



TOWN OF CALEDON

# Community Risk Assessment

Final Report

November 2020 - 20-2879

# Table of Contents

<b>1.0</b>	<b>Introduction</b>	<b>1</b>
1.1	Methodology.....	2
<b>2.0</b>	<b>Geographic Profile</b>	<b>5</b>
2.1	Geographical Snapshot of Caledon .....	5
2.2	Roads, Transit, Bridges and Rail .....	9
2.2.1	Road Network .....	9
2.2.2	Bridges .....	11
2.2.3	Rail .....	13
2.3	Waterways and Conservation Areas .....	16
2.3.1	Waterways .....	16
2.3.2	Conservation Areas .....	16
2.4	Wildland-Urban Interface .....	17
<b>3.0</b>	<b>Building Stock Profile</b>	<b>21</b>
3.1	Ontario Building Code Occupancy Classifications .....	21
3.2	O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications .....	22
3.2.1	Town of Caledon Existing Major Building Occupancy Classification Summary.....	28
3.3	Building Density and Exposure.....	33
3.4	Building Age and Construction.....	33
3.5	Building Height and Area .....	38
3.5.1	Building Height.....	38
3.5.2	Building Area.....	40
3.6	Potential High-Fire Risk Occupancies .....	40
3.7	Occupancies with Potential High Fire Life-Safety Risk .....	42
3.7.1	Registered Vulnerable Occupancies .....	43
3.7.2	Other High Fire Life Safety Risk Occupancies.....	43
3.8	Historic or Culturally Significant Buildings.....	44

<b>4.0</b>	<b>Critical Infrastructure Profile</b>	<b>45</b>
4.1	Critical Infrastructure in Caledon .....	45
4.1.1	Water Infrastructure .....	48
4.1.2	Airport .....	50
<b>5.0</b>	<b>Demographic Profile</b>	<b>51</b>
5.1	Population and Dispersion.....	51
5.1.1	Mapping Population Dispersion.....	52
5.2	Population Age.....	54
5.2.1	Mapping Population Age .....	57
5.3	Sex .....	61
5.4	Socioeconomic Circumstances.....	62
5.4.1	Labour Force Status.....	62
5.4.2	Educational Attainment.....	64
5.4.3	Income Decile Groups .....	67
5.4.4	Household Tenure, Occupancy, Suitability and Costs .....	71
5.4.5	Peel Region Healthy Complete Communities .....	73
5.5	Cultural Background and Language Considerations.....	74
5.6	Transient Populations.....	75
5.6.1	Tourism .....	75
5.6.2	Employment.....	76
<b>6.0</b>	<b>Hazard Profile</b>	<b>79</b>
6.1	Hazard Identification and Risk Assessment in Ontario (H.I.R.A.) .....	79
6.1.1	H.I.R.A. and the C.R.A. ....	79
6.2	Town of Caledon Hazard Identification and Risk Assessment .....	80
6.3	Impacts of H.I.R.A. Identified Hazards on Fire Protection Services.....	80
<b>7.0</b>	<b>Public Safety Response Profile</b>	<b>84</b>
7.1	Public Safety Response Agencies in the Town of Caledon .....	84
7.1.1	Mutual/Automatic Aid Agreements .....	86

7.1.2	Mutual Assistance Agreements .....	86
<b>8.0</b>	<b>Community Services Profile</b>	<b>87</b>
8.1	Community Services in the Town of Caledon .....	87
<b>9.0</b>	<b>Economic Profile</b>	<b>92</b>
9.1	Economic Sectors and Employers in Caledon .....	92
<b>10.0</b>	<b>Past Loss and Event History Profile</b>	<b>95</b>
10.1	Past Loss .....	95
10.1.1	Total Fire Loss .....	95
10.1.2	Fires by Occupancy Type .....	97
10.1.3	Civilian Fire Fatalities and Injuries .....	99
10.1.4	Reported Fire Cause .....	100
10.1.5	Ignition Source .....	102
10.1.6	Smoke Alarm Status Processing Equipment .....	103
10.2	Event History .....	104
10.2.1	Total Emergency Call Volume Caledon/Ontario Comparison – All Incident Types .....	105
10.2.2	Total Emergency Call Volume Town of Caledon – All Incident Types .....	107
10.2.3	Emergency Call Volume – Spatial Modelling .....	111
10.2.4	Emergency Call Volume – Summary .....	121
<b>11.0</b>	<b>Applying Key Findings and Identified Risks</b>	<b>122</b>
11.1	Prioritizing Risks .....	124
11.1.1	Risk Assignment Process Overview .....	124
11.1.2	Assigned Risk Levels .....	126
11.2	Risk Treatment Options .....	133
11.2.1	The ‘Five Es’ of Community Risk Reduction .....	133
11.2.2	Risk Conclusions, Treatment Options, and the Five Es .....	134

## Figures

Figure 1: Community Risk Assessment Profiles and Sub-Topics .....	4
Figure 2: Town of Caledon – Schedule ‘A1’ – Town Structure .....	6
Figure 3: Land Use Designations .....	8
Figure 4: Long Range Road Network .....	10
Figure 5: Bridge Locations and Restrictions .....	12
Figure 6: At-grade Rail Crossings .....	15
Figure 7: Forest/Communities Corresponding to Wildland Fire (Caledon) .....	19
Figure 9: O.B.C. Major Building Occupancy Classifications by M.P.A.C. Property Stock .....	29
Figure 10: Fire Propagation Curve .....	36
Figure 11: Period of Construction of Residential Dwellings – Caledon and Ontario .....	37
Figure 12: Existing Fire Hydrant Locations .....	49
Figure 13: Population Density – Town of Caledon .....	53
Figure 14: 2008-2018 Residential Fire Death Rate by Age of Victim .....	55
Figure 15: Population Distribution – Caledon and Ontario .....	57
Figure 16: Percentage of Population Aged 65 and Older by Dissemination Area .....	59
Figure 17: Percentage of Population Age 0-14 Years Old by Dissemination Area .....	60
Figure 18: Median Total Income of Households in 2015 by Dissemination Area .....	66
Figure 19: Percentage of Bottom Income Decile by Dissemination Area .....	69
Figure 20: Percentage of Top Income Decile by Dissemination Area .....	70
Figure 21: Labour Force by Industry in Caledon by North American Industry Classification System (N.A.I.C.S.) .....	93
Figure 22: Town of Caledon – Total Emergency Call Volume by O.F.M.E.M. Response Type - January 1st, 2014 to December 31st, 2018 .....	105

Figure 23: Province of Ontario – Total Emergency Call Volume by O.F.M.E.M. Response Type - January 1st, 2014 to December 31st, 2018 .....	106
Figure 24: Annual Call Volume – All Incidents January 1st, 2014 to December 31st, 2019 .....	108
Figure 25: Average Call Volume by Month – All Incident January 1st, 2014 to December 31st, 2019 .....	109
Figure 26: Average Call Volume by Day of Week – All Incidents January 1st, 2014 to December 31st, 2019 .....	110
Figure 27: Average Call Volume by Time of Day – All Incidents January 1st, 2014 to December 31st, 2019 .....	111
Figure 28: Spatial Concentration – All Emergency Incidents .....	112
Figure 29: Spatial Concentration – Medical/Resuscitator Incidents .....	114
Figure 30: Spatial Concentration – Rescue Incidents .....	116
Figure 31: Spatial Concentration – False Fire Incidents .....	118
Figure 32: Spatial Concentration – Fire/Explosion Incidents .....	120
Figure 33: Risk Conclusions Application Process .....	123

## Tables

Table 1: O.B.C. Major Building Occupancy Classifications .....	21
Table 2: O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications .....	23
Table 3: Town of Caledon Existing Property Stock .....	30
Table 4: Group C- Residential Building Stock Comparison .....	32
Table 5: Time to Reach 1 M.W. Fire Growth Rates in the Absence of Fire Suppression .....	35
Table 6: Period of Construction of Residential Dwellings – Caledon and Ontario .....	37
Table 7: Summary of High-Rise Building Height Metrics .....	39
Table 8: Inventory of Buildings of Existing Buildings of Three Storeys or More .....	39

Table 9: Building Area .....	40
Table 10: Potential High-Fire Risk Occupancies.....	41
Table 11: Registered Vulnerable OccupanciesTable 9: Registered Vulnerable Occupancies.....	43
Table 12: Critical Infrastructure Considerations .....	46
Table 13: Historic Growth in Population and Households - Caledon.....	51
Table 14: Population by Age Group – Caledon and Ontario.....	55
Table 15: Sex Distribution by Age Group – Town of Caledon.....	61
Table 16: Labour Force Status – Caledon and Ontario.....	64
Table 17: Educational Attainment – Caledon and Ontario.....	65
Table 18: Economic Family Income Decile Group for the Population in Private Households – Caledon and Ontario .....	67
Table 19: Household Tenure, Occupancy, Suitability and Costs – Caledon and Ontario .....	72
Table 20: Immigration Status – Caledon and Ontario.....	74
Table 21: Knowledge of Official Language – Caledon and Ontario.....	75
Table 22: Commuting Destinations – Town of Caledon (25% Sample Data).....	77
Table 23: Impacts of Identified H.I.R.A. Hazards on Fire Protection Services .....	81
Table 24: Public Safety Response Agencies.....	85
Table 25: Community Service Agencies, Organizations and Associations.....	88
Table 26: Largest Employers in Caledon.....	94
Table 27: Total Fire Loss – Town of Caledon .....	96
Table 28: Structure Fires and Property Loss – Town of Caledon and Province of Ontario .....	96
Table 29: Fires by O.B.C. Major Occupancy Classification – Town of Caledon and Province of Ontario 2014-2018 .....	98

Table 30: Civilian Fire Fatalities and Injuries by O.B.C. Major Occupancy Classification - Town of Caledon .....	99
Table 31: Reported Fire Cause – Town of Caledon and Province of Ontario .....	101
Table 32: Source of Ignition - Town of Caledon and Province of Ontario .....	102
Table 33: Smoke Alarm Presence and Operation on the Floor of Fire Origin - Town of Caledon and Province of Ontario .....	103
Table 34: Total C.F.E.S. Calls by O.F.M.E.M. Response Type January 1st, 2014 to December 31st, 2019 .....	107
Table 35: Rescue Incidents - Analysis .....	115
Table 36: Probability Levels .....	124
Table 37: Consequence Levels .....	125
Table 38: Risk Matrix .....	126
Table 39: Risk Assignment .....	128
Table 40: Risk Treatment Options .....	133
Table 41: Overview of the N.F.P.A. 1300 Five “E’s” .....	134
Table 42: Risk Analysis Conclusions – 5 E’s Categorization .....	135
Table 43: Treatment Options and Five E’s Categorization – Identified Risks .....	136
Table 44: Treatment Options and Five E’s Categorization – Key Findings .....	139



## 1.0

# Introduction

This Community Risk Assessment (C.R.A.) has been developed for the Town of Caledon to comply with **Ontario Regulation 378/18: Community Risk Assessments (O. Reg. 378/18)**. **O. Reg. 378/18** was made under the authority of the Fire Protection and Prevention Act, 1997 (F.P.P.A.) and came into effect on July 1st 2019. It requires all municipalities in Ontario to develop a C.R.A. prior to July 1st, 2024. This regulation also requires municipalities to “use its community risk assessment to inform decisions about the provisions of fire protection services”<sup>1</sup>.

The Town of Caledon has chosen to proactively develop this C.R.A. at this time to both comply with the requirements of **O. Reg. 378/18** and to inform the companion Fire Master Plan that is being updated at Council’s request. Therefore, this C.R.A. is formatted to become a stand-alone document in the future to assist the Town in maintaining compliance with **O. Reg. 378/18**, including the requirement for the C.R.A. to be reviewed at least annually, and more often as any change in circumstances may warrant.

The F.P.P.A. requires that municipalities provide fire protection programs that “include public education with respect to fire safety and certain components of fire prevention, and provide such other fire protection services as it determines may be necessary in accordance with its needs and circumstances”<sup>2</sup>. The recent introduction of **O. Reg. 378/18** is now a core component of developing an in-depth analysis of a community’s fire related risks through a comprehensive analysis of nine mandatory profiles.

The F.P.P.A. also assigns duties to the Office of the Fire Marshal and Emergency Management (O.F.M.E.M.) to “advise municipalities in the interpretation and enforcement of this Act and the regulations”<sup>3</sup>. The O.F.M.E.M. has developed Technical Guideline-02-2019 (O.F.M.E.M. T.G.-02-2019) to assist municipalities and fire departments in the process to develop a C.R.A. and to utilize the completed C.R.A. to inform the municipality’s decisions with regard to complying with the F.P.P.A.

The methodology and analysis utilized to develop this C.R.A. has been directly informed by O.F.M.E.M. T.G.-02-2019, which recognizes the value of understanding the fire risk within a community, and the importance of developing fire risk reduction and mitigation strategies in addition to providing fire suppression services.

The primary purpose of this C.R.A. is twofold:

1. To develop a Community Risk Assessment for the Town of Caledon to identify the fire related risks within the community and comply with **O. Reg. 378/18**; and

<sup>1</sup> Ontario Regulation 378/18: Community Risk Assessments, Mandatory Use, Section 1 (b).

<sup>2</sup> Fire Protection and Prevention Act, 1997 Part II Responsibility for Fire Protection Services, Section 2.1 (a) (b).

<sup>3</sup> Fire Protection and Prevention Act, 1997, Part III Fire Marshal, Section 9.2(b).

2. To utilize the fire related risk conclusions of the Community Risk Assessment to inform comprehensive analyses of the existing, and future fire protection needs of the Town of Caledon through the development of a Fire Master Plan (F.M.P.).

## 1.1 Methodology

In addition to O.F.M.E.M. T.G.-02-2019, the methodology applied to develop this C.R.A. has been informed by other current industry standards and best practices. These include:

1. O.F.M.E.M. Comprehensive Fire Safety Effectiveness Model: Fire Risk Sub-Model;
2. O.F.M.E.M. Public Fire Safety Guideline (P.F.S.G.) 04-40A-03: Simplified Risk Assessment;
3. N.F.P.A 1300, Standard on Community Risk Assessment and Community Risk Reduction Plan Development (2020 Edition);
4. N.F.P.A. 1730, Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition);
5. Vision 20/20 Community Risk Assessment: A Guide for Conducting a Community Risk Assessment (Version 1.5, 2016); and
6. Vision 20/20 Community Risk Reduction Planning: A Guide for Developing a Community Risk Reduction Plan.

In our view, these documents collectively represent the most current industry best practices related to the applicable methodology and process to develop a C.R.A. for the Town of Caledon, as required by **O. Reg. 378/18**. The information presented within these documents is, in many cases, complementary. For example, the N.F.P.A. 1730 Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition), Community Risk Assessment Guide, Annex B is based on the O.F.M.E.M. Public Fire Safety Guideline on Simplified Risk Assessments (04-40A-03). The methodology presented within this C.R.A. has also been reviewed by the O.F.M.E.M. and the N.F.P.A. Risk Analysis Sub-Committee as part of other projects completed by Dillon Consulting Limited. This includes the Corporation of the Town of Mississauga Comprehensive Community Risk Assessment.<sup>4</sup>

As required by **O. Reg. 378/18**, this C.R.A. includes a comprehensive analysis of the nine mandatory profiles including:

- Geographic Profile
- Building Stock Profile
- Critical Infrastructure Profile
- Demographic Profile

<sup>4</sup> O.F.M.E.M. T.G.-02-2019 End Notes (2)

- Public Safety and Response Profile
- Community Services Profile
- Hazard Profile
- Economic Profile
- Past Loss and Event History Profile

Within each of the nine profiles, there are a number of sub-topics examined. These sub-topics are illustrated in **Figure 1**. These profiles are based on an analysis of several sources of information, including data provided by the Town of Caledon, Caledon Fire and Emergency Services, Statistics Canada, the O.F.M.E.M., and desktop research.

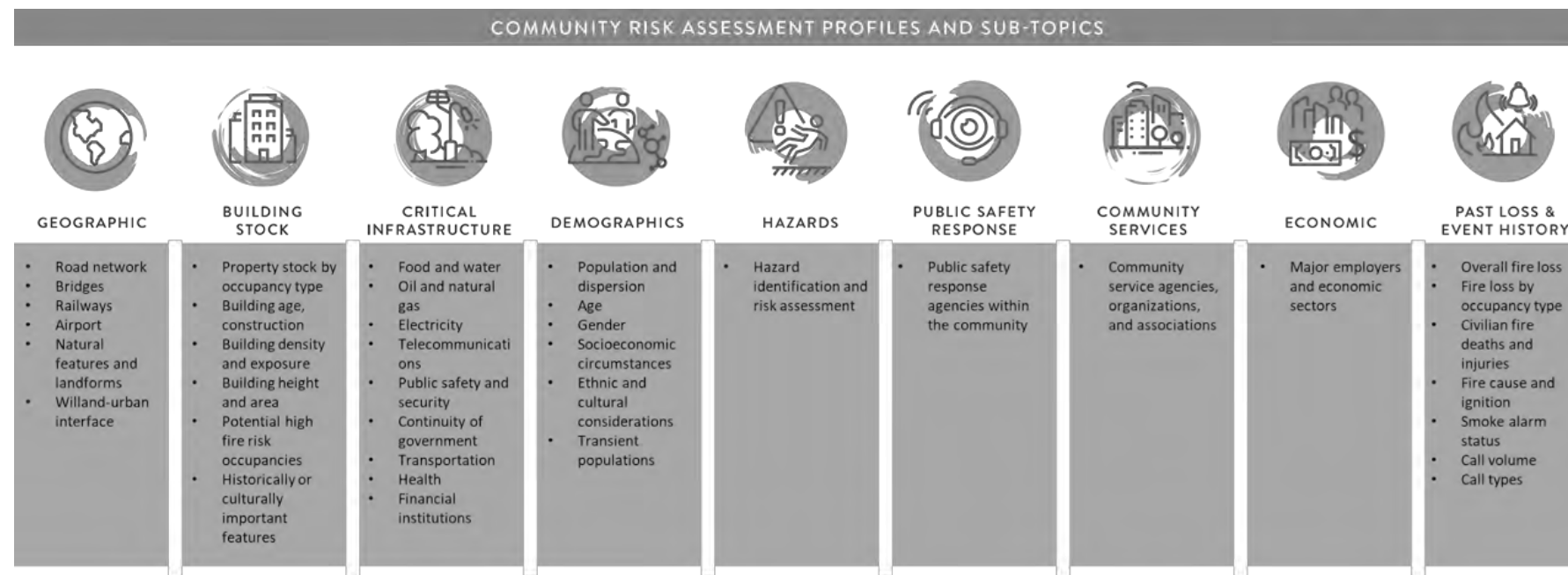
The mandatory profile analyses result in a series of risk related conclusions that will be used to inform service levels or other strategies in alignment with the three lines of defense through a risk treatment process. These are referred to as a **'key finding'** or an **'identified risk'**. Those findings referred to as an **'Identified Risk'** are taken through a risk assignment process to assist with risk prioritization as referred to within O.F.M.E.M. T.G.-02-2019. In specific circumstances, being those that involve additional local or legislative considerations, a risk-related conclusion is referred to as a Special Consideration. All fire risk-related conclusions will be taken through a risk treatment process and aligned with Ontario's **"three lines of defence"** fire protection strategy that optimizes the use of public education and fire prevention initiatives in order to inform the analysis and recommendations within the Fire Master Plan.

The analysis presented within this C.R.A. has been informed by a wide range of data sources. Where applicable the analysis within each of the nine mandatory profiles also includes a comparison to provincial fire related statistics available through the O.F.M.E.M. As a result of the current COVID-19 pandemic the provincial historical fire related statistics are currently only available for the time period ending December 31<sup>st</sup>, 2018. Therefore, where provincial comparative analysis is presented within this C.R.A. it will focus primarily on the historical five-year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018. Where applicable, the statistical data for the year 2019, as provided by the C.F.E.S., is presented within this C.R.A.

Where applicable all numerical data has been rounded to the nearest 1/100 (hundredths) decimal point to provide consistency in the analysis. As a result, the numerical totals presented within each analysis although presented as reflecting 100% may actually reflect a minor variance based on the use of only the nearest 1/100 (hundredths) decimal points.

More information on how the key findings and identified risks will be used to inform the F.M.P. can be found in **Section 11.0 – Applying Key Findings and Identified Risks**.

