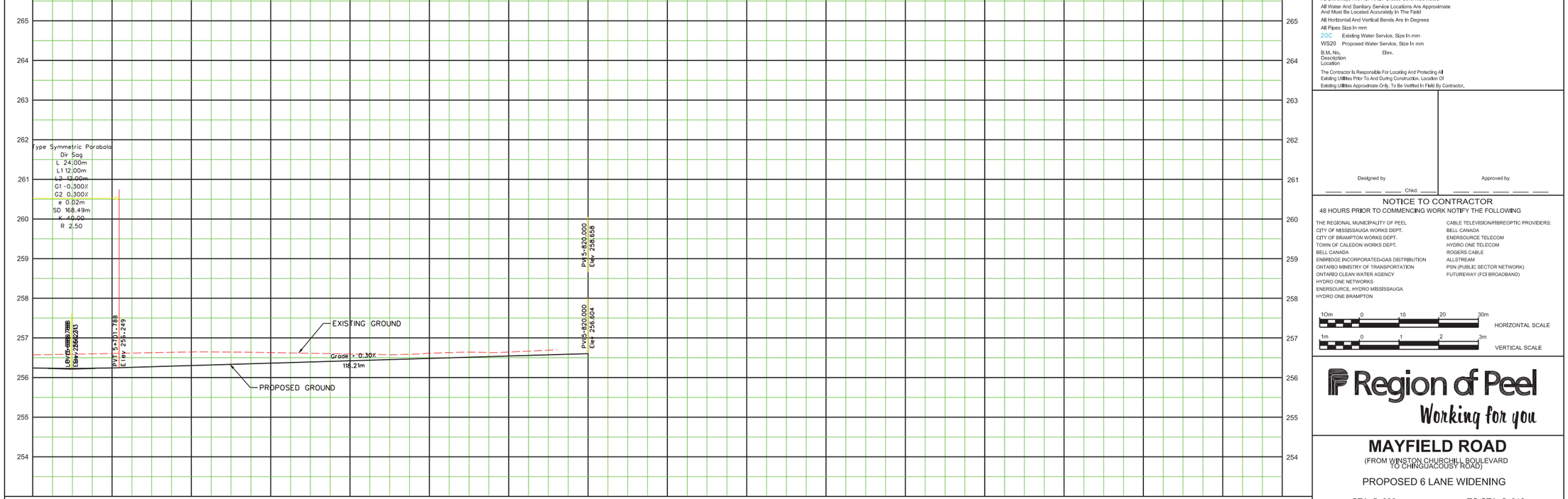

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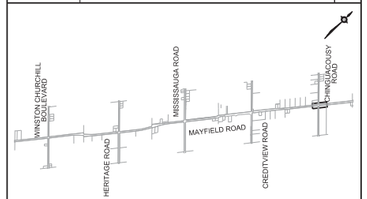

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PROPOSED 6 LANE WIDENING

STA. 5+680 TO STA. 5+812

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6.0 IMPACTS OF THE RECOMMENDED ALTERNATIVE DESIGN

6.1 Intersections and Vehicle Turning Movements

The traffic volumes for the intersection of Mayfield Road and Heritage Road are very close to meeting the warrant for signals. A traffic review will be conducted in detailed design to determine if the warrant for a signalized intersection has been met.

6.2 Access and Safety

Existing accesses will be maintained for current property owners. A centre turning lane to facilitate safer left hand turns into properties will be provided for both the 4 lanes and 5 lane interim sections of the road.

6.3 Property Impacts

Throughout the majority of the corridor property impacts are equidistant from the existing centre line except in areas of constraint. These constraints include areas of existing or new development which have created a hard property limit or where there is an existing heritage property. Fortunately the majority of the corridor is rural and existing homes will have sufficient set-back from the road despite the additional land required for widening.