Figure 1: Community Risk Assessment Profiles and Sub-Topics



## 2.0

## Geographic Profile

As referenced in **O. Reg. 378/18**, the geographic profile assessment includes analysis of the physical features of the community, including the nature and placement of features such as highways, waterways, railways, canyons, bridges, landforms and wildland-urban interfaces. These physical features may present inherent risks or potentially have an impact on fire department access or emergency response time. The following sections consider these geographic characteristics within the Town of Caledon.

## 2.1

### Geographical Snapshot of Caledon

The Town of Caledon is one of three municipalities within the Region of Peel, located in the Greater Toronto Area. It is bordered by the City of Vaughan, Township of King, Town of Erin, Town of Halton Hills, Town of Orangeville and Dufferin, Simcoe County, and Wellington counties. Caledon is located in close proximity to transportation corridors that facilitate the movement of commuting populations as well as a large volume of goods and products to employment areas and throughout the region.

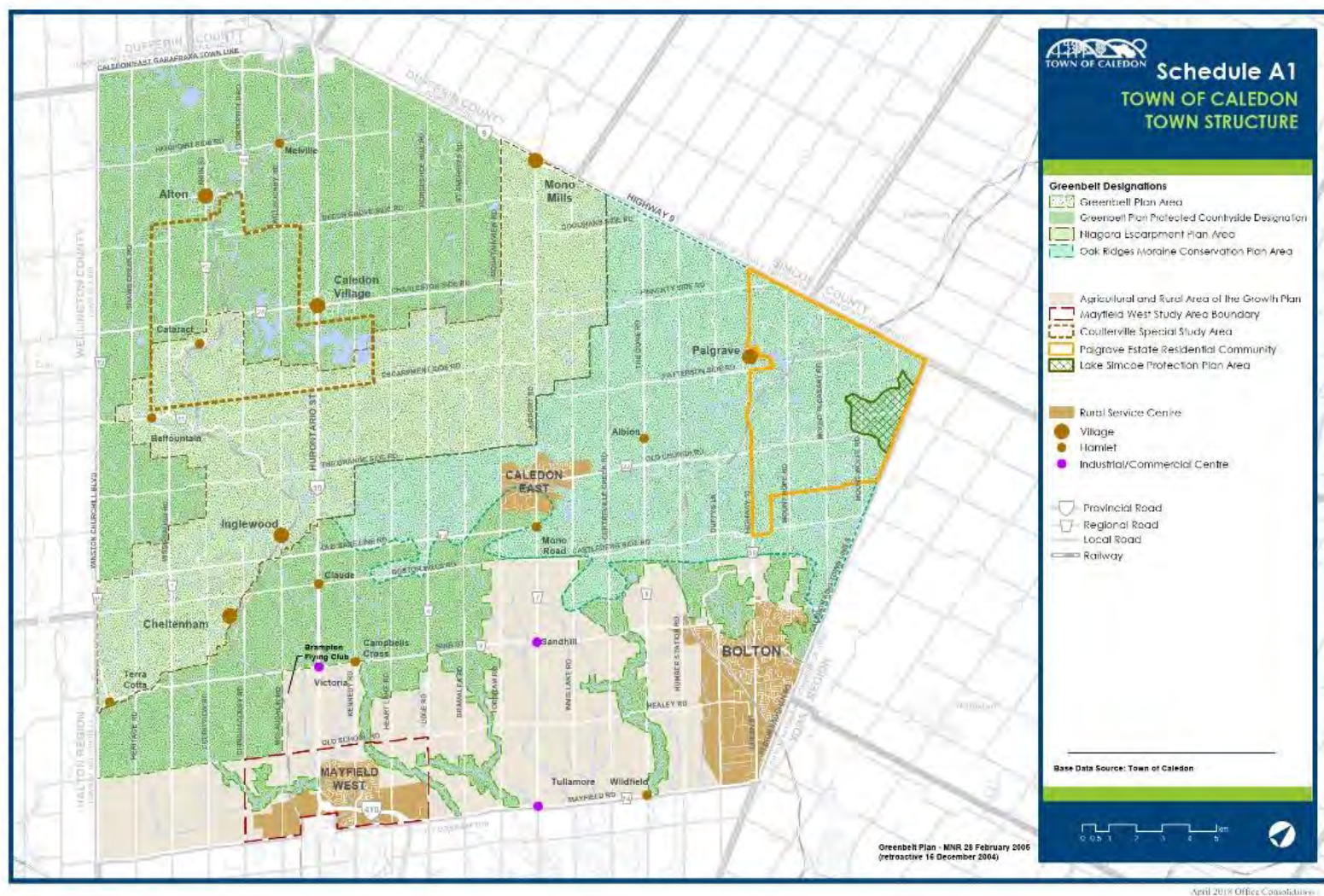
The land area of the Town of Caledon represents a geographically large emergency response area of 688.16 square kilometres, excluding aid-agreement areas (2016 Census, Statistics Canada). The large geographic emergency response area may have a direct impact on travel time by C.F.E.S. As the Town continues to grow, the Town may wish to consider partnerships with local developers to construct homes equipped with residential sprinklers. Residential sprinklers are an effective strategy to reducing the spread of fire until suppression crews arrive on scene.

**Identified Risk: The large geographic emergency response area may have a direct impact on travel time by C.F.E.S.**

The land is rich with natural heritage features that are protected by the Niagara Escarpment Plan, Oak Ridges Moraine Plan, Greenbelt Plan, and provincial and local conservation authorities. Additionally, there are a number of woodlots, waterbodies, and watercourses located throughout the municipality. The large proportion of natural heritage features influence the growth and development of the smaller communities within Caledon. The areas protected by the Greenbelt Plan designations, as well as the settlement areas within Caledon, are found in Caledon's Official Plan in Schedule 'A1' – Town Structure, as seen in **Figure 2** below.



**Figure 2: Town of Caledon – Schedule ‘A1’ – Town Structure**



**Figure Source: Schedule 'A1' – Town Structure, Town of Caledon Official Plan, April 2018 Consolidation**

Town of Caledon  
Community Risk Assessment - Final Report

The hierarchy of settlement area types in Caledon includes rural service centres, villages, hamlets, and industrial/commercial centres. The three rural service centres are Caledon East, Bolton, and Mayfield West. Bolton and Mayfield West are located along the southern border of the Town and are faster growing communities due to the accessibility to transportation networks and the Greater Toronto Area. Hamlets and villages include Alton, Cheltenham, Inglewood, Palgrave, Mayfield West, and Mono Mills.

Caledon is primarily rural and agricultural in nature with communities that generally include residential, commercial, and industrial land uses. Land use designations from Caledon's Official Plan Schedule 'A' – Land Use can be seen in **Figure 3** below. There are residential areas throughout, however rural service areas in the south of the Town have higher density. The rural service areas include a variety of uses including residential, agricultural, and equestrian uses. Lands designated as Prime Agricultural Area and General Agricultural Area are high capability agricultural lands classified by the Canada Land Inventory of Soil Capability as Class 1, 2, or 3 agricultural lands. The primary function of this designation is to protect or promote agricultural uses and support the conservation of productive soils and lands. Lands designated as Extractive Industrial are used for the extraction of mineral aggregates from licenced sand and gravel pits, and the rehabilitation of extracted areas. These lands are generally located to the northwest of the Town, adjacent to the rail line.







## 2.2 Roads, Transit, Bridges and Rail

### 2.2.1 Road Network

Road networks and transportation systems provide fire and emergency services with access throughout a community when responding to emergency calls. Roads are also important from a risk and emergency response perspective because motor vehicle-related incidents are often a common source of emergency call volume within a municipality. Road networks can also contribute to vehicle congestion causing delays in emergency response travel times.

Where possible, the Town's transportation planning processes should include the C.F.E.S. as a stakeholder to provide consideration to emergency services needs and challenges relating to the road network, traffic congestion, and initiatives such as traffic calming.

The road hierarchy of Caledon is presented in Caledon's Official Plan in Schedule 'J' – Long Range Road Network as seen in **Figure 4** below. Caledon is connected to the Greater Toronto Area by Provincial Highway 410, Highway 10 (Hurontario Street), Highway 9, Highway 50, and other high, medium, and low capacity arterial roads. The overall road network in Caledon follows gridiron pattern, which alters to a warped grid due to significant natural heritage features. Rural service centres with more development and local road networks such as Bolton and Caledon East have adequate access to higher capacity roads.

Figure 4: Long Range Road Network

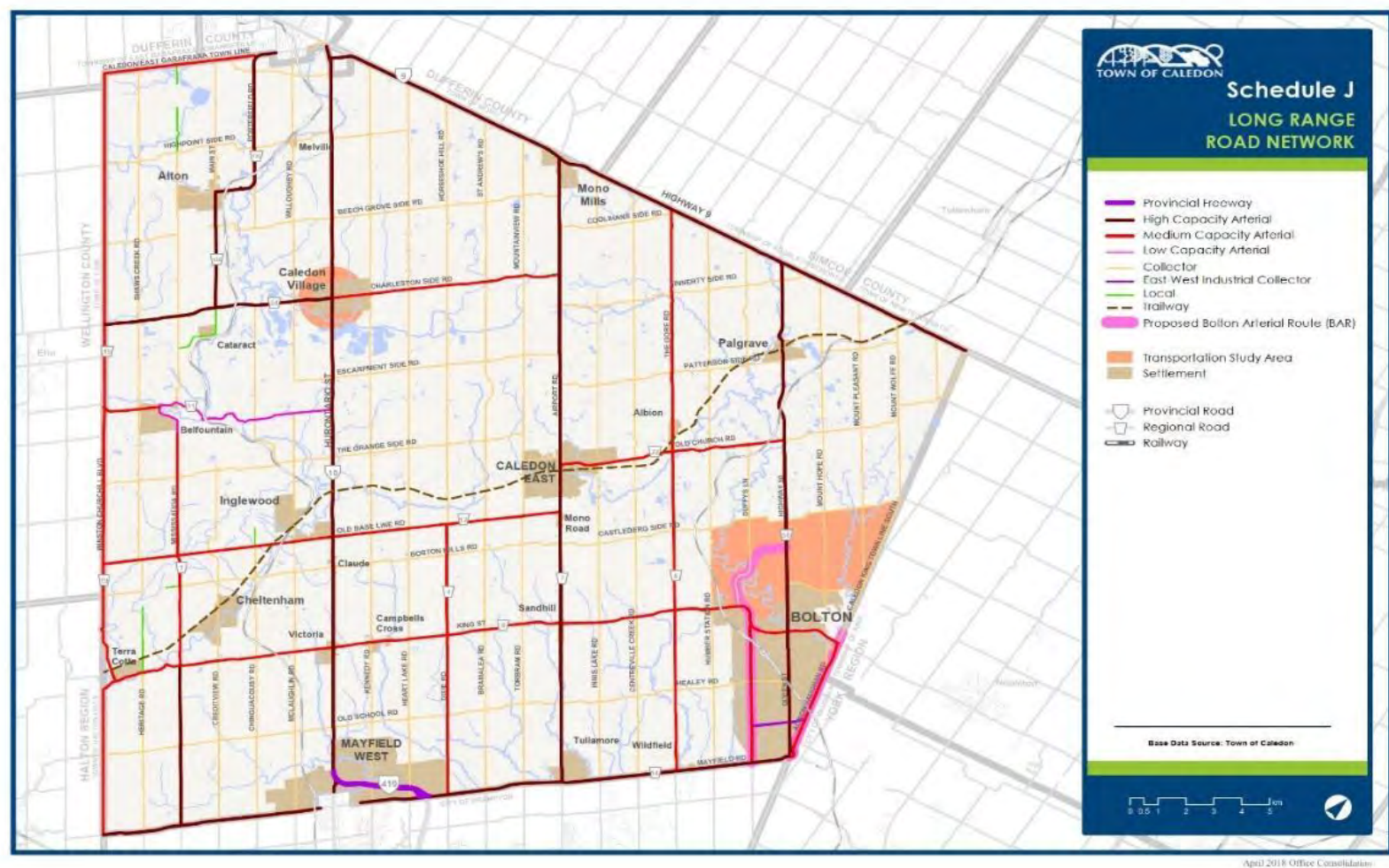


Figure Source: Schedule 'J' – Long Range Road Network, Town of Caledon Official Plan, April 2018 Consolidation

The presence of major highways and transportation routes have the potential for transport incidents involving dangerous goods. Major industry in the employment areas increases the volume of large transport trucks and in and through the Town. These areas should be given consideration as an incident involving the goods being transported could occur, requiring hazardous materials response from C.F.E.S. The Town acknowledges population growth, truck traffic, downtown heritage preservation and multi-use transportation in the Bolton Transportation Master Plan and in its Official Plan.

Roads are also important from a risk and emergency response perspective because motor vehicle-related incidents are often a common source of emergency call volume within a municipality. The C.F.E.S. responded to 2,044 emergency calls pertaining to motor-vehicle related incidents (vehicle collisions and vehicle extrication combined), accounting for approximately 13.27% of all emergency calls during a six-year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019.

Currently, the Town does not operate a local public transit system. Transit is however offered in Caledon and the Region of Peel via Brampton Transit, GO Transit and Metrolinx. Three GO Transit bus routes in Caledon operate in the morning and afternoon and connect users to other transit services.

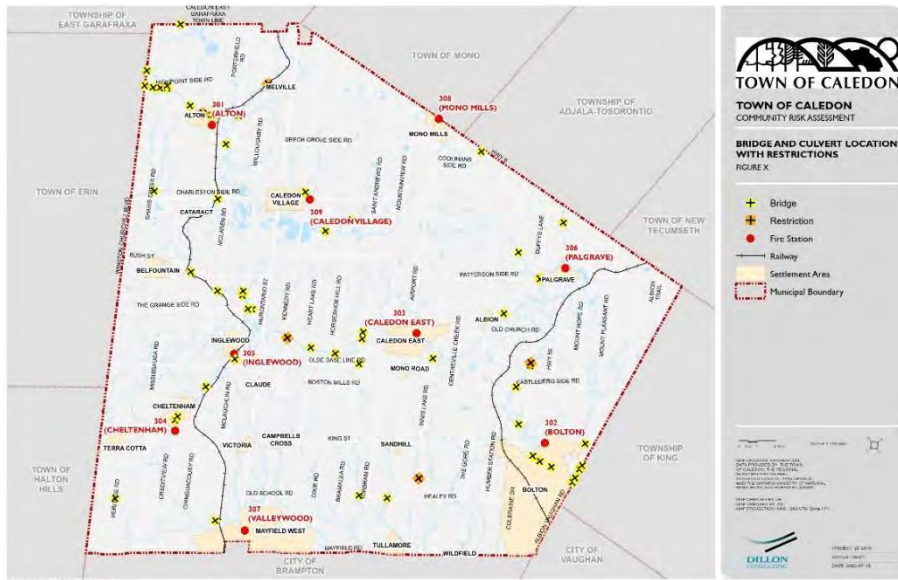
**Identified Risk: The interconnectivity of the Town's road network has a direct impact on emergency response travel times.**

**Identified Risk: Motor vehicle-related incidents on the existing road network represent 13.27% of the total emergency call volume the Caledon Fire and Emergency Services responded to during the six-year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019.**

### 2.2.2 Bridges

Bridges are considered within a C.R.A. for two main reasons: the potential for crossing restrictions for fire apparatus due to weight (i.e. load restrictions); and potential for impact on road network connectivity in the event that a bridge is out of service. This could result in the potential for delays in emergency response times. The locations of the bridges and bridge restrictions are shown in **Figure 5** below.

Figure 5: Bridge Locations and Restrictions



There are significant watercourses throughout Caledon that are discussed in **Section 2.3.1 – Waterways**. Watercourses, along with the rail lines result in a number of bridges and culverts along the road network. The bridges in Caledon are managed and systematically inspected using the Ontario Structure Inspection Manual (O.S.I.M.). The Ontario Structure Inspection Manual was developed by the Ontario Ministry of Transportation to set standards for the detailed inspection of structures along the highway network. The O.S.I.M. records for Caledon identified 62 road bridges in the Town, four of which have weight restrictions.

It is important that the Caledon Fire and Emergency Services and emergency apparatus drivers/operators are aware of the location of the restrictions, and alternative travel routes. The C.F.E.S. is aware of the four bridge restrictions. There were no particular emergency vehicle access risks identified based on the current configuration of the road network, location, and number of bridges in the Town of Caledon.

**Key Finding: Bridges, with restrictions or closures, have the potential to reduce the connectivity of the Town's road network resulting in the potential for delays in emergency response travel times.**

### 2.2.3

#### Rail

There are two rail lines that run through the Town in a north-south direction. The Orangeville Brampton Railway (O.B.R.Y.) is an approximately 55 kilometre short line rail line used by Canadian Pacific (C.P.), Canadian National Railway (C.N.), and local industry. The O.B.R.Y. rail line extends through multiple settlement areas including Cheltenham, Inglewood, Belfountain, Cataract, Alton, and Melville. The C.P. rail line on the east side of Caledon is also used by C.P., C.N., and local industries, and passes through Bolton and extends past Palgrave. Both rail lines pass through a range of land uses including residential, employment, and the natural heritage system.

Rail lines are considered in this C.R.A. for the potential for a rail-based transportation incident such as a derailment or accident involving dangerous goods transport. An event such as this would require specialized emergency response.

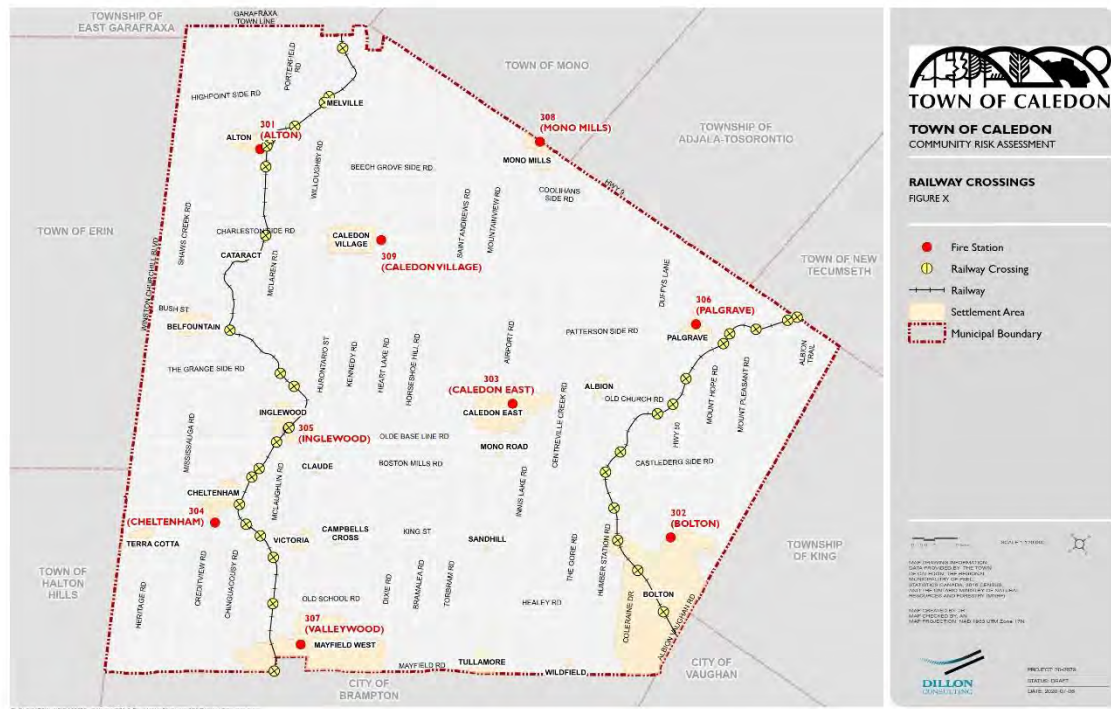
At this time, C.F.E.S. is provided with details of dangerous goods travelling through the Town from C.N. The O.B.R.Y. does not currently share this information with the Town. Information sharing practices such as this enable the C.F.E.S. to provide informed and appropriate response to incidents involving the release of dangerous goods.

At-grade rail crossings (an intersection at which a road crosses a rail line at the same level) can create delays in emergency response by impeding access to a roadway. Also, the physical barrier created by the rail infrastructure itself, such as rail yards or the placement of rail infrastructure (e.g. tracks, grade separations, grade level crossings, etc.) within and throughout a municipality can impact emergency services travel times and overall emergency response times.