Widening Property Impacts

- Between Chinguacousy Rd and Creditview Rd widening is mostly equidistant from the centre line. At the north east corner of Creditview Road is the historic Alloa Home United Church. Widening at that intersection was pushed to the south to avoid property impacts to the heritage feature.
- Between Creditview to just opposite the Alloa Public School, the Mount Pleasant development (Blocks 51-1 and 51-2) is ongoing to the south side of Mayfield Road. Unfortunately at the time the development was approved, it was not recognized that Mayfield Road is a dual hydro corridor and that an additional 5m of property would be needed along the corridor for a total 55.5m. The widening design has been adjusted primarily to the north side of Mayfield Road in this location.
- Between the Alloa Public School and Mississauga Road the proposed design is equidistant from the centre line.
- Between Mississauga Road and Heritage Road the proposed design is equidistant from the centre line.
- At the north-west corner of the Heritage Rd intersection is one property that will be negatively impacted by the proposed design. Adjusting the centre line to the north or

south were explored however to acquire an expanded right-of-way, the property would still be impacted either way. A total buy-out of that property is recommended.

- Between Heritage Rd and Winston Churchill Boulevard the proposed widening is equidistant from the centre line.

The recommended alternative design is a hybrid solution to minimize property impacts along the corridor. There is only one property that will be negatively impacted by the recommended design which will trigger a total property buy-out. The property is located at the north-west corner of Mayfield and Heritage Rd.

486 Mayfield Road, Caledon ON L7C 0Y5 - PIN 142550026

Roundabout Property Impacts

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

The radius of a proposed roundabout is 60+m. At the time of review a roundabout at Winston Churchill Boulevard would not trigger a property buy-out. However at the corner of Heritage Road there may be the need to totally purchase a property depending on the proposed centre of the roundabout. A future Sandalwood Parkway intersection at Mayfield Road has not been confirmed at the time of writing this report so evaluation of property impacts is not possible.

Capacity and operational analysis will be further reviewed during detailed design as more planning information becomes available (i.e. if the hold on the GTA West the status of development applications, and Sandalwood Parkway alignment). However the environmental assessment design will protect for both signals and roundabouts. The final selection of the preferred option will be made during the detailed design process.

6.4 Active Transportation and Pedestrian and Cycling Facilities

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.

The multi-use trail will be built on the south side of Mayfield Road (**Section 1**) between Chinguacousy Rd and Mississauga Rd for the ultimate design which has an urban cross section. The north side will retain its rural cross section and a paved shoulder will be provided for bicycles. After 2031 a multi-use trail will be added to the north side for **Section 1**.

For **Section 2**, Mayfield Rd from Mississauga Rd to Winston Churchill Boulevard, the rural cross section will remain and a paved shoulder provided on both sides of the road. If in the future the road is improved to an urban cross section, it is recommended that the multi-use trail be extended at that time on both sides of the road.

Bicycle detections systems are recommended at intersections and their possible locations evaluated in detailed design.

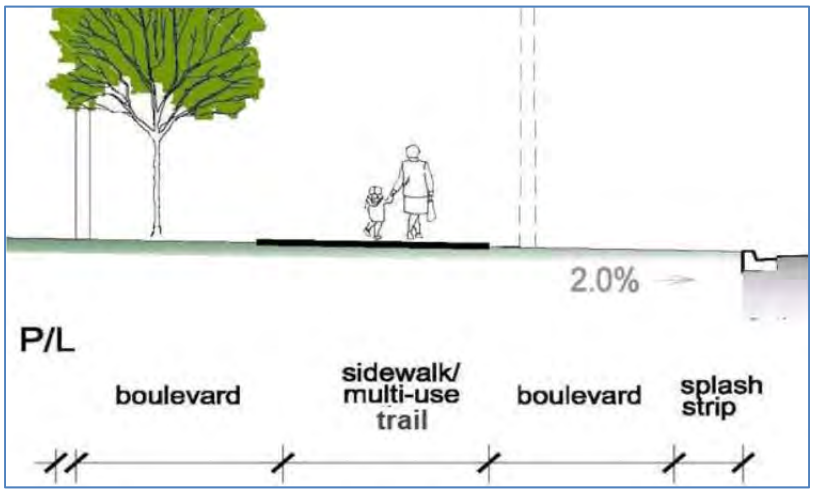

Illustration 4 – Example of Multi-use Trail Placement within the Road Right-of-Way

Illustration 5 - Bicycle Detection Systems and Cross Ride Treatments

6.5 Accessibility for Ontarians with Disabilities Act (AODA)

The **Act** requires that all barriers in the built environment (public spaces and buildings) be removed. The corridor design will meet or exceed requirements incorporating accessibility

options such as pedestrian cross walks, countdown signals, line markings, accessible curb ramps, and tactile surfaces where feasible. If roundabouts become part of the corridor solution, intersection surface indicators will be provided to accommodate users who have accessibility needs.