There are 36 at-grade rail crossings throughout the Town of Caledon. These locations are illustrated in **Figure 6**. The at-grade crossings are predominantly located in rural areas, although there are 10 crossings within the settlement areas of Bolton, Mayfield West, Inglewood, Alton, and Melville. The at-grade rail crossings in rural areas meet with the overall grid pattern of the road network, allowing emergency apparatus to use access alternate routes should that be necessary.



Figure 6: At-grade Rail Crossings



**Key Finding: At-grade level rail crossings could create a physical barrier to the connectivity of the Town's road network that can potentially result in extended emergency response travel times.**

## 2.3 Waterways and Conservation Areas

### 2.3.1 Waterways

Waterways are important from a risk perspective, in part, due to the recreational activities that take place in these settings and the natural hazards that they present, which could require specialized technical rescue emergency responses. There may also be natural hazards, such as flooding, associated with waterways. For example, flooding of the Humber River in Bolton in the spring of 2019 resulted in 85 homes being evacuated.

The Town of Caledon is situated within the Lake Ontario Basin which consists of three watersheds namely the Credit River Watershed, the Humber River Watershed, and the Etobicoke Watershed. In Caledon, there are headwaters for five major rivers including the Credit and Humber rivers and Etobicoke Creek flowing south towards Lake Ontario, and the head waters for the Nottawasaga and Holland Rivers, all which flow towards Georgian Bay and Lake Simcoe. Rivers in Caledon include the Credit River and Humber River both flow through the Town, and have a significant number of tributaries including the Caledon Creek, Cold Creek, and Coffee Creek.

The Credit Valley Conservation Authority works in partnership with the Toronto & Region Conservation Authority to maintain a flood monitoring gauge that continually monitors real time stream flow, water levels, and precipitation information. The conservation authorities distribute flood warnings and messages to municipalities and emergency services.

**Identified Risk: The presence of waterways within the Town of Caledon creates a potential need for specialized technical ice and water rescue services.**

### 2.3.2 Conservation Areas

Caledon has thousands of hectares of protected natural space, including major river systems, the Oak Ridges Moraine, and the Niagara Escarpment, the Forks of the Credit Provincial Park, and a number of conservation areas. Conservation areas in Caledon fall under the jurisdiction of the Credit Valley Conservation Authority and the Toronto and Region Conservation Authority. Conservation Areas include:

- Cheltenham Badlands;
- Terra Cotta Conservation Area;
- Albion Hills Conservation Area;
- Belfountain Conservation Area;
- Upper Credit Conservation Area;



- Ken Whillans Resource Management Area; and
- Glen Haffy Conservation Area.

Conservation areas are typically included in the assessment of community risk due to the activities that take place within them, which may necessitate specialized rescue services. For example, the presence of an escarpment may facilitate activities such as rock climbing that could, at some point, require high angle rescue from fire service personnel. Conservation areas and landforms covering a large area, with few internal roadways, also have the potential to impact emergency response travel times, as they may require emergency vehicles to travel longer distances to respond to a specific location.

The Cheltenham Badlands were temporarily closed in 2015 due to specific public safety concerns including access to parking and stopping along the road. In addition to the increased risks related to the high volume of users utilizing the conservation area, stopping and parking on a road not designed for this use creates a greater risk of a motor vehicle collision.

As a result of these public safety concerns, a master planning process was undertaken which identified phased solutions for public safety and park management. The Cheltenham Badlands were subsequently reopened in 2018 with an accessible boardwalk, new trail head and way-finding signs, and a new parking area. These features have been added to mitigate safety concerns and provide safe public access to the Badlands.

There are many watercourses and waterbodies located throughout the Town, including many within conservation areas, which are used for recreational activities. Most of the areas offer trails, camping, hiking, and fishing during the warmer months. There are a number of conservation areas open year-round, including the Albion Hills Conservation Area, Upper Credit Conservation Area, and Terra Cotta conservation area. These places feature winter amenities such as cross-country skiing, snowshoeing, biking and skating during winter months.

The presence of water activities such as those present within the conservation areas necessitates the consideration of water-related hazards. These are discussed in the Waterways - **Section 2.3.1** of this C.R.A.

## 2.4 Wildland-Urban Interface

N.F.P.A. 1730: Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations identifies wildland-urban interface as geography-based risk for consideration. This interface refers to the area of transition between unoccupied land and human development. This transition area can be a mix of woodlots, bush or grass.

As Caledon is primarily a rural area with multiple types of forests, it is at risk of wildfires or grass fires. Additionally, the number of communities throughout the Town increases the residential areas adjacent to wildland areas.

As part of the Peel 2041: Official Plan Review, the Region of Peel is conducting a wildland fire policy review. This review is intended to identify areas in the Region that have an increased risk of wildland fire, and to develop a wildland fire policy in the Regional Official Plan that is consistent with the Ontario Provincial Policy Statement, 2014. This includes policy that recognizes the risk of wildland fires, identifies hazardous forest types within the Region, and provides tools and mechanisms to ensure appropriate mitigation measures are conducted.

A simplified broad-level assessment was conducted based on the Ecological Land Classification (E.L.C.) and Ministry of Natural Resources and Forestry (M.N.R.F.) potential hazardous forest types for wildland fires that generally corresponded to the forest composition characteristics of hazardous forests, as described in the Provincial Wildland Fire Risk Assessment and Mitigation Reference Manual. As seen in **Figure 7** below, the analysis identified areas within Caledon that are classified as extreme / high, and moderate risk. The Regional of Peel and Town of Caledon should include C.F.E.S. as a stakeholder when developing policy and guidelines to address the risk of wildland fires.

Figure 7: Forest/Communities Corresponding to Wildland Fire (Caledon)

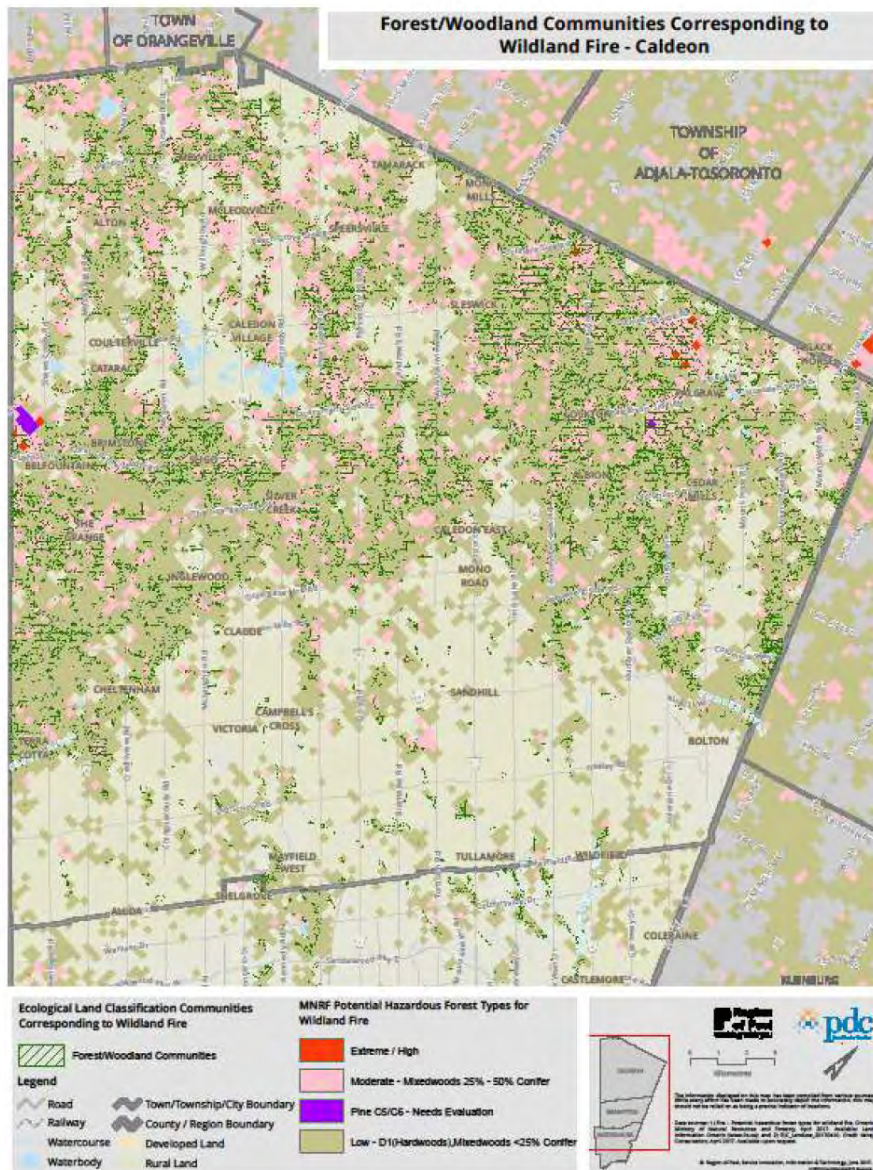


Figure Source: Peel 2041 Regional Official Plan Review - Peel 2041 Discussion Paper - Wildland Fire - November 2018

As a strategy to mitigate the potential of wildland fires the Town has implemented a burn permit system to address outdoor burning on private property. The regulations and types of permits can be found in the **Open Air, Recreational and Agricultural Fires By-law (2016-092)**. There are three type of burn permits available: a Recreational Permit, an Open Air Permit, and an Agricultural Permit. The recreational burn permit is available to most residential properties for recreational purposes, providing the requirements of the by-law are met. These requirements include a minimum distance setback, the containment of the fire in a non-combustible device on a non-combustible surface, at least 3 metres separation from any combustible materials, and can only burn clean, dry seasoned firewood. The open air permit is available to properties with a lot size of 0.5 acres or greater, and permits the ability to burn yard waste such as tree limbs and branches. This does not include the burning of grass clippings and leaves. By contrast, the agricultural permit is available to properties zoned as agricultural and requires a site inspection and approval of the burn pile before burning.

A review of historical fire loss data for the Town for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019 indicates that there were 14 outdoor fires during this period that resulted in a dollar loss. Although this historical data indicates a relatively low number of outdoor fires, the geography of the Town includes a large number of areas where there is wildland-urban interface as described by N.F.P.A. 1730. This supports the need for the C.F.E.S. and the Town to be included as key stakeholders in the Region of Peel's current wildland fire policy review.

**Identified Risk: The geography of the Town of Caledon includes a large number of areas where there is wildland-urban interface as described by N.F.P.A. 1730 standard that presents the potential for a wildland fire.**

## 3.0 Building Stock Profile

As referenced in **O. Reg. 378/18**, the building stock profile assessment includes analysis of the types and uses of the building stock within the municipality. Important considerations include the number of buildings of each type, the number of buildings of each use and any building-related risks known to the fire service. There are potential fire risks associated with different types or uses of buildings given the presence or absence of fire safety systems and equipment at the time of construction and maintenance thereafter. This section considers these building stock characteristics within the Town of Caledon.

### 3.1 Ontario Building Code Occupancy Classifications

O.F.M.E.M. T.G.-02-2019 encourages fire departments to consider the potential fire related risks associated with different building occupancy types and building uses. This includes consideration of the prevalence of each occupancy classification within a community and the presence of fire and life safety systems and equipment. The Ontario Building Code (O.B.C.) categorizes buildings by major occupancy classification to distinguish it from other occupancy classifications. Utilizing the O.B.C. major building occupancy classifications is consistent with the intent of O.F.M.E.M. T.G.-02-2019 to provide a recognized definition and baseline for developing a community risk assessment.

The O.B.C. is divided into six major building occupancy classifications (groups). Within each group the occupancies are further defined by division. The O.B.C. major building occupancy classification groups and divisions are presented in **Table 1**.

**Table 1: O.B.C. Major Building Occupancy Classifications**

Group	Division	Description of Major Building Occupancy Classifications
Group A	1	Assembly occupancies intended for the production and viewing of the performing arts
Group A	2	Assembly occupancies not elsewhere classified in Group A
Group A	3	Assembly occupancies of the arena type
Group A	4	Assembly occupancies in which occupants are gathered in the open air
Group B	1	Detention occupancies
Group B	2	Care and treatment occupancies
Group B	3	Care occupancies
Group C	---	Residential occupancies
Group D	---	Business and personal services occupancies
Group E	---	Mercantile occupancies
Group F	1	High-hazard industrial occupancies
Group F	2	Medium-hazard industrial occupancies
Group F	3	Low-hazard industrial occupancies

Source: Ontario Building Code<sup>5</sup>

## 3.2

## O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications

The Fire Risk Sub-model developed by the O.F.M.E.M. utilizes the major building occupancy classifications (i.e. Group A, B, C, D, E and F), but does not use the detailed division classifications as included in the O.B.C. This strategy provides the ability to assess buildings within a community comparatively by major occupancy groups, thus providing a consistent and recognized definition for each major occupancy type. This strategy provides the opportunity for further analysis of a specific occupancy group. Subject to any site specific hazards or concerns, occupancies within this group can be assessed individually and then included where required within the scope of the broader Community Risk Assessment. The O.F.M.E.M. Fire Risk Sub-Model O.B.C. classifications, definitions and associated fire related risks are presented in **Table 2** along with potential proactive measures to reduce risk within these occupancy types.

<sup>5</sup> Ontario Regulation 332/12: Building Code, Part III Fire Protection, Occupant Safety and Accessibility, Section 3.1.2.1.



**Table 2: O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications**

<b>O.B.C. Major Building Occupancy Classifications</b>	<b>O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications</b>	<b>O.F.M.E.M. Definitions</b>	<b>O.F.M.E.M. Fire Related Risks</b>	<b>Proactive Measures for Reducing Risk</b>
Group A	Assembly Occupancies	An assembly occupancy is defined as one that is used by a gathering of persons for civic, political, travel, religious, social, educational, recreational or like purposes or for the consumption of food or drink.	Assembly buildings are often occupied by a large number of people and may contain high quantities of combustible furnishings and decorations. Occupants are generally unfamiliar with the building's exit locations and may not know how to react in the event of an emergency. Low light conditions are inherent to some of these occupancies and can contribute to occupant confusion during an evacuation. Numerous examples exist of disastrous events that have occurred throughout the world, resulting in multiple fire fatalities in these occupancies. Therefore, these facilities warrant special attention. Accordingly, it is paramount to ensure that maximum occupant load limits are not exceeded, detection is available, an approved fire safety plan is in place and adequate unobstructed exits/means of egress are readily available.	<ul style="list-style-type: none"> <li>• Regular fire prevention inspection cycles</li> <li>• Automatic fire detection and monitoring systems</li> <li>• Approved fire safety plan and staff training</li> <li>• Pre-planning by fire suppression staff</li> </ul>

O.B.C. Major Building Occupancy Classifications	O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications	O.F.M.E.M. Definitions	O.F.M.E.M. Fire Related Risks	Proactive Measures for Reducing Risk
Group B	Care or Detention Occupancies	<p>A care or detention occupancy means the occupancy or use of a building or part thereof by persons who:</p> <p>Are dependent on others to release security devices to permit egress;</p> <p>Receive special care and treatment; or</p> <p>Receive supervisory care.</p>	In addition to the presence of vulnerable occupants, these occupancies may contain quantities of various flammable/combustible liquids and gases, oxidizers and combustible furnishings that will impact the intensity of the fire if one should occur. The evacuation or relocation of patients, residents or inmates to an area of refuge during an emergency poses additional challenges in these facilities. It is essential to ensure that properly trained staff is available and prepared to quickly respond according to the facility's approved fire safety plan.	<ul style="list-style-type: none"> <li>• Regular fire prevention inspection cycles</li> <li>• Automatic fire detection and monitoring systems</li> <li>• Approved Fire Safety Plan and staff training</li> <li>• Pre-planning by fire suppression staff</li> </ul>
Group C	Residential Occupancies	A residential occupancy is defined as one that is used by persons for whom sleeping accommodation is provided but who are not harboured or detained to receive medical care or treatment or are not involuntarily detained.	In Ontario, residential occupancies account for 70% of all structural fires and 90% of all fire deaths. Residential units that are located in multi-unit buildings, including secondary units in a house, pose additional risks due to egress and firefighting accessibility challenges.	<ul style="list-style-type: none"> <li>• Home smoke alarm programs</li> <li>• Public education programming including home escape planning</li> <li>• Retro-fit and compliance inspection cycles for O.F.C. compliance</li> <li>• Pre-planning by fire suppression staff</li> <li>• Fire Drills as required by the O.F.C.</li> </ul>



O.B.C. Major Building Occupancy Classifications	O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications	O.F.M.E.M. Definitions	O.F.M.E.M. Fire Related Risks	Proactive Measures for Reducing Risk
Group D	Business & Personal Services	A business and personal services occupancy is defined as one that is used for the transaction of business or the rendering or receiving of professional or personal services.	Many office buildings are occupied by a large number of people during business hours and contain high combustible content in the form of furnishings, paper, books, computers and other office equipment/supplies. Those that are located in a high-rise building pose additional risks due to egress and firefighting challenges.	<ul style="list-style-type: none"> <li>• Regular fire prevention inspection cycles to maintain O.F.C. compliance</li> <li>• Targeted fire prevention inspections for O.F.C. retro-fit compliance</li> <li>• Staff training in fire prevention and evacuation procedures</li> <li>• Public education programs</li> <li>• Pre-planning by fire suppression staff</li> </ul>
Group E	Mercantile	A mercantile occupancy is defined as one that is used for the displaying or selling of retail goods, wares or merchandise.	Larger mercantile occupancies such as department stores are generally occupied by a large number of people and contain high quantities of combustibles in the form of merchandise, furnishings and decorations. Customers may be unfamiliar with the building's exit locations and not know how to react in the event of an emergency. Additional hazards will be present in "big box" type stores that sell and store large volumes of combustible materials in bulk. These stores generally have similar properties to industrial warehouses with the additional hazard of higher number of occupants.	<ul style="list-style-type: none"> <li>• Regular fire prevention inspection cycles</li> <li>• Automatic fire detection and monitoring systems</li> <li>• Approved Fire Safety Plan and staff training</li> <li>• Pre-planning by fire suppression staff</li> </ul>

O.B.C. Major Building Occupancy Classifications	O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications	O.F.M.E.M. Definitions	O.F.M.E.M. Fire Related Risks	Proactive Measures for Reducing Risk
Group F	High/Medium/Low Hazard Industrial	An industrial occupancy is defined as one for the assembling, fabricating, manufacturing, processing, repairing or storing of goods and materials. This category is divided into low hazard (F3), medium hazard (F2) and high hazard (F1) based on its combustible content and the potential for rapid fire growth.	These occupancies constitute a special fire hazard due to the high levels of combustible, flammable or explosive content and the possible presence of oxidizing chemicals and gases within them. Processing and other activities that involve various ignition sources often occur in these occupancies. The lack of security during non-operational hours also makes them susceptible to incendiary type fires. Industrial fires generally involve large quantities of combustible materials and potentially result in large financial losses (e.g. building, contents) and significant damage to the community's environment and economic well-being (e.g. loss of jobs).	<ul style="list-style-type: none"> <li>• Regular fire prevention inspection cycles</li> <li>• Staff training in fire prevention and evacuation</li> <li>• Public education</li> <li>• Pre-planning by fire suppression staff</li> <li>• Installation of early detection systems (e.g., fire alarm systems, heat detectors)</li> <li>• Installation of automatic sprinkler systems</li> <li>• Approved Fire Safety Plans</li> <li>• Preplanning by fire suppression staff</li> <li>• Fire extinguisher training</li> </ul>

O.B.C. Major Building Occupancy Classifications	O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications	O.F.M.E.M. Definitions	O.F.M.E.M. Fire Related Risks	Proactive Measures for Reducing Risk
Other	Other Properties	In addition to gathering information on building related risks, attention should also be given to other property types, particularly those that contain large quantities of combustible materials. Propane storage facilities, outdoor tire storage yards, grasslands/forests, plastic recycling depots are examples of properties that could severely impact a community and its environment if involved in a fire. Major highways and railway lines used to transport high volumes of traffic and perhaps large quantities of hazardous chemicals also warrant serious consideration.		