Traffic islands at intersections have been designed to exceed minimum Transportation Association of Canada guidelines of 10m and will be built with wheelchair accessible ramps.

6.6 Pavement Design and Rehabilitation of Existing Pavement

6.6.1 New Pavement

The recommended new pavement structure for Mayfield Road should consist of:

50 mm HL1
110 mm HDBC (2 lifts)
150 mm Granular 'A' Base
500 mm Granular 'B', Type I Subbase

Reconstruction of the existing pavement structure should include full-depth removal of the existing asphalt surface; followed by the removal of the underlying granular material to subgrade level. The exposed subgrade should be graded, and shaped, with a 3 percent cross-fall to provide subsurface drainage. In all pavement widening areas, the surficial topsoil should be removed with the underlying subgrade shaped, graded, and compacted as required for the construction of the new pavement structure. All new ditches should be constructed prior to the placement of pavement materials.

If Roundabouts are constructed the recommended new pavement structure for the roundabout intersection should consist of:

50 mm HL1
120 mm HDBC (2 lifts)
150 mm Granular 'A' Base
500 mm Granular 'B', Type I Subbase

All Hot Mix Asphalt (HMA) material should meet the requirements of OPSS 310, and Peel Region Specifications. See **Appendix E** for the Geotechnical Report details.

6.6.2 Existing Pavement Rehabilitation

A pavement condition assessment showed that the existing pavement is in very good condition, with very few surface distresses. In the interim time period before construction starts it is anticipated the existing pavement will deteriorate. The construction of the new 6-lane pavement platform on Mayfield Road will require:

- grade adjustments;
- installation of storm sewers;
- culvert replacements and installations;
- construction of a possible roundabout intersection; and
- extensive pavement widening with slight realignment of the existing platform.

Each of these operations will likely require cutting tie-in's and transitions into the existing pavement reducing the structural capacity of the in-place pavement, increasing the functional distresses, and further reducing the remaining service life of the existing pavement. Furthermore, as construction of the new roadway platform is not expected for several years, the in-place pavement will continue to deteriorate and may exhibit additional distresses that the current strengthening strategy would not address.

In consideration of all these factors, attempting to salvage the existing pavement is not considered a feasible strategy for the construction of the new 6-lane pavement platform for Mayfield Road and it is recommended that the existing pavement be reconstructed to provide a uniform pavement platform throughout the project.

6.7 Social Economic Impacts

Existing accesses to property will be maintained.

6.8 Impacts to Cultural Heritage

- avoid construction impacts to cultural heritage resources; and
- prepare heritage impact statements for the Home United Church (identified as BHR 1 in the Cultural Heritage Report) at 1500 Mayfield Road and the Farmscape (identified as CL4 in the Cultural Heritage Report) at the southwest corner of Heritage Road and Mayfield Road prior to construction.

6.9 Landscaping

The landscaping plan will be determined in detailed design and will follow the guidelines of the Region's Streetscaping Toolbox.

6.10 Environmental Impacts and Recommended Mitigation

- The watercourse flow is intermittent and does not provide suitable habitat for Redside Dace.
- There are no identified bird species at risk within the study area.

Further details on the recommendations for the Natural Environment are discussed in Section 3.6 – Natural Environment.