Source: O.F.M.E.M. Fire Risk Sub-Model<sup>6</sup>

<sup>6</sup> Office of the Fire Marshall and Emergency Management. (2016, February). Comprehensive Fire Safety Effectiveness Model: Fire Risk Sub-Model. Retrieved from [https://www.mcscs.jus.gov.on.ca/english/FireMarshal/FireServiceResources/ComprehensiveFireSafetyEffectivenessModel/FireRiskSub-Model/Fire\\_risk\\_submodel.html](https://www.mcscs.jus.gov.on.ca/english/FireMarshal/FireServiceResources/ComprehensiveFireSafetyEffectivenessModel/FireRiskSub-Model/Fire_risk_submodel.html)

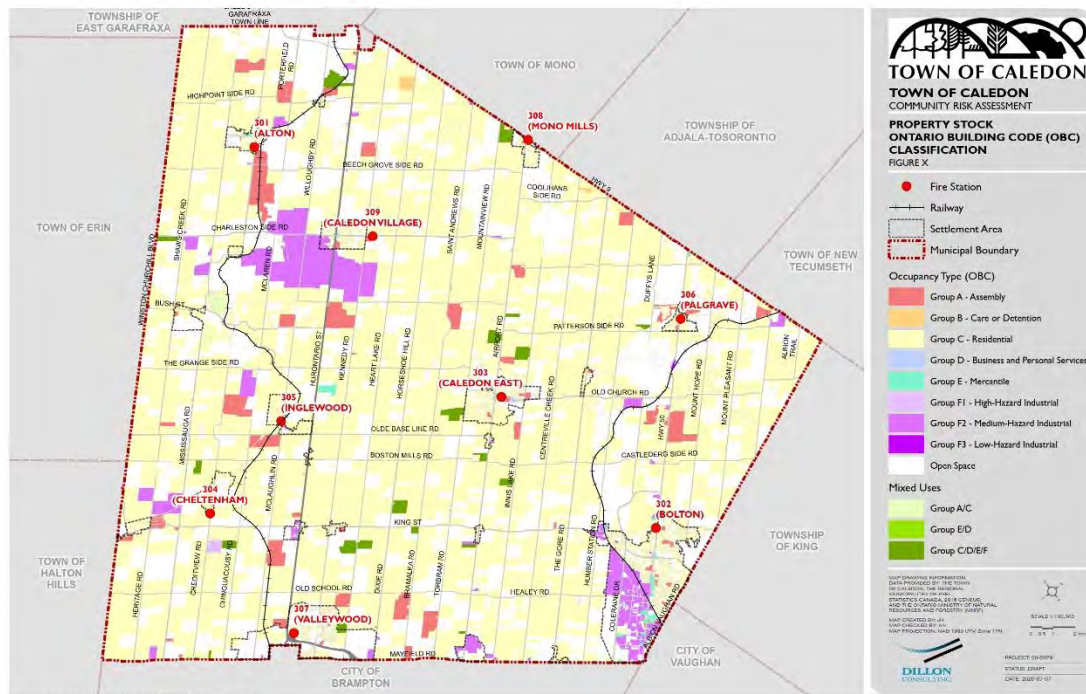
## 3.2.1

**Town of Caledon Existing Major Building Occupancy Classification Summary**

Research into preparing this C.R.A. identified that the Town does not maintain a detailed inventory of the current building stock, and related major building occupancy classifications within the community. In our experience this is not uncommon in Ontario. Therefore, this C.R.A, utilizes Municipal Property Assessment Corporation (M.P.A.C.) property parcel data as provided by the Town of Caledon to assess the existing building stock within the community.

The distribution and summary of the Town's existing property stock as designated by the applicable O.B.C. major building occupancy classifications are illustrated below in **Figure 8** and in **Table 3**.

Figure 8: O.B.C. Major Building Occupancy Classifications by M.P.A.C. Property Stock



As shown, the majority of the Town's existing property stock consists of Group C - Residential Occupancies (85.50%) represented by 22,669 residential property parcels. This includes farms and other properties with a residence on the parcel. The second largest occupancy type within the Town is Group F – Industrial Occupancies (combined 2.24%, with Low [0.06%], Medium [2.18%] and High Hazard [0.004%]) of the Town's property stock. There is also a comparatively small number of Group A – Assembly Occupancies (0.55%), Group E – Mercantile (0.48%) and Group D – Business (0.16%) and a small number of mixed use property parcels (0.12%).

In addition, there are a number of parcels that are classified as farms under the National Farm Building Code that do not have a structure classified under the O.B.C. This includes lands with structures specific to the farming industry, such as barns and silos. There is a significant proportion of parcels that are classified as vacant (10.75%). This can be explained by natural heritage features and significant number of farm properties without structures.

There are 8 Group B – Care or Detention Occupancies in the Town of Caledon based on property parcel data. Through the analysis conducted for this C.R.A., it was identified that some Vulnerable Occupancies (V.O.) are considered Group C - Residential Occupancies according to M.P.A.C. data. The property stock analysis presented in the table reflects a confirmation of occupancy types of these properties in consultation with the C.F.E.S.

**Table 3: Town of Caledon Existing Property Stock**

<b>O.B.C. Major Building Occupancy Classifications</b>	<b>O.F.M.E.M. Fire Risk Sub-Model Major Building Occupancy Classifications</b>	<b>Number of Occupancies</b>	<b>Percentage of Occupancies</b>
Group A	Assembly Occupancies	146	0.55%
Group B	Care or Detention Occupancies	8	0.03%
Group C	Residential Occupancies	22,669	85.50%
Group D	Business	42	0.16%
Group E	Mercantile	126	0.48%
Group F Division 3	Low-Hazard Industrial	15	0.06%
Group F Division 2	Medium-Hazard Industrial	577	2.18%
Group F Division 1	High-Hazard Industrial	1	0.004%
Group A/C	Mixed Use A/C	1	0.004%
Group C/D/E/F	Mixed Use C/D/E/F	22	0.08%
Group E/D	Mixed Use E/D	8	0.03%
Farm	Classed under National Farm Building Code	50	0.19%
Vacant	Vacant	2,850	10.75%
<b>Total</b>		<b>26,515</b>	<b>100.00%</b>

Source: Town of Caledon, Municipal Property Assessment Corporation Data

This analysis confirms that Group C - Residential Occupancies represent the most prominent type of building occupancy type within the Town of Caledon. For the five-year period from January 1<sup>st</sup>, 2104 to December 31<sup>st</sup>, 2018 the Group C- Residential Occupancies accounted for 72.19% of the structure fires in the Town of Caledon. Similar historical data provided by the O.F.M.E.M. indicates that the majority of structure fires within Ontario also occurred in group C-Residential Occupancies.

**Identified Risk: Group C - Residential Occupancies represent 85.50% of the Town's existing property stock, and were associated with 72.19% of the historical structure fires during the period from January 1<sup>st</sup>, 2104 to December 31<sup>st</sup>, 2018.**

**Table 4** illustrates a comparison of the Town's existing Group C - Residential building stock with that of the Province based on the most recent 2016 Statistics Canada Census data. This analysis highlights that the existing residential building stock within the Town is significantly different to that of the Province. The Town has a 29.11% higher percentage of single-detached houses (83.42%) compared to the Province (54.31%).

**Identified Risk: 83.42% of the Town's Group C - Residential Occupancies are of single-family houses as compared to 54.31% within the Province.**

Caledon has a significantly lower proportion of apartments when compared with the rest of the Province. The Town has a 16.61% lower proportion of apartments units in buildings of five storeys or more (0.54%) compared to the Province (17.15%), and an 8.26% lower proportion of apartment units in a building that has fewer than five stories (1.86%) than the Province (10.11%). Additionally, Caledon has a 13.20% lower proportion of other attached dwellings (15.95%) compared to that of the Province (28.25%).

**Table 4: Group C- Residential Building Stock Comparison**

<b>Structural Dwelling Type</b>	<b>Caledon</b>		<b>Ontario</b>	
	<b>Total Dwellings</b>	<b>Total % Dwellings</b>	<b>Total Dwellings</b>	<b>Total % Dwellings</b>
Single-detached house	17,730	83.42%	2,807,380	54.31%
Apartment in a building that has five or more storeys	115	0.54%	886,705	17.15%
Movable dwelling	15	0.07%	14,890	0.29%
Other attached dwellings <sup>7</sup>	3,390	15.95%	1,460,200	28.25%
Semi-detached house	1,280	6.02%	289,975	5.61%
Row house	1,360	6.40%	460,425	8.91%
Apartment or flat in a duplex	340	1.60%	176,080	3.41%
Apartment in a building that has fewer than five storeys	395	1.86%	522,810	10.11%
Other single-attached house <sup>8</sup>	15	0.07%	10,910	0.21%
<b>Total</b>	<b>21,255</b>	<b>100%</b>	<b>5,169,175</b>	<b>100.00%</b>

Source: 2016 Census, Statistics Canada<sup>9</sup>

<sup>7</sup> The category 'Other attached-dwelling' is a subtotal of the following categories: semi-detached house, row house, apartment or flat in a duplex, apartment in a building that has fewer than five storeys and other single-attached house.

<sup>8</sup> The category 'other single-attached house' addresses houses attached to non-residential buildings and to account for single houses attached to multi-unit or multi-purpose buildings.

<sup>9</sup> Statistics Canada. 2017. Caledon, [Census subdivision], Ontario and Peel, RM [Census division], Ontario (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed July 2, 2020).Caledon



### 3.3 Building Density and Exposure

N.F.P.A. 1730 Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition) lists building density as a key factor for understanding potential fire related risk with particular consideration given to core areas (downtown) of a municipality. Closely spaced buildings, typical of historic downtown core areas and newer infill construction, may have a higher risk of a fire spreading to an adjacent exposed building. In a built up area with minimal building setbacks, a fire originating in one building could extend to a neighbouring structure due to the close proximity. The close proximity of buildings can also impede firefighting operations due to the limited access for firefighters and equipment.

As shown in **Table 4**, the Town also has a lower percentage of other attached dwellings of 15.95% compared to that of the Province of 28.25%. As the existing property stock is predominantly single-detached houses spread over a large geographic area, building density remains low throughout the Town. Research indicates that there are a number of residential developments in the Bolton and Mayfield west communities that include row housing and other attached dwelling types. As the Town continues to grow and develop, it's built form the potential fire related risks associated with building density and exposures will increase. The C.F.E.S. should continue to be considered a key stakeholder in the Town's future planning and development with regards to opportunities to mitigate and/or reduce the fire related risks associated with building density and exposures.

**Key Finding: As the Town continues to grow and develop it's built form the potential fire related risks associated with building density and exposures will increase.**

### 3.4 Building Age and Construction

The O.B.C. was adopted in 1975, and the Ontario Fire Code (O.F.C.) was adopted in 1981. Together, these two codes have provided the foundation for eliminating many of the inconsistencies in building construction and maintenance that were present before adoption.

The O.B.C. and the O.F.C. were developed to ensure that uniform building construction and maintenance standards are applied for all new building construction. The codes also provide for specific fire and life safety measures depending on the use of the building.

Examples of the fire and life safety issues that are addressed include:

- occupancy;
- exits/means of egress including signs and lighting;
- fire alarm and detection equipment;
- fire department access; and
- inspection, testing, and maintenance.

In many situations, the age and construction of a building can be directly associated with whether the building was constructed prior to, or after the introduction of these codes. For example, during the late 19th century and early 20th century, balloon frame construction was a common wood framing technique that was used in both residential and small commercial construction. This technique allowed for exterior walls to be continuous from the main floor to the roof in some cases extending multiple stories through a building. The result was the potential for fire and smoke to spread unobstructed from the basement to the roof of a building. In many cases, the result was a fire that started in the basement spreading to the roof very quickly and without the knowledge of building occupants or fire service personnel. The O.B.C. implemented requirements to change this construction method and introduce additional requirements to mitigate the potential of fire spread through wall cavities.

Similarly, the new codes have recognized new construction techniques such as light weight wood frame construction. This includes the use of wood trusses to replace conventional wood frame roofing techniques and new construction materials including Laminated Veneer Lumber (L.V.L.) that is a high strength engineered wood product now used commonly in residential and commercial buildings. Although these techniques and materials have enhanced the efficiency and cost of construction, this construction presents very different challenges to firefighters from those of historical construction methods. For example, the light weight wood frame construction used in an engineered wood truss roof system relies on all of the structural components to work together. In the event one of the components fails due to exposure to high heat or fire, the result is the potential for the entire roof system to fail.

In addition to building construction, fire growth rate depends on the flammability of the materials and contents within the building which introduces variances into the growth rates presented above.

The impact of increasing fire growth rates is directly related to the time lapse from ignition to flashover when the combustible items within a given space reach a temperature that is sufficiently high for them to auto-ignite.

Listed in **Table 5**, are fire growth rates measured by the time it takes for a fire to reach a one megawatt (M.W.) fire. Fire growth rate depends on the flammability of the materials and contents within the building which introduces variances into the growth rates presented below.

**Table 5: Time to Reach 1 M.W. Fire Growth Rates in the Absence of Fire Suppression**

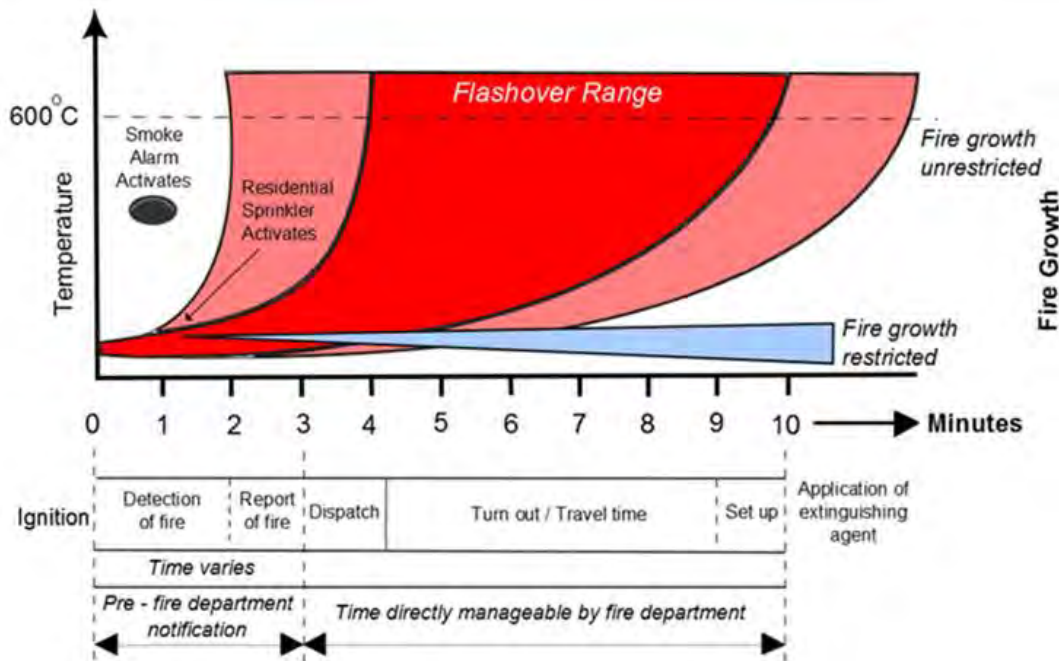
<b>Fire Growth Rate</b>	<b>Time in Seconds to Reach 1 M.W.</b>	<b>Time in Seconds to Reach 2 M.W.</b>
Slow	600 seconds	848 seconds
Medium	300 seconds	424 seconds
Fast	150 seconds	212 seconds

Source: O.F.M.E.M, Operational Planning: An Official Guide to Matching Resource Deployment and Risk Workbook.<sup>10</sup>

In addition to building construction, fire growth rate depends on the flammability of the materials and contents within the building which introduces variances into the growth rates presented above. The impact of increasing fire growth rates is directly related to the time lapse from ignition to flashover when the combustible items within a given space reach a temperature that is sufficiently high for them to auto-ignite. The graph in **Figure 9** (below) highlights the exponential increase in fire temperature and the potential for loss of property/loss of life with the progression of time.

<sup>10</sup> Office of the Fire Marshal and Emergency Management. (2017, May). Operational Planning: An Official Guide to Matching Resource Deployment and Risk Workbook. Retrieved from <http://www.mcscs.jus.gov.on.ca/english/FireMarshal/FireServiceResources/PublicFireSafetyGuidelines/04-08-10at1.html>

Figure 9: Fire Propagation Curve



**Figure Source:** Fire Underwriters Survey “Alternative Water Supplies for Public Fire Protection: An informative Reference Guide for Use in Fire Insurance Grading” (May 2009) and N.F.P.A. “Fire Protection Handbook” (2001)

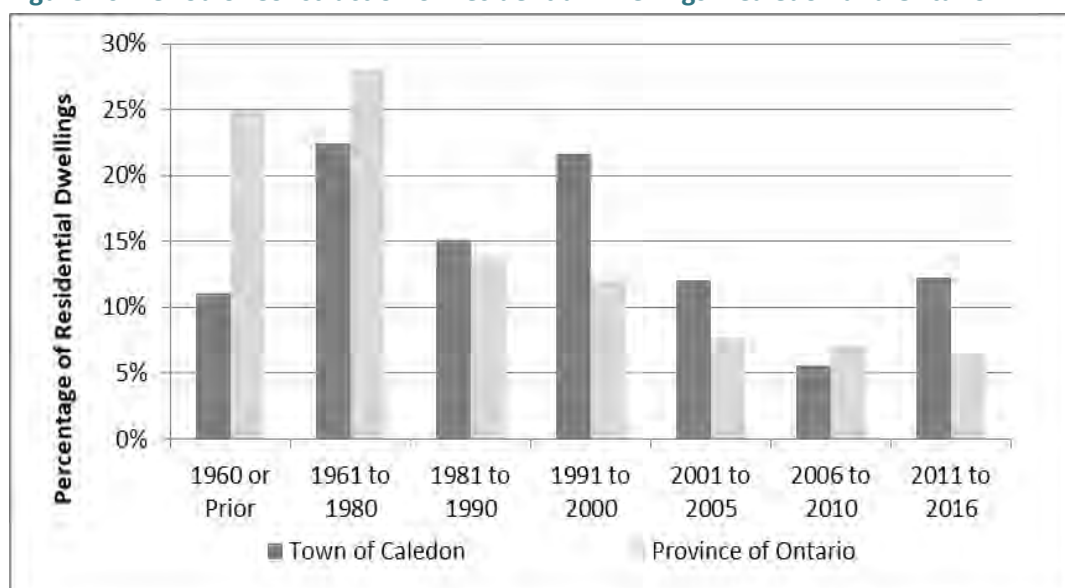
Understanding building construction and building materials is a critical component for firefighters in determining the appropriate type of fire attack and safety measures that need to be in place. As such, having knowledge of the age of a building may be directly related to the type of construction methods and materials used to build it, making building age and construction an essential component of this Community Risk Assessment.

**Table 6** and **Figure 10** present the growth in residential building stock in the Town of Caledon and the Province of Ontario based on 2016 Census Data. This analysis indicates that 11.08% of the Town’s residential building stock was built prior to 1960, and that a further 22.39% was built prior to 1981 representing a total of 33.47% of the Town’s residential building stock being built prior to the adoption of the 1981 Ontario Fire Code. By comparison, 53.06% of the residential building stock in the Province was built prior to the same time period. This confirms that the Town of Caledon has a newer residential building stock when compared to the Province.

This analysis does indicate that 33.47% of the Town’s residential building stock was built prior to the adoption of the O.F.C. and as such represents a higher fire risk as a result of its age.

**Table 6: Period of Construction of Residential Dwellings – Caledon and Ontario**

	<b>Caledon</b>		<b>Ontario</b>	
Period of Construction	Total Dwellings	% Dwellings	Total Dwellings	% Dwellings
Prior to 1960	2,355	11.08%	1,293,135	25.02%
1961 to 1980	4,760	22.39%	1,449,585	28.04%
1981 to 1990	3,190	15.01%	709,135	13.72%
1991 to 2000	4,605	21.67%	622,565	12.04%
2001 to 2005	2,560	12.04%	396,130	7.66%
2006 to 2010	1,185	5.58%	368,235	7.12%
2011 to 2016	2,610	12.28%	330,390	6.39%
Total	21,255	100.00%	5,169,175	100.00%

Source: 2016 Census, Statistics Canada<sup>11</sup>**Figure 10: Period of Construction of Residential Dwellings – Caledon and Ontario****Figure Source: 2016, Census, Statistics Canada<sup>12</sup>**

<sup>11</sup> Statistics Canada. 2017. Caledon, [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed June 25, 2020).