6.11 Summary of Commitments

1. In order to achieve the Ministry of Transportation criteria for noise remediation is it recommended that for the one sensitive location (just west of Heritage Rd) a 1.5m tall, 25m long berm be positioned on either side of the driveway leading to the residential unit.
2. For residential locations that will become closer to the road based on the recommended design, it is recommended that coniferous trees be planted to help mitigate particulate matter and act as a year round barrier.
3. The feasibility of roundabouts will be determined in detailed design when the future of the GTA West highway is confirmed and development applications along the corridor have been approved. The detailed design project team will consult with Halton Region and the Town of Halton Hills staff when evaluating the intersection design options at Winston Churchill Boulevard and Mayfield Road/17th Sideroad.
4. Traffic volumes for warrant of signals at Heritage Road and Mayfield Road are close and will be reviewed in detailed design to determine if they now meet the warrant.
5. Any affected well owners will continue to have water supplied of appropriate quality and in adequate quantities during construction. Any work done on affected wells or any replacement wells will be done pursuant to O. Reg. 903, Wells (pursuant to the *Ontario Water Resources Act*).
6. Three properties identified with the potential for soil contamination due to land use or previous spills will be reviewed in detailed design for a Phase I Environmental Site Assessment (ESA) if required.
7. The study area contains the headwaters of the subwatersheds of Fletcher's Creek in the east and Huttonville Creek in the west. The drainage features are ephemeral but contribute to the features downstream. Mitigation measures will be provided to the satisfaction of the CVC in order to obtain the necessary permits under the Regulation. During detailed design construction staff will work with CVC to look at opportunities to reduce any culvert lengths at watercourse crossings and for opportunities to infiltrate drainage such as changes to grading, reductions in boulevard widths and centre medians.
8. Wildlife passage to support the movement of small mammals will be a feature of improved culverts. The culverts to be similarly sized as the downstream crossing through development lands.
9. A total of 243 trees have been documented and individually tagged and their condition rated within 20m of either side of Mayfield Road. Removal and replacement of trees during construction will be based on an agreed to formula with Credit Valley Conservation.
10. The watercourse flow is intermittent and does not provide suitable habitat for Redside Dace. No bird species at risk were identified within the study area.

11. Use of Low Impact Development process to manage stormwater within the urban portions of the right-of-way. Use of a flat bottom infiltration ditch for those sections of the corridor that will retain their rural profile. LID options will be reviewed and finalized in detailed design.
12. The remaining Stage 2 Archaeological Assessments will be completed for the corridor in detailed design.
13. A Stage 3 Archaeological Assessment will be performed for the 3 properties identified in the Stage 2 report (see **Section 3.7.2 – Archaeology**).
14. Two cultural heritage resources were identified and a heritage impact statement should be prepared for the Home United Church (identified as BHR 1 in the Cultural Heritage Report) at 1500 Mayfield Road and the Farmscape (identified as CL4 in the Cultural Heritage Report) at the southwest corner of Heritage Road and Mayfield Road prior to construction
15. The Alloa pumping station storm water management pond is currently designed to outlet to Mayfield Road in the event of a severe storm. Staff proposes that this flow should be re-directed to the north and outlet to the Etobicoke Creek. This solution will be confirmed with the Toronto Regional Conservation Authority in detailed design as Etobicoke Creek is under their jurisdiction.
16. Attempting to salvage the existing pavement when widening is not considered a feasible strategy for construction of the new 6-lane pavement platform and it is recommended that the existing pavement be reconstructed to provide a uniform pavement platform throughout the project.
17. Active Transportation facilities will be provided along the corridor as follows:
    - For Section 1, Chinguacousy Rd to Mississauga Rd, the north side will retain its rural cross section and a paved shoulder will be provided for bicycles. After 2031 a multi-use trail will be added to the north side. On the south side a multi-use trail will be added by 2021.
    - For Section 2, Mayfield Rd from Mississauga Rd to Winston Churchill Boulevard, the rural cross section will remain and a paved shoulder provided on both sides of the road. If in the future the road is improved to an urban cross section, it is recommended that the multi-use trail be extended at that time on both sides of the road.
    - Bicycle detections systems are recommended at intersections and their possible locations evaluated in detailed design.
18. During construction, best management practices will be applied to mitigate any air quality impacts caused by construction dust and non-chloride dust suppressants applied.
19. The Streetscaping Plan will be prepared in detailed design. Region to consult with the City of Brampton on plant choices. Streetscape plantings adjacent to Natural Heritage Systems should use native plant species.

7.0 NOTICE OF COMPLETION and CONSTRUCTION

7.1 Notice of Completion

The final step in Phase 4 of the environmental assessment process is to publish the Notice of Completion and send it to reviewing agencies and the public. This ESR document will be placed for public review with the:

- Peel Regional Clerk and on the Region's website;
- City of Brampton Clerk;
- Halton Hills Clerk;
- Town of Caledon Clerk; and,
- at the Brampton Library, Mount Pleasant Village Branch, the Caledon Library, Margaret Dunn Valleywood Branch and the Halton Hills Public Library, Georgetown.

If after review there are no Part II Orders received for the study, then the Region may proceed with the detailed design and construction of the recommended works. Directions on how to initiate a Part II Order are given in **Section 1.10** of this report.