<sup>12</sup> Ibid.

**Identified Risk: 33.47% of the Town’s residential building stock was built prior to the adoption of the O.F.C. and as such represents a higher fire risk as a result of its age.**

### 3.5

## Building Height and Area

Buildings that are taller in height, or contain a large amount of square footage (building footprint) can have a greater fire loss risk and life safety concern. One of the unique characteristics and risks of tall / multi-storey buildings is known as the “stack effect”. This is characterized as vertical air movement occurring throughout the building, caused by air flowing into and out of the building, typically through open doors and windows. The resulting buoyancy caused by the differences between the indoor/outdoor temperature and elevation differences causes smoke and heat to rise within the building. This can have a dramatic effect on smoke permeation throughout the common areas and individual units within the building. This can be directly related to the high percentage of deaths that occur in high-rise buildings as a result of smoke inhalation.

The nature of taller buildings also brings the presence of higher occupant loads and higher fuel loads due to the quantity of furnishings and building materials.

Efficient evacuation can also be a challenging process due to a lack of direction, signage, knowledge, or familiarity of the occupants which may result in overcrowding of stairways and exit routes.

Ensuring all required fire and life safety systems are in place and functioning is a priority for these occupancies. Taller buildings can experience extended rescue / fire suppression response times for firefighters to ascend to the upper levels. This is commonly referred to as “vertical response” representing the time it takes for firefighters to gain entry into the building and ascent to the upper floors by the stairwells. Options such as “shelter-in-place” whereby occupants are directed by the fire department to stay within their units can be an effective life safety strategy. However, ensuring internal building communications systems are in place and functioning is critical to the success of this strategy. Targeted public education campaigns addressing strategies like shelter-in-place are also critical to educating building occupants.

Building area can cause comparable challenges as those present in taller buildings. Horizontal travel distances rather than vertical can mean extended response times by firefighters attempting rescue or fire suppression activities in buildings with a very large footprint.

### 3.5.1 Building Height

#### 3.5.1.1 Defining High-Rise Buildings

It is important to note that there are a variety of metrics associated with the terms “high rise”, “tall buildings” and “high buildings.” Some key definitions are outlined in **Table 7**.

**Table 7: Summary of High-Rise Building Height Metrics**

Source	Simplified Definition
Ontario Building Code/Ontario Fire Code	A building with its floor level 18 metres (59 feet) above grade, or 6 storeys
N.F.P.A. 1710: Standard for the Organization and Deployment of Fire Suppression Operations	Building height greater than 75 feet (23 metres), or 7 storeys
Statistics Canada*	Buildings with 5 or more storeys
*Statistic Canada's references to building height are not focused on a strict definition of building height consideration but to provide insight as to the overall built form of housing within a community.	

The variance in these definitions is directly related to the different applications required by these organizations. For example, the O.B.C. has detailed considerations to define a high-rise building based on the occupancy classification, floor area and occupant load. Within all occupancy classifications, additional O.B.C. requirements apply when a building is or exceeds 18 meters in height.

The O.B.C. definition is applied by departments that work within the building, planning and development areas of the Town, whereas C.F.E.S. utilizes the definition of the N.F.P.A. 1710 standard to define high-rise buildings when applicable to delivering fire suppression services. In our experience, in other municipalities this is not uncommon and relates directly to the regulatory and operational responsibilities of the Town.

For the purposes of developing this C.R.A., the O.B.C. definition has been used to analyse building height within the Town. For the purposes of developing the accompanying Fire Master Plan, the N.F.P.A. 1710 standard will be applied.

## 3.5.1.2

**Building Height Considerations**

Research indicates that the Town of Caledon currently has one building that meets the definition of a high-rise building under the O.B.C. **Table 8** represents an inventory provided by the Town of the current number of buildings of three storeys or more within the Town.

**Table 8: Inventory of Buildings of Existing Buildings of Three Storeys or More**

Type	Address	Height
Apartment Building	181 King Street East	3 Storey
Apartment Building	121 Glasgow Road	5 Storey
Hotel	12700 Regional Road 50	6 Storey
Retirement Home	100 Morra Avenue	4 Storey
Retirement Home	10 Station Road	6 Storey
Apartment Building	12600 Kennedy Road	3 Storey
Condo	50 Ann Street	5 Storey



**Key Finding:** Caledon currently has one building that meets the O.B.C. definition of a high-rise building with a floor level 18 metres (59 feet) above grade, or 6 storeys. This building is located in Bolton.

### 3.5.2 Building Area

Building area can cause comparable challenges as those present in taller buildings. Horizontal travel distances rather than vertical can mean extended response times by firefighters attempting rescue or fire suppression activities. Large buildings, such as industrial plants and warehouses, department stores, and big box stores, can also contain large volumes of combustible materials. In many of these occupancies the use of high rack storage is also present. Fires within this type of storage system can be difficult to access and may cause additional risk to firefighter safety, due to collapse-related risks.

The information presented in **Table 9** indicates that the majority of building stock (80.42%) have a total building area (footprint) of 2,500 square feet or less. This summary also indicates that 0.17% (70) buildings have an area greater than 50,000 square feet (approximately 4,645 square meters).

**Table 9: Building Area**

Building Size (Square Feet)	# of Buildings	% of all Buildings
0-2,500	33,882	80.42%
2,500-5,000	6,363	15.10%
5,000-10,000	1,300	3.09%
10,000-20,000	324	0.77%
20,000-50,000	192	0.46%
>50,000	70	0.17%
Total	42,131	100.00%

Source: Town of Caledon, Spatial Data

**Identified Risk:** The Town has 70 buildings with a total building area (footprint) that exceed 50,000 square feet (4,655 square metres). These buildings are predominantly located in the employment areas east of Bolton and in Mayfield West.

### 3.6 Potential High-Fire Risk Occupancies

Potential high-fire risk occupancy is another factor for consideration within a community's building stock. High fire risk can be linked to a combination of factors such as building density (exposures), building age, and construction. Fuel load typically refers to the amount and nature of combustible content and materials within a building. This can include combustible contents, interior finishes as well as structural materials. Combustible content tends to create the greatest potential fire loss risk. Higher fuel loads results in increased fire loss risk due to increased opportunity for ignition and increased fire severity. In many communities large amounts of fuel load can be contained within a single occupancy, such as a building supply business, within a large multi-unit residential building, or within a historic

downtown core. This section of the Community Risk Assessment will focus primarily on fuel load for industrial occupancies.

In terms of industrial occupancies, the C.F.E.S. has identified occupancies with a fuel load concern, primarily those providing distribution and manufacturing services. Three licenced marijuana grow operations have also been identified by the C.F.E.S. Although the potential fire risk associated with unlicensed, illegal marijuana grow operations that are unknown to fire services is greater than those associated with licenced facilities, the workload attributed to legal growing facilities is not insignificant. As the marijuana industry and legislation continues to evolve, fire departments are challenged to understand the unique hazards and safety issues posed by cannabis facilities. Such hazards include, but are not limited to: lack of egress, excessive carbon monoxide levels, large amounts of hazardous materials (e.g. fertilizer) on site, high electrical load, combustible interior finishes and improper change of use. Compliance with the Ontario Fire Code within these occupancies requires increased fire safety inspections.

Buildings with potential fuel load concerns as identified by C.F.E.S. are presented in **Table 10**. As mentioned in **Section 3.4 – Building Age and Construction**, fire growth rate is dependent upon the flammability of materials and contents within a building.

**Table 10: Potential High-Fire Risk Occupancies**

Address	Facility Name/Organization	Fire Related Risk Description
1 Betomat Court	Caledon Propane	Large Propane Handling Facility
60 Healey Road	Maretek Environmental	Solvent Processing Facility
12557 Coleraine Drive	Kingspan Panels	Hexane Gas used in process
8400 Healey Road	Canadian Tire Distribution Centre	Numerous commodities (Set to open Early 2017)
8068 King Street	Ontario Hardwoods	Large quantities of wood
21 Merchant Road	Acklands Grainger	Numerous commodities
8112 King Street	Agri-Turf Alliance	Large Agricultural Supplier (Fertilizers, Pesticides and herbicides)
12333 Airport Road	Continental Tires	Large Tire Distribution Facility
37 & 57 Holland Drive	Mars Canada	Large Manufacturing Facility
12203 Airport Road	PepsiCo Canada	Large Distribution Centre
13083 Coleraine Drive	Archives One	Provincial Records Facility
480, 500, 530, & 560 Queen Street South	Husky Injection Molding	Large Manufacturing Facility
70 Pillsworth Road	Pactiv Canada Inc.	Large Distribution Facility (Foam and paper container)
41 Simpson Road	Metrie	Large MDF Processing Facility
10 Loring Court	Licensed Marijuana Grow Operation	Lighting, wires, fertilizers

Address	Facility Name/Organization	Fire Related Risk Description
235 Wilton Drive	AFA Forest Product	Shingles and other roofing materials
34 Nixon Road	Licensed Marijuana Grow Operation	Lighting, wires, fertilizers
2 Heather Street	Licensed Marijuana Grow Operation	Lighting, wires, fertilizers
12724 Coleraine Drive	Amazon	Large Distribution Centre
100 Pillsworth Drive	Home Depot	Large Distribution Centre
12424 Dixie Road	UPS	Large Parcel sorting / Distribution Centre
Source: C.F.E.S.		

In addition to ensuring compliance to the requirements of the O.B.C. and the O.F.C., there are operational strategies that a fire service can implement to address fuel load concerns. These include regular fire inspection cycles and pre-planning of buildings of this nature to provide an operational advantage in the event of fire.

**Key Finding: The Town of Caledon has an inventory of occupancies that may have a higher fire risk associated with a high volume of fuel load storage, or manufacturing/distribution process.**

### 3.7

## Occupancies with Potential High Fire Life-Safety Risk

Fire risk does not affect all people equally. Those who are at an increased risk of fire injury or fatality are known as vulnerable individuals. In the event of a fire, these individuals may be unable to self-evacuate and/or require assistance in their evacuation efforts. Identifying the location and number of vulnerable individuals or occupancies within the community provides insight into the magnitude of this particular demographic within a community.

From an occupancy perspective, vulnerable occupancies contain vulnerable individuals who may require assistance to evacuate in the event of an emergency due to cognitive or physical limitations, representing a potential high-life safety risk. As part of its registry of vulnerable occupancies, the O.F.M.E.M. defines vulnerable occupancy as any care occupancy, care and treatment occupancy, or retirement home regulated under the Retirement Homes Act.

These occupancies house individuals such as seniors and people who require specialized care. It is important to note, however, that **not all vulnerable individuals live in vulnerable occupancies**; for example, some seniors who are vulnerable due to physical limitation can live on their own or in subsidized housing making them a key demographic to reach.

### 3.7.1 Registered Vulnerable Occupancies

**Ontario Regulation 150/13: Fire Code**, which amends **Ontario Regulation 213/07: Fire Code**, identifies vulnerable occupancies as care, care and treatment and retirement homes. This includes hospitals, certain group homes and seniors' residences and long term care facilities. The regulation requires fire departments to perform annual inspection, approve and witness fire drill scenarios and file certain information regarding the occupancy with the Fire Marshal's office. **Table 11** provides a list of registered vulnerable occupancies within the Town of Caledon. As referenced in **Section 3.2.1 – Town of Caledon Existing Major Building Occupancy Classification Summary**, a registered Vulnerable Occupancy could fall into different occupancy types such as Group B – Care or Detention or Group C – Residential.

**Table 11: Registered Vulnerable Occupancies**

Property Name	Occupancy Type	Location
King Nursing Home	Nursing Home	49 Sterne Street
Vera Davis	Retirement Home	80 Allan Drive
Kerry's Place	Group Home	14398 McLaughlin Rd
Bethell House	Hospice	15835 McLaughlin Rd
Brampton/Caledon Living	Community Living	8 Corsham Place
Brampton/Caledon Living	Community Living	3751 Old School Road
Brampton/Caledon Living	Community Living	13223 Heart Lake Road
Bolton Mills Retirement Home	Retirement Home	100 Morra Avenue

Source: Town of Caledon, Registry of Vulnerable Occupancies

**Identified Risk: The Town of Caledon currently has eight (8) registered vulnerable occupancies.**

### 3.7.2 Other High Fire Life Safety Risk Occupancies

From the perspective of risk, and for the purposes of the services provided by the fire services, including enhanced and targeted fire inspections and public education programming, it can be valuable for a fire department to identify additional potential high fire life-safety risk considerations, including day care facilities and schools, where due to their age, children may have cognitive or physical limitations to preventing or delaying self-evacuation in the event of an emergency. For the purposes of this C.R.A., potential high life-safety risk occupancy considerations include schools and licenced day care facilities. The C.F.E.S. identified 17 public schools, eight catholic schools, five private schools, and 11 day care facilities within the Town of Caledon.

It would be beneficial for C.F.E.S. to conduct pre-planning activities for all occupancies with vulnerable occupants. Pre-planning activities increase fire department personnel familiarity with buildings of special interest. A fire department can help reduce the risk faced by vulnerable individuals or vulnerable occupancies by performing regularly scheduled fire safety inspections; approving and witnessing fire drill scenarios; enforcing the O.F.C.; providing public education on fire safety issues; conducting pre-planning

exercises to increase fire department personnel's familiarity with the facility; reviewing fire safety plans for accuracy and encouraging facility owners to update facilities as needed; providing staff training; and encouraging fire drills. Some of these activities are now legislated responsibilities under O. Reg. 150/13: Fire Code for those facilities classified as vulnerable occupancies.

**Key Finding:** In addition to registered vulnerable occupancies the Town has 30 schools and 11 day care facilities that represent higher fire life-safety risks.

### 3.8

## Historic or Culturally Significant Buildings

An understanding of the location of historic or culturally significant buildings or facilities is an important consideration within the building stock profile of a Community Risk Assessment. Such buildings or facilities may be keystone features to the community that provide a sense of heritage, place, and pride and act as tourism destinations which could result in an economic impact in the case of a fire loss. Historic areas can present a high fire risk due to age, the materials used to construct the buildings, exposure to other buildings, and importance to the community. Regular fire inspection cycles and strategies to enforce continued compliance with the O.F.C. are considered as best practices to achieving the legislative responsibilities of the municipality and providing an effective fire protection program to address fuel load risks.

The Town of Caledon maintains an inventory of properties of cultural heritage value or interest. There is a Heritage Conservation District (H.C.D.) located to the north of Bolton that has 102 contributing properties. In total, Caledon has 130 properties designated and 968 properties listed under Part IV of the Ontario Heritage Act.

**Key Finding:** There are a number of identified heritage buildings within Caledon, many of which were constructed prior to the introduction of the Ontario Fire Code and Ontario Building Code.

## 4.0

## Critical Infrastructure Profile

As referenced in **O. Reg. 378/18**, the critical infrastructure profile assessment includes analysis of the capabilities and limitations of critical infrastructure, including electrical distribution, water distribution, telecommunications, hospitals and airports. The following section considers these critical infrastructure characteristics within the Town of Caledon.

## 4.1

### Critical Infrastructure in Caledon

Ontario's Critical Infrastructure Assurance Program defines critical infrastructure (C.I.) as "interdependent, interactive, interconnected networks of institutions, services, systems and processes that meet vital human needs, sustain the economy, protect public health, safety and security, and maintain continuity of and confidence in government."<sup>13</sup> The program also sets out nine critical infrastructure sectors, namely: continuity of government, electricity, financial institutions, food and water, health, oil and natural gas, public safety and security, telecommunications and transportation networks. Infrastructure is a complex system of interconnected elements whereby failure of one could lead to the failure of others. The vulnerability of infrastructure is often connected to the degree to which one infrastructure component depends upon another. Therefore, it is critical that these elements be viewed in relation to one another and not in isolation.

A list of the Town's C.I. was provided by the Town of Caledon. General considerations and concerns related to each C.I. as it pertains to the provision of fire protection services for each C.I. listed within the Town of Caledon are included in **Table 12**. Caledon specific C.I. concerns are described in greater detail within the text.

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<sup>13</sup> Ministry of the Solicitor General. (2017). Critical Infrastructure. Retrieved from <https://www.emergencymanagementontario.ca/english/emcommunity/ProvincialPrograms/ci/ci.html>

**Table 12: Critical Infrastructure Considerations**

Identified Critical Infrastructure	C.I. Sector	Fire Related Issues/Concerns
Water Towers, Reservoir, Pumping Station	Food and Water	<ul style="list-style-type: none"> <li>• Caledon water systems are owned and provided by the Region of Peel. Water supply is an essential component of firefighting and is accessible to the fire department through hydrant systems. A water supply shortage or damage to the distribution system could impede the fire department's ability or use of these systems.</li> <li>• There are fire department considerations to areas without adequate water flow and supply (hydrants)</li> </ul>
Sewage Pumping Station	Food and Water	<ul style="list-style-type: none"> <li>• Potential for contaminated water or spread of disease with untreated sewage on a local or regional level.</li> </ul>
Hydro	Electricity	<ul style="list-style-type: none"> <li>• Electricity in Caledon is provided by Hydro One. Firefighter safety considerations when responding to a fire at an electrical substation (e.g. high voltage electrical hazards and the presence of chemical hazards that are used to cool electrical conductors)</li> <li>• Disruption to the electrical distribution system can disrupt communications, cause food spoilage, close local business, prevent the use of medical devices and have other potential impacts on public health</li> </ul>
911 Communications and Tower Sites	Telecommunications	<ul style="list-style-type: none"> <li>• 911 communications infrastructure is significant to fire department operations. If wires or towers are compromised, the ability to communicate with emergency personnel could be extended.</li> </ul>
Rail Line	Transportation	<ul style="list-style-type: none"> <li>• Rail lines and operations are of concern from the perspective of fire protection services due to the following factors: <ul style="list-style-type: none"> <li>➢ Accidents involving transportation of hazardous cargo could result in release hazardous material requiring hazardous materials response</li> <li>➢ Potential for explosions, fires and destabilization of surrounding structures</li> <li>➢ For passenger train derailments or collisions, passenger and rail employee extrication and technical rescue may be required</li> <li>➢ Difficulty accessing scene</li> <li>➢ Major incidents resulting in long term recovery could delay daily shipment of goods and services, with potential negative effects to local economy</li> </ul> </li> </ul>
Major Highways	Transportation	<ul style="list-style-type: none"> <li>• In Caledon, there are several major highways including Highway 9, Highway 10, and Highway 50. Major highways are of concern from the perspective of fire protection services due to the following factors:</li> </ul>



Identified Critical Infrastructure	C.I. Sector	Fire Related Issues/Concerns
		<ul style="list-style-type: none"> <li>➤ Incidents involving hazardous materials transport</li> <li>➤ Motor vehicle collisions driving fire department and ambulance call volume</li> <li>➤ Multi-lane and vehicle collisions can obstruct lane access for responding apparatus</li> <li>➤ Traffic hazards (distracted drivers, high speed movement) present safety considerations for responding crews</li> </ul>
Brampton Flight Centre	Transportation	<ul style="list-style-type: none"> <li>• Airports also present unique hazards related to aircraft and supporting infrastructure. In addition to those using this type of transportation these hazards can include the use of aircraft fuel and the transportation of dangerous goods.</li> </ul>
Driver's License Office and Unemployment Office	Continuity of Government	<ul style="list-style-type: none"> <li>• Municipal services are often interconnected, therefore the failure of one may lead to the failure or damage to other services.</li> </ul>
Fire and Emergency Service Stations	Public Safety and Security	<ul style="list-style-type: none"> <li>• There are nine fire stations (three with E.M.S.), one Ontario Provincial Police detachment office and one Provincial offences office which provide public safety and response to Caledon and the surrounding area. Frequent or extreme emergency events could increase demand for emergency response services affecting the response capacity of the fire department.</li> <li>• Health related emergencies can increase demand for health care services, specifically ambulance services and medical response.</li> </ul>
Emergency Operations Centre	Public Safety and Security	<ul style="list-style-type: none"> <li>• The Town of Caledon has a primary and secondary emergency operations centre (E.O.C.). The E.O.C. is a predetermined location from where an emergency is managed and helps to ensure the continuity of operations. During an emergency situation that requires activation of the E.O.C., fire department personnel may be required to fill key positions within the E.O.C.</li> </ul>
Caledon Dufferin Victim Services	Public Safety and Security	<ul style="list-style-type: none"> <li>• Caledon Victim Services are a public safety response safety infrastructure that is able to assist fire department personnel in a collective emergency response. They may be able to provide victims of a fire with several support systems.</li> </ul>
Long-term Care	Health	<ul style="list-style-type: none"> <li>• Caledon has identified long-term care facilities as critical health care infrastructure. A fire at a long-term care facility would require complex evacuation procedures for a large number of cognitively and physically dependant individuals.</li> </ul>