The Notice of Completion will be advertised twice in the Caledon Enterprise, Brampton Guardian and The Georgetown Independent. A copy of the Notice of Completion is shown in **Appendix A**.

7.2 Utilities

Extensive consultation was carried out with various utility stakeholders. Utilities were invited to participate in the project and their attendance is recorded in the TAC meeting minutes. Following are a list of utilities consulted and their comments during the EA.

Table 7 - Utilities Consulted

Utility	Comment
Hydro One Brampton*	• Hydro One submitted a PUCC application to install a new pole line on the north side of Mayfield Road from the Alloa School to Creditview Rd. As part of the EA we have identified the ultimate property requirements (55.5m) and the final road alignment. It was identified that 3 properties would be affected: the school, the Region's access to the Alloa Pumping Station and one large parcel at the corner of Mayfield Rd and Creditview Road. • Staff discussed with Hydro One Brampton if the hydro pole located at the south-east corner of Mayfield Road and Creditview Road (pole off the sidewalk) will fall within the new

	daylighting triangle. The land where it sits is currently owned by a developer and staff wanted to know if land would be purchased in advance of widening. • Due to budget constraints, Hydro One Brampton decided to only construct the pole line from Mississauga Rd to the hold-out properties. • The pole line from Creditview Rd to the hold-out properties will be deferred to a later date.
Halton Hills Hydro	• Halton Hills Hydro identified that they have a preliminary design to relocate some of their hydro poles. They cannot confirm the timing of the relocations but believe the project will proceed before 2031.
Rogers Communications	• Rogers has a proposed wireless telecommunication site located at 12016 Chinguacousy Road, Caledon 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. • The site is situated and designed to have minimal impact on surrounding land uses.
Enbridge Gas	• Enbridge is looking at running a gas line along Mayfield Rd, just west of McLaughlin Rd. Project manager provided Enbridge with details of the current EA project.
Hydro One Networks Inc.	• There are no Hydro One Transmission (above 115 kV) Facilities in the area. • Region requested the hydro line be relocated for the future six lanes at the Alloa Pumping Station Location. Hydro indicated that their hands were tied until expropriation is finalized. Further discussions with the Hydro and the Alloa Pumping station project manager ensued and it was agreed that a single supply would be provided in the interim to the Alloa Pumping Station and that the future pole location would be mutually agreed upon by both project managers. • Hydro One indicated their easements requirements -5m each side of center line. At a 2m offset that would be 3m onto customer's property.

Region of Peel Water/Wastewater Infrastructure Existing and Future	**Existing Infrastructure:** • There are no existing sanitary assets and no proposed State of Good Repair works within the limits of the study area. • A new 750mm (Zone 6) feedermain on Creditview Rd from Mayfield Rd to Wanless Dr has been installed recently. There are no concerns. • From Chinguacousy Road to Creditview Road: - An existing 750-mm PZ6 water main - An existing 600-mm PZ7 water main • From Creditview Road to Alloa Pumping Station: - An existing 1050-mm PZ6 water main - An existing 600-mm PZ7 water main **Future Growth Related Infrastructure:** Alloa Pumping Station to Mississauga Road: - A future 1200-mm PZ5 transmission main (in service by 2018) - A future 900-mm PZ6 water main (in service by 2018) - A future 600-mm PZ7 water main (in service by 2018) Mississauga Road to Heritage Road: - A future 750-mm PZ6 water main (construction in 2026) - A future 400-mm PZ7 water main (construction in 2026) Heritage Road to Winston Churchill Boulevard: - No proposed Development Capital water mains - Probably need future local water main for future development in northwest Brampton The future sanitary sewers in this area will generally run north-south so although no new sewers are anticipated along Mayfield Road there will be several Development Capital related sewers crossing Mayfield Road: - Potentially a 600-mm or 675-mm sanitary sewer at Chinguacousy Road (construction in 2019) - A 900mm trunk sewer along the future north-south street east of Mississauga Road, which is planned for construction in 2028 - A future 375-mm sanitary sewer at Heritage Road (construction in 2028) - A future 450-mm sanitary sewer between Heritage Road and Winston Churchill Boulevard (construction in 2031)
Bell Canada	• No issues identified.