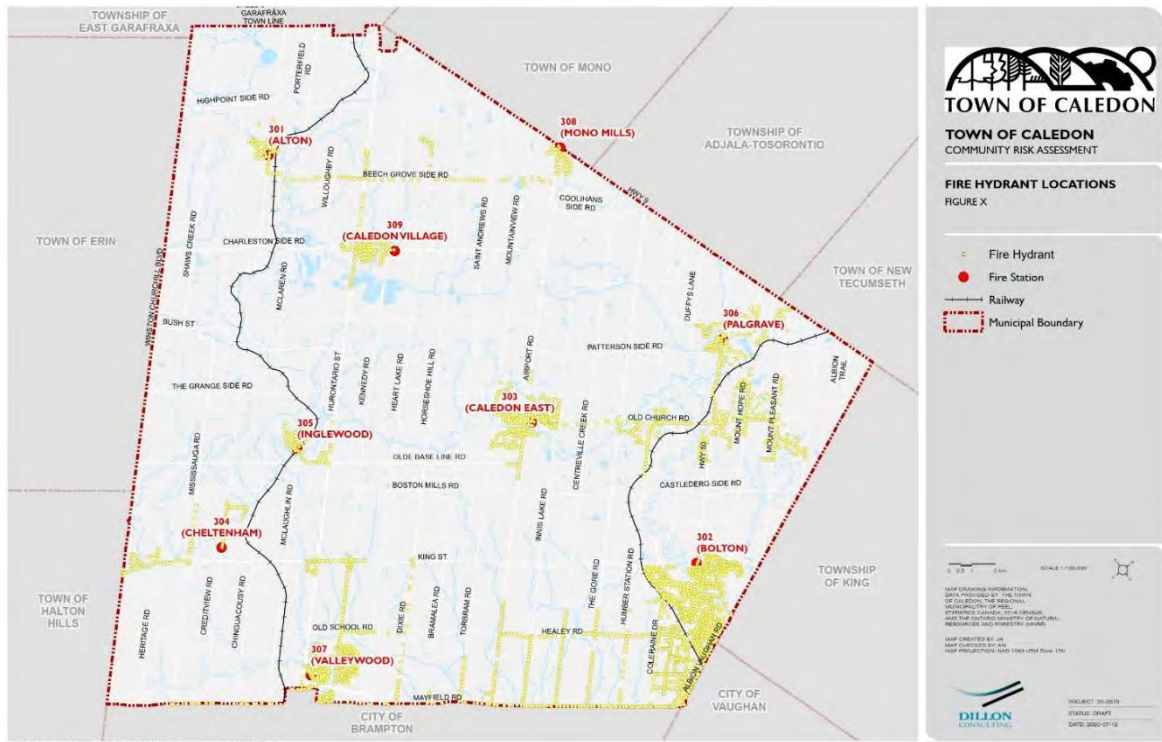
### 4.1.1 Water Infrastructure

Caledon's water infrastructure includes a municipal water system including fire hydrants predominantly located in the urbanized areas of the Town. Water supply as a critical infrastructure is essential for firefighting and can be accessible to a fire department through a municipal water delivery system, or by the fire department itself through the utilization of water tankers. Equally important to the presence of water supply is the quantity of water available for fire protection purposes, referred to as fire flow. As described in the N.F.P.A. Glossary of Terms (2019 Edition), fire flow is "the flow rate of water supply measured at 20psi (137.9 kPa) residual pressure, that is available for firefighting." The control of structure fires in urban areas are typically delivered by hose lines supplied by a local water delivery system via hydrants. A water supply shortage or water system disruption could impede the flow rate of water delivered to hydranted areas resulting in inadequate water supply and distribution needed for the delivery of fire protection services.

Where no municipal water systems exist, supplementary water supply sources are considered. It is a common occurrence for rural and undeveloped areas, not to have pressurized water supply systems including fire hydrants. For example, **Figure 11** displays the existing fire hydrants located throughout Caledon. The majority of fire hydrants are located in the urbanized areas, however, a large portion of the Town does not have access to a municipal water system and fire hydrant protection.

Alternate water supply sources can include fire department access to ponds, streams and alternative water supplies, and the use of fire suppression apparatus that have portable tanks that can support a tanker shuttle and a continuous supply of water to support fire suppression activities. According to the Fire Underwriter's Survey, an Accredited Superior Tanker Shuttle Service is a recognized equivalent to a municipal fire hydrant protection system if it meets all the requirements for accreditation. In areas without municipal water supply, a fire department should consider a water servicing strategy or formal plan for those areas requiring water flow for firefighting.

Figure 11: Existing Fire Hydrant Locations



#### 4.1.2 Airport

Airports and airlines facilitate the movement of material goods and people, serving as gateways of connectivity to other municipalities and regions that can contribute to the economic growth and development of a municipality. Airports also present unique hazards related to aircraft and supporting infrastructure such as the use of aircraft fuel and the transportation of dangerous goods. The Brampton Flight Centre, located within the Town of Caledon provides aircraft maintenance, hangar services, flight camps and tours as well as ramp and fueling services.

**Special Consideration: The Brampton Flight Centre presents a number of unique fire related risks associated with aircraft, supporting infrastructure and the potential transportation of dangerous goods requiring specialized fire protection services.**

## 5.0 Demographic Profile

As referenced in **O. Reg. 378/18**, the demographic profile assessment includes analysis of the composition of the community's population, respecting matters relevant to the community such as population size and dispersion, age, sex, cultural background, level of education, socioeconomic make-up and transient population. The following sections consider these demographic characteristics within the Town of Caledon.

### 5.1 Population and Dispersion

Based on available Census data the Town of Caledon's population increased by 28.7% over the period from 2001 to 2016. **Table 13** shows that over this same fifteen year timeframe, the number of total private dwellings has also increased at a similar rate and timeframe to the population growth, with the largest increase occurring between 2001 and 2006 at 13.52%, followed by a similar increase between 2011 and 2016 at 12.07%.

**Table 13: Historic Growth in Population and Households - Caledon**

Year	Population	% Change	Total Private Dwellings	% Change
2001	50,605	-	16,662	-
2006	57,050	12.7%	18,915	13.52%
2011	59,460	4.2%	19,649	3.88%
2016	66,502	11.8%	22,021	12.07%

Source: 2016<sup>14</sup>, 2011<sup>15</sup>, 2006<sup>16</sup>, 2001<sup>17</sup> Census, Statistics Canada

<sup>14</sup> Statistics Canada. 2017. Caledon, T [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<sup>15</sup> Statistics Canada. 2012. Caledon, Ontario (Code 3521024) and Ontario (Code 35) (table). Census Profile. 2011 Census. Statistics Canada Catalogue no. 98-316-XWE. Ottawa. Released October 24, 2012.

<sup>16</sup> Statistics Canada. 2007. Caledon, Ontario (Code3521024) (table). 2006 Community Profiles. 2006 Census. Statistics Canada Catalogue no. 92-591-XWE. Ottawa. Released March 13, 2007.

<https://www12.statcan.gc.ca/census-recensement/2006/dp-pd/prof/92-591/index.cfm?Lang=E> (accessed June 15, 2020)

<sup>17</sup> Statistics Canada. (updated 2012). Population and Dwelling Counts, for Canada and Census Subdivisions (Municipalities), 2001 and 1996 Censuses. Retrieved from

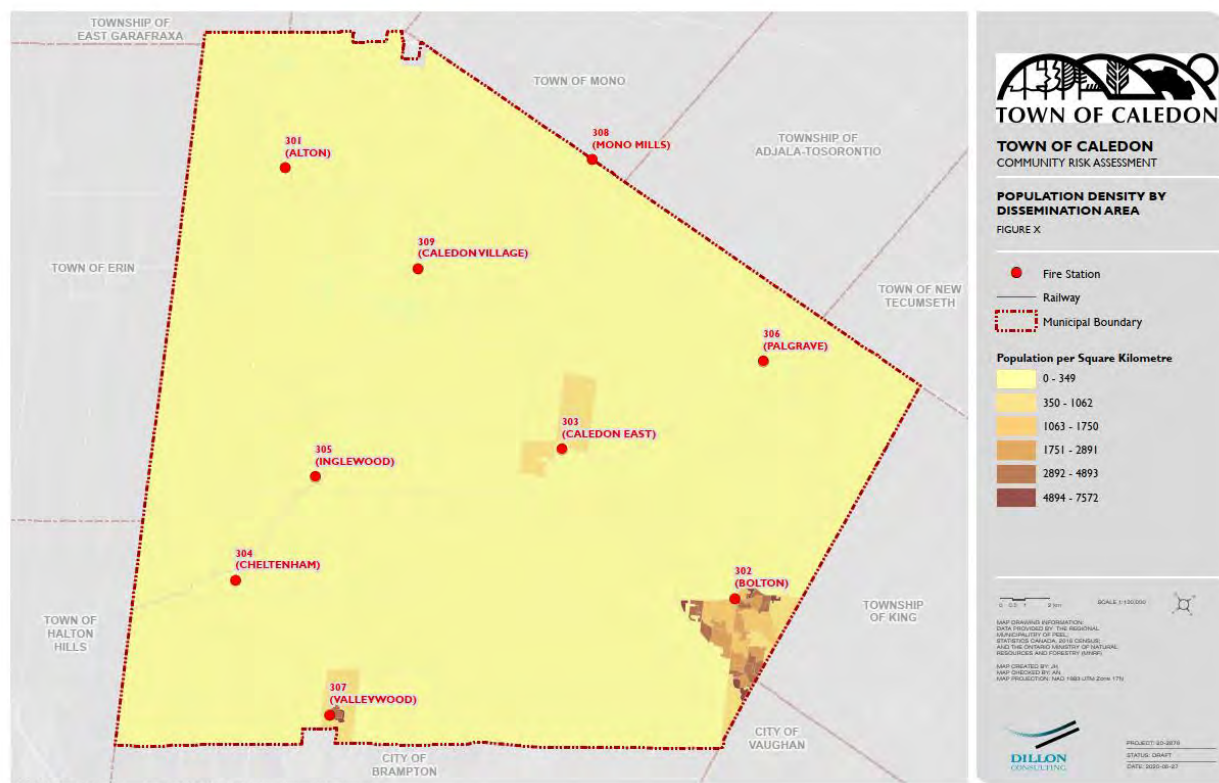
### 5.1.1 Mapping Population Dispersion

The dispersion of the population is presented in **Figure 12**. Areas of the Town most densely populated are found along Highway 50 in Bolton, near the end of Highway 410 and Hurontario St. (Valleywood), and in Caledon East.

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<https://www12.statcan.gc.ca/english/census01/products/standard/popdwell/Table-CSD-N.cfm?T=1&SR=573&SRCH=0>

Figure 12: Population Density – Town of Caledon



Data Source: Population, Statistics Canada Census Profile, 2016 Census



## 5.2 Population Age

A community's population by age is an important factor in identifying specific measures to mitigate fire related risks associated with a specific age group, such as seniors. Canada's aging population has been recognized as one of the most significant demographic trends. According to Statistics Canada, from 2011 to 2016 Canada experienced "the largest increase in the proportion of seniors since "Confederation" due to the baby boomer generation reaching the age of 65. There are now more Canadians over the age of 65 (16.9% of the population) than there were children aged 14 years and younger (16.6%).<sup>18</sup>

Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the province based on residential fire death rate (fire deaths per million of population). **Figure 13** illustrates the results of an analysis revised by the O.F.M.E.M.'s Fire Statistics in November 2018. The figure illustrates fire death rate which is characterized by the number of fire fatalities per million of population. Through this analysis, it is identified that seniors are at an increased risk of fatality in residential occupancies compared to other age groups.

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<sup>18</sup> Statistics Canada. (2017, May). The Daily: Age and sex, and type of dwelling data: key results from the 2016 Census. Retrieved from <http://www.statcan.gc.ca/daily-quotidien/170503/dq170503a-eng.htm?HPA=1>

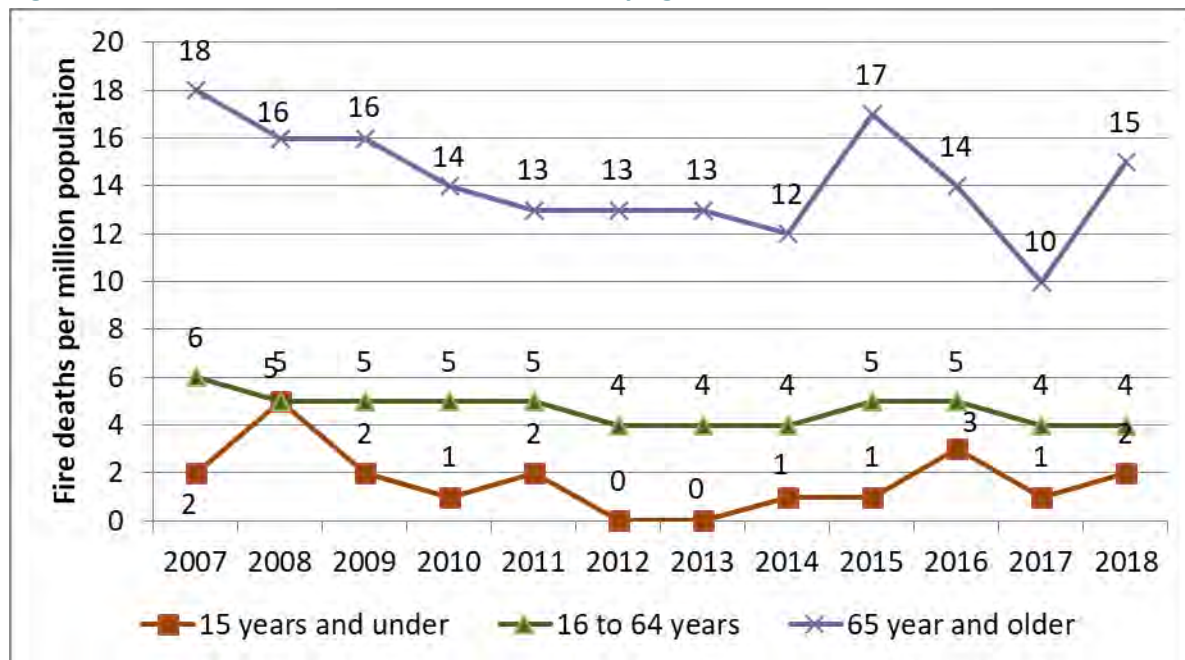
**Figure 13: 2008-2018 Residential Fire Death Rate by Age of Victim**

Figure Source: Adapted based on O.F.M.E.M. reported residential fatal fires.<sup>19</sup>

Identifying a community's population by age category is a core component of developing the C.R.A. and identifying specific measures to mitigate risks associated with a specific age group, such as seniors. The 2016 Census identifies a total population of 66,505 for the Town of Caledon. The age distributions of the Town's population and the Province of Ontario's population are summarized and compared in **Table 14** and further illustrated in **Figure 14** below.

**Table 14: Population by Age Group – Caledon and Ontario**

Age	Caledon		Ontario	
	Population	%	Population	%
0 to 4 years	3,335	5.01%	697,360	5.19%
5 to 9 years	4,095	6.16%	756,085	5.62%
10 to 14 years	4,925	7.41%	754,530	5.61%
15 to 19 years	5,125	7.71%	811,670	6.04%
20 to 24 years	4,210	6.33%	894,390	6.65%
25 to 44 years	15,395	23.15%	3,453,475	25.68%

<sup>19</sup> Office of the Fire Marshal and Emergency Management. (Revised 2018, November). Ontario Residential Fatal Fires. Retrieved from [https://www.mcscs.jus.gov.on.ca/english/FireMarshal/MediaRelationsandResources/FireStatistics/OntarioFatalities/HomeFireFatalitiesChildrenAdultsSeniors/stats\\_fatal\\_res.html](https://www.mcscs.jus.gov.on.ca/english/FireMarshal/MediaRelationsandResources/FireStatistics/OntarioFatalities/HomeFireFatalitiesChildrenAdultsSeniors/stats_fatal_res.html)

45 to 54 years	12,050	18.12%	1,993,730	14.82%
55 to 64 years	8,595	12.92%	1,835,605	13.65%
65 to 74 years	5,440	8.18%	1,266,390	9.42%
75 to 84 years	2,605	3.92%	684,195	5.09%
85 + years	730	1.10%	301,075	2.24%
Total	66,505	100.00%	13,448,505	100.00%
Median Age of the Population	41	-	41	-
Population aged 14 and under	12,355	18.58%	2,207,975	16.42%
Population aged 65 and over	8,775	13.19%	2,251,660	16.74%

Source: 2016 Census, Statistics Canada<sup>20</sup>

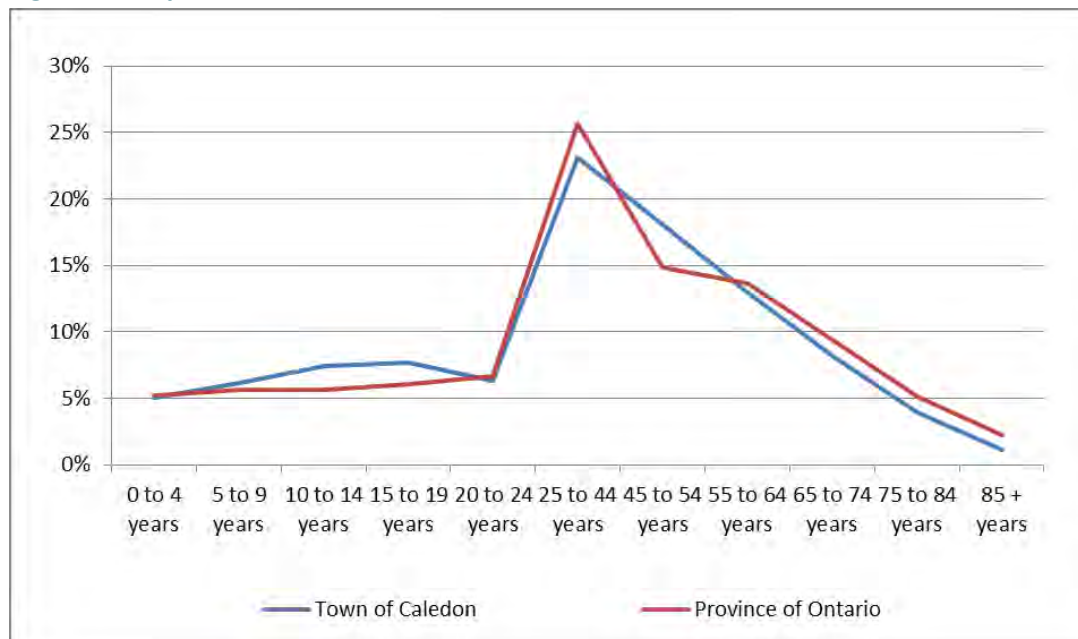
Overall, the Town and the Province show slightly different age distributions. The youngest demographic (those 14 years of age and under) represents 18.58% of the Town's total population, slightly higher in comparison to the Province. While at a lower risk of fatality in residential occupancies overall when compared to seniors or adults, youth (aged 14 years and under) represent an important demographic for the purposes of public education. As a result, public education and prevention programs should target this demographic. Structured education programs consistently provided to children and youth can help to engrain fire and life safety awareness and knowledge into future generations.

The percentage of the population aged 65 years and older in Caledon is 13.19%, which is slightly lower to that of the Province at 16.74%. An additional 31.04% of the Town's population falls between the age group of 45 and 64, compared to representing 28.47% of the population in the Province. This age group is aging towards the senior demographic of 65 years of age and older, and based on historic residential fire fatality data will be at greater risk.

These demographic trends are important considerations for the development of informed targeted public education programs and risk reduction strategies within the community.

<sup>20</sup> Statistics Canada. 2017. Caledon, T [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed June 11, 2020).

**Figure 14: Population Distribution – Caledon and Ontario**

**Figure Source: 2016 Census, Statistics Canada<sup>21</sup>**

**Identified Risk: Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the Province based on the historical residential fire death rate. According to the 2016 Census, seniors represent 13.19% of the Town’s total population.**

**Key Finding: Of the Town’s total population, 31.04% fall into the age range of 45 to 64, representing a cohort aging towards the seniors demographic of 65 years or older.**

**Key Finding: The 2016 Census data indicates that children aged 14 and under represent 18.58% of the Town’s total population.**

### 5.2.1

### Mapping Population Age

To understand the spatial distribution of population by age across the Town, 2016 Census data was mapped by dissemination area. **Figure 15** presents the distribution of the senior population (65 and older) and **Figure 16** shows the distribution of youth (0 to 14 years). **Figure 15** shows that there are more dissemination areas on the east side of the municipality that have the highest proportion of seniors, although these areas are not centralized to one particular hamlet.

<sup>21</sup> Ibid.

**Figure 16** shows the highest proportion of youth (0-14 years) concentrated in south Caledon east of Valleywood Fire Station 307, followed by a high proportion north of Caledon East Station 303. Beyond these areas, youth proportions are moderate around Bolton and Station 302, and low throughout the remainder. The identified areas observed and presented in both figures should be considered for targeted public education and fire life safety programming.



Figure 16: Percentage of Population Age 0-14 Years Old by Dissemination Area



Age Characteristics, Statistics Canada Census Profile, 2016 Census



## 5.3

## Sex

N.F.P.A. 1730 Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition) considers sex as part of a Community Risk Assessment due to the finding that, based on historical data, males are more likely to be injured or lose their life in a fire. **Table 15** displays the distribution of the population's sex by age for the Town of Caledon. The proportion of males versus females is fairly even at 49.97% male and 50.03% female. When specific age groups are reviewed, there are minor variations. One of the greater differences is the proportion of males (40.41%) compared to females (59.59%) for the 85 years and over age group. Based on these statistics, it is not anticipated that public education programming would be refined based on sex. The impact of sex distribution on public education programming would be more notable in a community with unique demographics such as those that have transient populations due to employment, for example.

**Table 15: Sex Distribution by Age Group – Town of Caledon**

Age Group	Total Population	Male	%	Female	%
0 to 4 years	3,330	1,675	50.30%	1,655	49.70%
5 to 9 years	4,095	2,130	52.01%	1,965	47.99%
10 to 14 years	4,930	2,585	52.43%	2,345	47.57%
15 to 19 years	5,130	2,695	52.53%	2,435	47.47%
20 to 24 years	4,210	2,200	52.26%	2,010	47.74%
25 to 44 years	15,400	7,505	48.73%	7,895	51.27%
45 to 54 years	12,055	5,910	49.03%	6,145	50.97%
55 to 64 years	8,590	4,325	50.35%	4,265	49.65%
65 to 74 years	5,440	2,630	48.35%	2,810	51.65%
75 to 84 years	2,595	1,280	49.33%	1,315	50.67%
85 + years	730	295	40.10%	435	59.59%
Total	66,505	33,230	49.97	33,275	50.03

Source: 2016 Census, Statistics Canada<sup>22</sup>

<sup>22</sup> Statistics Canada. 2017. Caledon, [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed June 11, 2020).

## 5.4 Socioeconomic Circumstances

Socioeconomic circumstances of a community are known to have a significant impact on fire risk. Socioeconomic status is reflected in an individual's economic and social standing and is measured in a variety of ways. These factors can be reflected in the analysis of socioeconomic indicators such as labour force status, educational attainment and income as well as household tenure, occupancy, suitability, and cost.

Socioeconomic factors intersect in a number of ways and have direct and indirect impacts on fire risk. One such example is outlined in the O.F.M.E.M.'s Fire Risk Sub-Model.<sup>23</sup> The Sub-Model makes reference to the relationship between income and fire risk. As one consideration, households with less disposable income may be less likely to purchase fire safety products (e.g., smoke alarms, fire extinguishers, etc.), which puts them at higher risk of experiencing consequences from a fire. Another consideration is that households living below the poverty line may have a higher number of persons per bedroom in a household and/or children who are more likely to be at home alone. These circumstances would impact both the probability and consequence of a fire. While these complex relationships between socioeconomic circumstances and the probability / consequence of a fire are not well understood, this C.R.A. seeks to explore these factors.

The factors reviewed at a high level have been selected based on the data available from Statistics Canada. Socioeconomic factors such as income decile group and median household income have been displayed spatially throughout this section.

Factors that are highlighted in this section include:

- Labour force status
- Immigrant status
- Educational attainment
- Household tenure, occupancy, suitability, and cost

### 5.4.1 Labour Force Status

Those who are economically disadvantaged, including low-income families, the homeless and perhaps those living alone, may experience a higher fire risk. The O.F.M.E.M.'s Fire Risk Sub-Model references a

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<sup>23</sup> Minister of the Solicitor General. (Modified 2016, February). Comprehensive Fire Safety Effectiveness Model: Fire Risk Sub-Model. Retrieved from [https://www.mcscs.jus.gov.on.ca/english/FireMarshal/FireServiceResources/ComprehensiveFireSafetyEffectivenessModel/FireRiskSub-Model/Fire\\_risk\\_submodel.html](https://www.mcscs.jus.gov.on.ca/english/FireMarshal/FireServiceResources/ComprehensiveFireSafetyEffectivenessModel/FireRiskSub-Model/Fire_risk_submodel.html)

number of reports that suggest there is a correlation between income levels and fire risk. The reports identify the following factors:

- The higher number of vacant buildings found in low-income neighborhoods attract the homeless. This introduces risks such as careless smoking, drinking and unsafe heating practices.
- Building owners are less likely to repair building systems (electrical, mechanical, suppression) due to affordability, increasing fire risk from improper maintenance.
- Households with lower disposable income are less likely to purchase fire safety products (i.e. smoke alarms, extinguishers, cigarette ignition resistant furniture, etc.) due to affordability.
- Households with lower disposable income are more likely to have their utilities shut off due to non-payment, leading to increased risks related to unsafe heating, lighting and cooking practices.
- The 1981 report, “Fire-Cause Patterns for Different Socioeconomic Neighborhoods in Toledo, Ohio” determined that the incendiary fire rate in low-income neighbourhoods is 14.4 times higher compared to areas with the highest median income. Further, fires caused by smoking and children playing occurred at rates 8.5 and 14.2 times higher, respectively.
- Single parent families are more economically challenged due to the fact that there is only one income. These households also have fewer resources to arrange childcare, increasing the likelihood of fires caused by unsupervised children.
- Studies have shown that cigarette smoking is inversely related to income. In Canada, findings by the Centre for Chronic Disease Prevention and Control through the National Population Health Survey established that there were nearly twice as many smokers in the lowest income group when compared against the highest (38% vs. 21% respectively), and
- Those with low education and literacy levels are inhibited in their ability to read instruction manuals and warning labels and less likely to grasp fire safety messages.<sup>24</sup>

Labour force status is a possible indicator of income levels which directly influence fire risk (e.g. lower income, increased fire risk). The participation rate (i.e. the proportion of residents in the labour force) can also be an indicator of income and can be considered alongside unemployment rates (e.g. lower participation rate and higher unemployment could mean lower income, higher fire risk).

Labour force status, shown in **Table 16** below, shows that the Town of Caledon has a higher participation rate than the Province of Ontario (72.11% versus 64.70%). This would suggest that the Town faces a slightly lower fire risk in comparison to the Province from the perspective of labour force.

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<sup>24</sup> Ibid.

**Table 16: Labour Force Status – Caledon and Ontario**

	Caledon		Ontario	
Status	Population	%	Population	%
In the Labour Force <sup>25</sup>	38,845	72.11%	7,141,675	64.70%
Employed	36,715	68.15%	6,612,150	59.90%
Unemployed	2,140	3.97%	529,525	4.80%
Not in the Labour Force	15,025	27.89%	3,896,765	35.30%
Total	53,870	100.00%	11,038,440	100.00%

Source: 2016 Census, Statistics Canada<sup>26</sup>

## 5.4.2

**Educational Attainment**

The relationship between educational attainment and income is complex. An analysis conducted by Statistics Canada has found that high-income Canadians are generally more likely to be highly educated. Over two thirds (67.1%) of the top 1% had attained a university degree compared to 20.9% of all Canadians aged 15 and over.<sup>27</sup> Based on this national trend and for the purposes of this Community Risk Assessment it is assumed that a higher education leads to more disposable income and a lower fire risk. It is also assumed that households with more disposable income are more likely to invest in fire life safety products such as fire extinguishers and smoke alarms reducing the fire risk.

**Table 17** displays educational attainment for the Town of Caledon and the Province of Ontario.

<sup>25</sup> The category 'In the Labour Force' is a subtotal of the following categories: employed and unemployed.

<sup>26</sup> Statistics Canada. 2017. Caledon, T [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed June 12, 2020).

<sup>27</sup> Statistics Canada. (Modified 2018, July). Education and occupation of high-income Canadians. Retrieved from [https://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-014-x/99-014-x2011003\\_2-eng.cfm](https://www12.statcan.gc.ca/nhs-enm/2011/as-sa/99-014-x/99-014-x2011003_2-eng.cfm)

**Table 17: Educational Attainment – Caledon and Ontario**

	Caledon		Ontario	
Educational Attainment	Population	%	Population	%
No Certificate/Diploma/Degree	9,450	17.54%	1,935,355	17.53%
High School Diploma or Equivalent	15,650	29.05%	3,026,100	27.41%
Postsecondary Certificate; Diploma Or Degree	28,770	53.41%	6,076,985	55.05%
Total	53,870	100.00%	11,038,440	100.00%

Source: 2016 Census, Statistics Canada<sup>28</sup>

According to the 2016 Census, 53.41% of residents in Caledon have a postsecondary Certificate, Diploma or Degree, which is slightly lower than the Province. This level of educational attainment could be linked to the median household incomes found in the Town.

According to the 2016 Census, the median total income of households for Caledon in 2015 was \$133,651, which is significantly higher than the Provincial median total income per household of \$74,287.

## 5.4.2.1

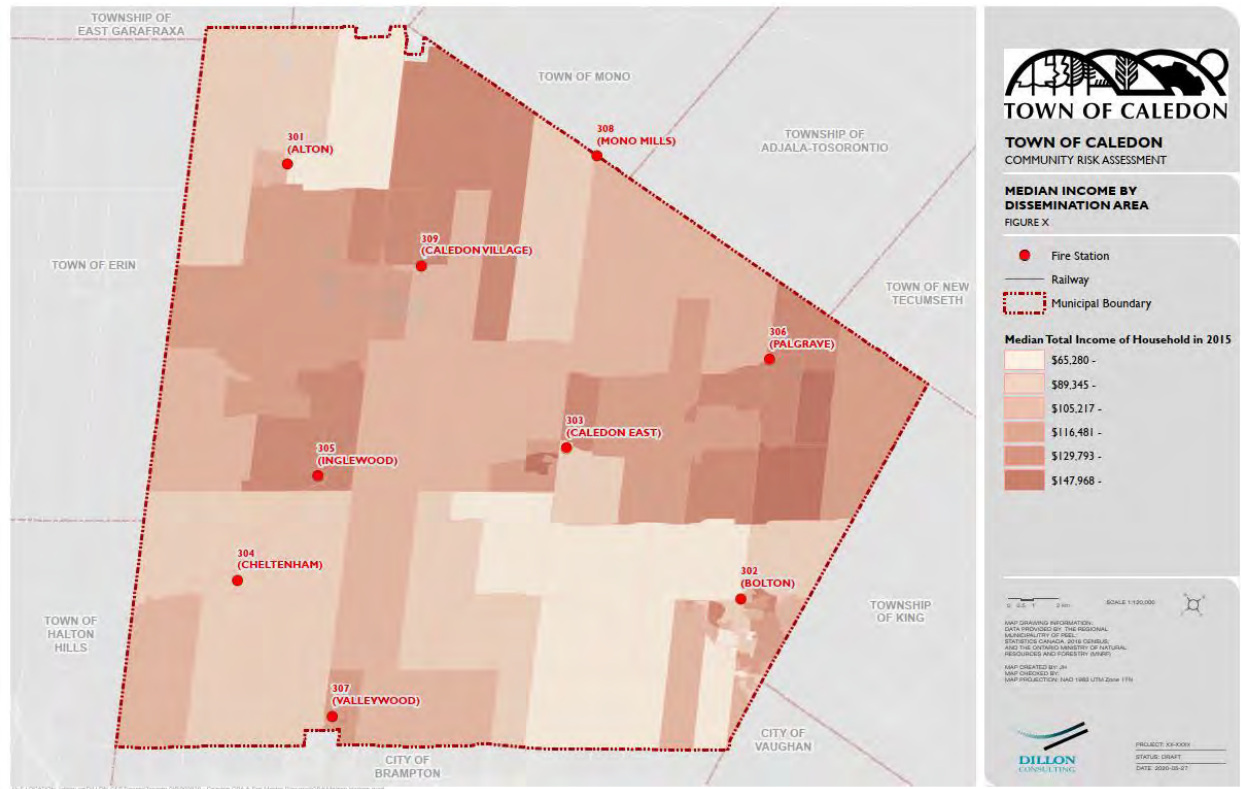
**Mapping Income**

Median household income across the Municipality is displayed in **Figure 17**, indicating that households with a lower median income are primarily east of Bolton in south Caledon, and higher median income levels in the area of the Inglewood Station 305, Caledon East Station 303, Caledon Village Station 309 and Palgrave Station 306. There does not appear to be an overall trend in median income across the Town.

<sup>28</sup> Statistics Canada. 2017. Caledon, T [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed July 30, 2020)

Figure 17: Median Total Income of Households in 2015 by Dissemination Area



### 5.4.3 Income Decile Groups

Income can also be viewed through the lens of income decile groups. As stated by Statistics Canada, a “decile group provides a rough ranking of the economic situation of a person based on his or her relative position in the Canadian distribution of the adjusted after-tax income of economic families”.<sup>29</sup> Economic family income decile group for the population in private households in Caledon is presented in **Table 18** illustrating that a smaller portion of the population within the Town falls within the bottom half of distribution of income decile groups when compared to the overall population of the Province. These statistics may be suggestive of a slightly lower fire risk within the Town from the perspective of income.

**Table 18: Economic Family Income Decile Group for the Population in Private Households – Caledon and Ontario**

Decile Group	Caledon		Ontario	
	Population	%	Population	%
In the bottom half of the distribution	20,225	30.54%	6,335,170	47.84%
In the top half of the distribution	45,990	69.46%	6,906,990	52.16%
Total	66,215 <sup>30</sup>	100.00%	13,242,160	100.00%

Source: 2016 Census, Statistics Canada<sup>31</sup>

<sup>29</sup> Statistics Canada. (Updated 2016). Income Decile Group. Retrieved from <https://www12.statcan.gc.ca/nhs-enm/2011/ref/dict/pop166-eng.cfm>

<sup>30</sup> According to Statistics Canada, this total reflects the economic family after-tax income decile group. The economic family income decile group provides a rough ranking of the economic situation of a person based on his or her relative position in the Canadian distribution of the adjusted after-tax income of economic families for all persons in private households. Using data from the 2016 Census of Population, the population in private households is sorted according to its adjusted after-tax family income and then divided into 10 equal groups each containing 10% of the population. The decile cut-points are the levels of adjusted after-tax family income that define the 10 groups. For the 2016 Census, the reference period is the calendar year 2015 for all income variables.

<sup>31</sup> Statistics Canada. 2017. Caledon, T [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed June 10, 2020).



## 5.4.3.1

**Mapping Income Decile Group**

To understand the spatial distribution of income decile group, **Figures 18** and **19** display the percentages of the population in the bottom and top decile groups by dissemination area.<sup>32</sup> **Figure 18** shows the areas with the highest proportion of the population in the bottom income decile are in the north of the municipality, around Alton Station 301, and in the south east, south of Bolton Station 302. Additionally, there is a high proportion of the population in the top income decile that are in rural areas, but the location of the population in relation to the income decile does not appear to follow an overall trend.

**Figure 19** shows there are areas with a high percentage of the population in the top income decile throughout the municipality. Areas with the lowest proportion of population within the top income decile are located in the south east of the municipality, west and south of Bolton Station 302.

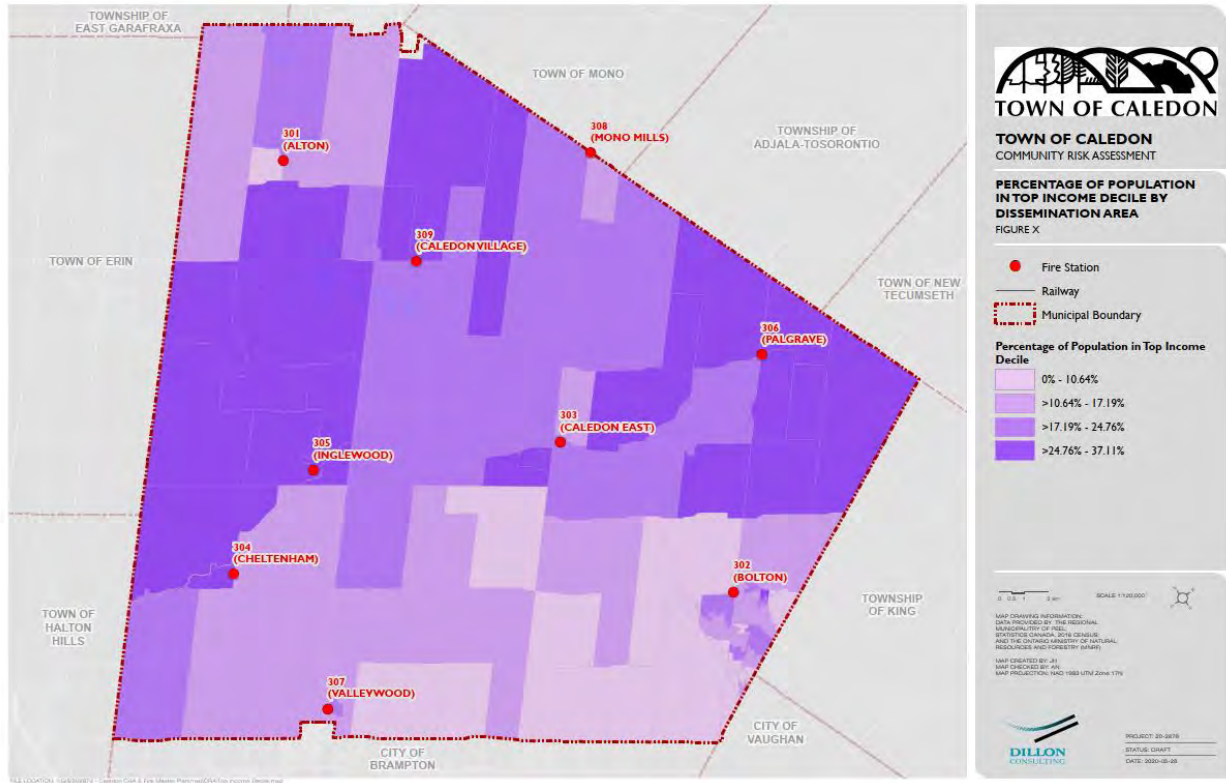
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<sup>32</sup> Data obtained from Statistics Canada was used in the creation of both income decile maps. Some areas of the Town are not included within the income decile group maps. According to the dataset obtained through Statistics Canada and viewed in the Beyond 20/20 data viewer, these areas were suppressed to meet the confidentiality requirements of the Statistics Act.

Figure 18: Percentage of Bottom Income Decile by Dissemination Area



Figure 19: Percentage of Top Income Decile by Dissemination Area



#### 5.4.4 Household Tenure, Occupancy, Suitability and Costs

**Table 19** summarizes household statistics for the Town of Caledon and the Province of Ontario including tenure, occupancy, suitability and costs.

##### 5.4.4.1 Housing Tenure

Housing tenure reflects socioeconomic status whereby a low home ownership rate may reflect lower incomes in the community and a higher overall fire risk. The Town has a higher proportion of dwellings that are owned versus rented when compared to the Province (90.80% owned in Caledon versus 69.78% in the Province).

##### 5.4.4.2 Occupancy

A higher proportion of multiple persons per household can result in increased fire loss (consequence) resulting in a higher risk. There are 270 households (1.27% of total households) that have more than one person per room in Caledon. This reflects a lower percentage compared to the Province where 2.37% of households have more than one person per room.