*Staff identified the desire to locate hydro in its ultimate location within a 55.5m ROW for the ultimate 6 lane widening to avoid duplication of effort and throw-away costs associated with

moving the utilities twice. While the EA was ongoing Hydro One Brampton submitted a PUCC application to install a new pole line on the north side of Mayfield Road from the Alloa School to Creditview Rd. The Region's Real Property Acquisition team identified the need to confirm that:

- the design is basically 100% for the three properties (Alloa School, Region's Alloa reservoir and the development property) and the property requirements will not change;
- all utility relocates, not just hydro, have been considered and accounted for in the design;
- the design has accounted for all hydro anchor locations/requirements and any swing easements required by hydro, and if needed, any temporary working easements that might be required – in other words, would hydro need additional lands outside of the ultimate right-of-way in order to install their poles, anchors, etc.; and
- Roads Capital agrees to acquire the property in advance.

It will take time to complete the acquisition process, which may not line up with Hydro's current proposed schedule for their work.

7.3 Proposed Construction Monitoring

During the construction the Region will review the implementation of mitigation measures and recommended design features to ensure that they are consistent with the contract and commitments made.

A sediment and erosion control plan will be prepared in detailed design to reduce the impact of construction activities on the study area watershed and watercourses. The sediment and erosion control plan will meet the requirements of the Credit Valley Conservation Authority.

The Region will consult with the Ministry of the Environment and Climate Change (MOECC) Central Region Permit to Take Water (PTTW) Coordinator prior to detailed design to confirm the most up-to-date approval requirements for water takings during construction or operation, as regulated under the Ontario Water Resources Act (OWRA) and the Water Taking Regulation (O. Reg. 387/04).

7.4 Cost Estimate

The estimate cost of the recommended design alternative at the 30 percent design stage is as follows:

Table 8 – Cost of 4-lane Design – WCB to Mississauga Rd – 3.0 km

Description	Unit of Measure	Unit Price	Cost (Millions of $)
Utility Relocations	km	720,000	2,160,000
Road Widening – 2-4 lanes (rural)	km	1,352,000	4,056,000
2 Culverts – 23.8m length	each	1,396,060	2,792,120
Storm Water Management (LID)*	km	unknown	unknown
Street Lights	each	410,000	1,230,000
Intersection	each	701,000	2,103,000
Traffic Signals	each	200,000	600,000
Multi-Use Trail*	km	119,000	n/a
Streetscaping	km	445,000	1,335,000
Trees	km	58,705	176,115
TOTAL			**14,453,235**

*Cost of Storm water management will be determined in detailed design due to the use of new practices.

**No multi-use trail along this section of road.

Table 9 – Cost of 5-lane Design – Mississauga Rd to Chinguacousy Rd –2.8 km

Description	Unit of Measure	Unit Price	Cost (Millions of $)
Utility Relocations	km	720,000	2,016,000
Road Widening – 2-5 lanes (urban)	km	2,602,000	7,285,600
2 Culverts – 38.7 length	each	2,097,090	4,194,180
Storm Water Management (LID)*	km	unknown	unknown
Street Lights	each	410,000	1,148,000
Intersection	each	701,000	1,402,000
Traffic Signals	each	200,000	600,000
Multi-Use Trail*	km	119,000	372,585
Streetscaping	km	445,000	1,246,000
Trees	km	58,705	164,374
TOTAL			**18,428,739**

Table 10 – Cost of 6-lane Design – Mississauga Rd to Chinguacousy Rd – 2.8 km

Description	Unit of Measure	Unit Price	Cost (Millions of $)
Utility Relocations*	km	720,000	n/a
Road Widening – 5-6 lanes (urban)	km	2,277,000	6,375,600
Culverts*	each	n/a	n/a
7Storm Water Management (LID)*	km	unknown	unknown
Street Lights*	each	410,000	n/a
Intersection*	each	701,000	n/a
Traffic Signals*	each	200,000	n/a
Multi-Use Trail	km	119,000	314,151
Streetscaping*	km	445,000	n/a
Trees*	km	58,705	n/a
			6,689,751

*Cost has already been included in the 2-4 lane widening

The total cost of all the above work is **$39,571,725.**

The cost to acquire the property, inclusive of potential damages and Real Estate's time, is estimated at **$12,658,613 (does not include any potential expropriation costs).**

The total cost of the work including property acquisition is **$52,230,338** (does not include LID infrastructure costs)**.**