##### 5.4.4.3 Suitability

The 2016 Census reports on housing suitability which, according to Statistics Canada, refers whether a private household is a suitable accommodation according to the National Occupancy Standard. Suitable accommodations are defined by whether the dwelling has enough bedrooms based on the ages and relationships among household members. Based on this measure, 3.69% (or 785 households) are classified as “not suitable” within the Town compared to 6.02% for the Province as a whole (resulting in nearly 311,005 “not suitable” households across Ontario). From the perspective of housing suitability, the Town has a potential lower fire risk than that of the Provincial statistics.

##### 5.4.4.4 Housing Costs

The cost of shelter may also be indicative of the amount of disposable income within a household. Households with less disposable income have fewer funds to purchase household fire life safety items resulting in a higher risk. In Caledon, 21.66% of households spend 30% or more of the household total income on shelter costs. This is 5.99% lower than the Province, where 27.65% of households spend 30% or more of income on shelter costs.

Looking closer at shelter costs, the median value of dwellings in Caledon is \$680,396 (\$279,900 more than the Province). The Town also has a greater median monthly shelter costs for owned and rented dwellings than the Province.

**Table 19: Household Tenure, Occupancy, Suitability and Costs – Caledon and Ontario**

	<b>Caledon</b>	<b>%</b>	<b>Ontario</b>	<b>%</b>
<b>Household Tenure</b>				
Owner	19,295	90.80%	3,601,825	69.78%
Renter	1,955	9.20%	1,559,720	30.22%
Total Households	21,250	100.00%	5,161,545	100.00%
<b>Household Occupancy</b>				
One person or fewer per room	20,990	98.73%	5,046,810	97.63%
More than one person per room	270	1.27%	122,360	2.37%
Total Households	21,260*	100.00%	5,169,170	100.00%
<b>Housing Suitability</b>				
Suitable	20,475	96.31%	4,858,170	93.98%
Not suitable	785	3.69%	311,005	6.02%
Total Households	21,260*	100.00%	5,169,175	100.00%
<b>Shelter Costs</b>				
Spending less than 30% of household total income on shelter costs	16,440	78.34%	3,694,385	72.35%
Spending 30% or more of household total income on shelter costs	4,545	21.66%	1,411,900	27.65%
Total Households	21,260*	100.00%	5,106,285	100.00%

	Caledon	%	Ontario	%
Median value of dwellings	\$680,396		\$400,496	
Median monthly shelter costs for owned dwellings	\$1,759		\$1,299	
Median monthly shelter costs for rented dwellings	\$1,298		\$1,045	
*Random rounding and data suppression has been adopted by Statistics Canada Census Data to further protect the confidentiality of individual respondents' personal information. <a href="https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/about-apropos/about-apropos.cfm?Lang=E&amp;wbdisable=true">https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/about-apropos/about-apropos.cfm?Lang=E&amp;wbdisable=true</a>				

#### 5.4.5 Peel Region Healthy Complete Communities

The Region of Peel is committed to creating healthy and supportive communities that build activity into everyday life. The vision of the 2015-2035 Strategic Plan for the Region “Community for Life” is to create a healthy, safe and connected community. The Region has created new tools guidelines and to help professionals and policy makers make more health-informed decisions. Tools include the Healthy Development Assessment (H.D.A.) user guide, and Neighbourhood Index information mapping tool. The Region identified six key features of a healthy complete community that work together as core elements of the built environment.

These core elements include Service Proximity, Land Use Mix, Street Connectivity, Streetscaping, Efficient Parking, and Density. Each core element has key considerations that are scored to inform decision-makers of a developments overall health promoting potential. The development score given a certification based on the score, and if it does not meet the criteria, is not considered as healthy development.

The Neighbourhood Index information mapping tool combines qualitative and quantitative data from a variety of reputable sources to assess Census Tracts (including 11 Census Tracts in Caledon) across six domains and 21 indicators, which are combined to create an index score. The index scores range from 15 (low) to 95 (high), and the six domains include:

1. Socio-demographics;
2. Economic opportunity;
3. Resident engagement and belonging;
4. Health;
5. Safety; and
6. Physical environment.

In summary, Census Tracts in Caledon have an average index score of 83, which is categorized as a high level of wellbeing. The lowest score (72) is found in west of Bolton in the developing employment lands, and the two highest (89) are located in north Bolton, and in the Palgrave Estates community.

## 5.5 Cultural Background and Language Considerations

Cultural background and language considerations can be factors for fire service providers to consider in developing and delivering programs related to fire prevention and public education. Communication barriers, in terms of language and the ability to read written material, may have an impact on the success of these programs. There may also be familiarity challenges related to fire safety standards within recent immigrant populations. A high proportion of immigrants could demonstrate a large population that has a potential for unfamiliarity with local fire life safety practices and/or may experience possible language barriers. **Table 20** summarizes the immigration status of Caledon's population. The Town has a lower proportion of newcomers (24.62%) when compared to Ontario (29.09%). This population should be monitored as new Census data becomes available for consideration when planning public education programs and materials.

**Table 20: Immigration Status – Caledon and Ontario**

	Caledon		Ontario	
Immigration Status	Population	%	Population	%
Non-immigrants	49,725	75.10%	9,188,815	69.39%
Immigrants	16,305	24.62%	3,852,150	29.09%
Before 1981	7,480	11.30%	1,077,745	8.14%
1981 to 1990	2,465	3.72%	513,995	3.88%
1991 to 2000	3,045	4.60%	834,510	6.30%
2001 to 2005	1,560	2.36%	490,560	3.70%
2006 to 2010	975	1.47%	463,170	3.50%
2011 to 2016	780	1.18%	472,170	3.57%
Non-permanent residents	185	0.28%	201,200	1.52%
Total	66,215 <sup>33</sup>	100.00%	13,242,165	100.00%

Source: 2016 Census, Statistics Canada<sup>34</sup>

Knowledge of official languages based on the 2016 Census is included in **Table 21** for the Town of Caledon and Province of Ontario. As shown, 91.99% of the population in the Town speak English only,

<sup>33</sup> According to Statistics Canada, the total population count refers to Immigrant status and period of immigration for the population in private households - 25% sample data.

<sup>34</sup> Statistics Canada. 2017. Caledon, T [Census metropolitan area], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed June 14, 2020).



6.43% possess knowledge of both English and French, 1.56% have no knowledge of English or French, and 10 people speak French only. The potential for communication barriers should be considered and monitored, especially as the Town continues to grow in the future.

**Table 21: Knowledge of Official Language – Caledon and Ontario**

	Caledon		Ontario	
Language	Total	%	Total	%
English Only	60,970	91.99%	11,455,500	86.05%
French Only	10	0.02%	40,040	0.30%
English and French	4,265	6.43%	1,490,390	11.20%
Neither English nor French	1,035	1.56%	326,935	2.46%
Total population (non-institutional)	66,280	100.00%	13,312,865	100.00%

Source: 2016 Census, Statistics Canada<sup>35</sup>

## 5.6 Transient Populations

**O. Reg. 378/18** requires the consideration of “transient population”. This refers to the concept of population shift where the population within a community can shift at various times during the day or week or throughout the year. Population shift can be a result of a number of factors including employment, tourism, and education. In some municipalities, residents regularly leave the community for employment. This can contribute to increased traffic volume resulting in an increase in the number of emergency responses related to motor vehicle accidents. The Town of Caledon relies significantly on the utilization of volunteer firefighters for the delivery of fire suppression services. If this portion of the Town’s population is required to travel outside of the assigned response areas for employment the efficiency and effectiveness of this organizational model may be at a higher risk of not being sustainable.

Other communities may be major tourist and vacation destinations resulting in large population shifts related to seasonal availability of tourism activities. This can result in an increased risk due to overnight tourism accommodation (sleeping) which can impact the demand for fire protection services.

### 5.6.1 Tourism

An increase in tourism can result in an increased risk due to overnight tourism accommodation which can impact the demand for fire protection services. The Town adopted a tourism strategy in 2014 that

<sup>35</sup> Statistics Canada. 2017. Caledon, T [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017.

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed July 30, 2020)

identified strategic priorities to develop the local tourism sector. These priorities include increasing tourism, and developing a year round tourism sector. In the 2018-2022 Council Work Plan, one of the four main pillars on which the plan is built from is 'Connected Community', which includes actively promoting tourism and preserving natural areas in order to encourage a connected community. The "Caledon 2020-2030, An Economic Development Strategy for the Town of Caledon" document was adopted by Council in April of 2020, and includes tourism (including arts and culture) as a candidate sector for growth.

There are several natural features, properties, and attractions that contribute to tourism throughout the municipality. These areas may contribute to population fluctuation as they draw people into the Town.

Among the Conservation Areas, the Albion Hills Conservation Area is open year round for outdoor winter activities. Additionally, Caledon has hundreds of kilometers of trails including sections of the Bruce Trail, the Trans Canada Trail, and the Caledon Trailway. While these features and properties may contribute to some population shift that is mainly seasonal, overall, they do not contribute to a significant shift in population in terms of tourism accommodation. However, due to the topology and natural features of these places, they do present a risk which could increase the demand for emergency response, and a sufficient level of service. These places provide an opportunity for C.F.E.S. to distribute fire and life safety information to large numbers of people.

### 5.6.2 Employment

In terms of employment, the proximity to numerous large job markets and its rural nature suggests that there is potential for day time population shifts outside of the Town to nearby municipalities for employment purposes.

**Table 22** shows the commuting destination trends for the residents of the Town of Caledon based on 2016 Census data. It appears that a large portion of the Town's labour force (36.15%) commutes to a different census subdivision within the Region of Peel. An additional 40.66% of the population commute outside the Region of Peel, but within the Province.

A shift in commuter population may impact the demand for fire protection services. These figures are important from a fire suppression standpoint as large numbers of people commuting to and from work could increase the number of vehicle collision calls to which the fire service responds.

**Table 22: Commuting Destinations – Town of Caledon (25% Sample Data)**

	<b>Total</b>	<b>% Total</b>
Commute within census subdivision (CSD) of residence	6,615	23.03%
Commute to a different census subdivision (CSD) within census division (CD) of residence	10,385	36.15%
Commute to a different census subdivision (CSD) and census division (CD) within province or territory of residence	11,680	40.66%
Commute to a different province or territory	50	0.17%
Total Sample	28,725	100.00 %
Source: 2016 Census, Statistics Canada <sup>36</sup>		

Another way to measure this population shift is traffic counts. The Transportation Tomorrow Survey (T.T.S.) is a comprehensive travel survey conducted every five years, providing insight into the travel habits of residents in the Greater Toronto, Hamilton and surrounding areas, including the Region of Peel and Town of Caledon.

The most recent T.T.S. reporting year (2016) indicates that, in a 24 hour period, 127,000 trips are made by the residents of Caledon. Of the 127,000 trips made in a 24 hour period, the majority were made by drivers (77%) as the main mode of travel. Similarly, 106,200 trips are made to Caledon by residents of the surrounding T.T.S. Area in a 24 hour period.<sup>37</sup>

High commuter volumes (due to an individual's journey to work or school) can have a significant impact on transit and traffic, increasing the likelihood of vehicle collisions with the possibility of higher call volumes during peak commuting times in the morning and late afternoon. This could potentially impact emergency response times within the Town.

**Identified Risk: The Town's commuter population presents a factor that may impact traffic congestion, and the potential occurrence of motor vehicle accidents.**

<sup>36</sup> Statistics Canada. 2017. Caledon, T [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E> (accessed July 30, 2020)

<sup>37</sup> Data Management Group, University of Toronto. (2018, March). Transportation Tomorrow Survey 2016 (PDF File). Retrieved from [http://dmg.utoronto.ca/pdf/tts/2016/2016TTS\\_Summaries\\_Peel\\_Wards.pdf](http://dmg.utoronto.ca/pdf/tts/2016/2016TTS_Summaries_Peel_Wards.pdf)

**Identified Risk:** The sustainability of the volunteer firefighter organizational model could be impacted if a large portion of the volunteer firefighters are required to travel outside of the assigned response areas to seek employment.

## 6.0 Hazard Profile

As referenced in the **O. Reg. 378/18**, the hazard profile assessment includes analysis of the hazards within the community, including natural hazards, hazards caused by humans, and technological hazards to which fire departments may be expected to respond, that may have a significant impact on the community. This section considers these hazards within the Town of Caledon.

### 6.1 Hazard Identification and Risk Assessment in Ontario (H.I.R.A.)

A hazard is defined as a phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Hazards can be natural, human-caused or technological. It is important to identify and consider these hazards from a fire risk, emergency response and overall public safety perspective in order to assist local governments and emergency management personnel plan for the risks within their communities and take the appropriate action to reduce future losses.

Under the Emergency Management and Civil Protection Act (E.M.C.P.A.), municipalities are required to 'identify and assess the various hazards and risks to public safety that could give rise to emergencies and identify the facilities and other elements of the infrastructure that are at risk of being affected by emergencies'. 2002, c. 14, s. 4. The O.F.M.E.M. has recently released methodology guidelines outlining a process for the development of an H.I.R.A. program, to assist municipalities in assessing the local hazards and potential risks.

Current legislation requires an annual review and update of the municipally developed H.I.R.A.

#### 6.1.1 H.I.R.A. and the C.R.A.

The O.F.M.E.M. T.G.-02-2019 and O.F.M.E.M. "Question and Answers" provide guidance on the role of a completed H.I.R.A. in the context of a Community Risk Assessment. The guidelines acknowledge that these processes are separate but complementary. The O.F.M.E.M. "Question and Answers" states that the C.R.A. process "may result in decisions about fire department responses to various types of emergencies identified in a completed H.I.R.A.".

A H.I.R.A. is a comprehensive process to identify the hazards to a community as a whole. A C.R.A. provides an opportunity to examine the impact that these hazards would have on the services provided by a fire department. For the purposes of this C.R.A., a "fire protection services" lens will be applied to the top hazards as identified through the municipal led H.I.R.A.

## 6.2 Town of Caledon Hazard Identification and Risk Assessment

The Town of Caledon completed a review and update of its Hazard Identification and Risk Assessment early in 2020 indicating its commitment to sustaining compliance with the municipality's legislative requirements. The Town's current H.I.R.A. assigns likelihood and consequence levels to a list of hazards based on the potential for impacts to people, property and the environment. As a result of this analysis, the top seven (7) hazards in the Town include the following:

- chemical release;
- fire / explosion;
- wildland fire;
- winter weather;
- high winds;
- crowd disaster; and
- infectious disease.

## 6.3 Impacts of H.I.R.A. Identified Hazards on Fire Protection Services

To better understand the risks of hazards as they pertain to fire protection services, the top seven hazards have been assessed to identify possible impacts on fire protection services. Many of the potential impacts are not unique to a jurisdiction. The results of this review as they pertain to the top hazards in the Town are presented in **Table 23**.

Table 23: Impacts of Identified H.I.R.A. Hazards on Fire Protection Services

Hazard (Town H.I.R.A.)	Possible Impact on Fire Protection Services
Chemical Release	<p>A chemical release is defined as the uncontrolled release of a hazardous chemical, either as a solid, liquid or a gas. Incidents involving a chemical release can have harmful effects on human life, property and the environment. Depending on the level of service offered and training acquired, a fire department can perform hazardous materials response or partner with a neighbouring jurisdiction to provide the same service. It is important for a fire department to possess the proper training and certification required to perform hazardous materials response safely and securely in order to prevent firefighter injury.</p> <p>The Town's H.I.R.A. indicates that chemicals are present along the transportation corridors via the highways and rail as well as at fixed sites where chemicals are regularly used at industrial facilities. If an emergency event involving a chemical release were to occur at a fixed site or along the transportation corridors, it could place people, property and business at an increased risk.</p> <p>The applicable hazardous material emergency response capabilities of C.F.E.S. will be evaluated in the Fire Master Plan.</p>
Fire / Explosion	<p>A fire is characterized by any instance of destructive and uncontrolled burning, including explosions. Responding to hazards of this type can be a daily occurrence for a fire department.</p> <p>As discussed in <b>Section 10.0</b>, there were 151 structure fires, 14 outdoor fires, and 156 vehicle fires representing \$25,962,341 in total dollar loss over a five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 in the Town of Caledon.</p> <p>The applicable fire suppression/explosion emergency response capabilities of C.F.E.S. will be evaluated in the Fire Master Plan.</p>
Wildland Fire	<p>The applicable N.F.P.A. 1730 Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition) identifies wildland-urban interface as geography-based risk for consideration. This interface refers to the area of transition between unoccupied land and human development. This transition area can be comprised of a mix of woodlots, bush or grass. As discussed in <b>Section 2.4</b>, there are several areas in the Town that are located adjacent to a wildland-urban interface presenting the potential for a wildland fire to occur. This C.R.A. identifies wildland fires as an identified risk.</p> <p>The wildland fire emergency response capabilities of C.F.E.S. will be evaluated in the Fire Master Plan.</p>



Winter Weather	Episodes of freezing rain, ice or heavy snowfall (associated with winter weather) can have an array of consequences. For example, freezing rain can weigh down electrical transmission lines or branches causing them to break, which in turn can block roadways impeding the fire department or other first response agency's ability to access the road network, leading to extended travel times. Downed electrical wiring presents electrical current exposure hazards which can cause injuries requiring medical assistance and overall, damages to the electrical grid could lead to energy system disruption. Freezing rain, heavy snowfall or ice can also promotes dangerous driving conditions leading to motor vehicle collisions or crashes, driving emergency response call volume.
High Winds	High winds can cause varying levels of property or structural damage; disrupt multi-modal transportation services and interfere with the delivery of utilities such as hydro or other critical infrastructure such as telecommunications. Damage to property and infrastructure caused by high winds can lead to: <ul style="list-style-type: none"> <li>• falling or flying debris leading to injury/fatalities, property and critical infrastructure damage;</li> <li>• restricted road access for fire department or other first response agency;</li> <li>• downed electrical wiring causing electrical current exposure hazards;</li> <li>• energy system disruption;</li> <li>• increase in call volume;</li> <li>• extended travel times;</li> <li>• individuals trapped under debris requiring rescue;</li> <li>• economic loss; and</li> <li>• release of hazardous materials due to container damage.</li> </ul>
Crowd Disaster	Crowd disasters are incidents resulting from crowd forces or behaviour that reach levels that are difficult to resist or control. Depending on the crowd behaviour, this could place community members and businesses at risk. First responders may be required to attend to injuries or fires related to riots for example. The presence of large crowds in a confined area can also have a negative impact on emergency service access and therefore emergency response times.
Infectious Disease	As highlighted in the 2020 HIRA, within the past 20 years there have been three major pandemics. The impacts of this hazard have no geographical boundaries. The current COVID-19 pandemic is having significant impact on communities at a local level, which has tested pandemic readiness and plans in a variety of ways. The ability to respond and adapt to the pandemic's effects, as with any emergency, is largely dependent on the social, economic and environmental needs and circumstances unique to each community. COVID-19 has highlighted now more than ever, the importance of community preparedness and pandemic planning as well as the need for first responders to adjust to these circumstances. Fire department personnel interact with members of the community on a daily basis and therefore will need to consider their own health and safety as well as those in the community if a hazard such as this were to occur.

Source: Town of Caledon 2020 Hazard Identification and Risk Assessment

The Fire Master Plan, which is informed by the findings of this C.R.A., includes a high-level review of the Town's emergency management and planning efforts and operational approaches to the hazards identified in this assessment.

**Key Finding: The Town's 2020 Hazard Identification and Risk Assessment identifies hazards that could each impact the ability of the Town to deliver fire protection services. These include: chemical release; fire / explosion; wildland fire; winter weather; high winds; crowd disaster; and infectious disease.**

## 7.0

## Public Safety Response Profile

As required by **O. Reg. 378/18**, the Public Safety Response Profile includes analysis of the types of incidents responded to by other entities in the community, and those entities' responsibilities. These entities could include police, ambulance, fire and other entities that may be tasked with or able to assist in some capacity the collective response to an emergency situation. The following sections consider these public safety response characteristics within the Town of Caledon.

## 7.1

### Public Safety Response Agencies in the Town of Caledon

Public safety and response agencies refer to agencies and organizations that respond to specific types of incidents within a community that provide trained personnel and resources critical to upholding public safety. Each of these entities offer specialized skill sets in support of front-line operations. The types of response services offered might include fire protection, medical attention, rescue operations, policing activities or hazardous materials response. In addition to responding individually to certain types of incidents, these entities work closely with one another in the event of major emergencies through a structured standardized response approach to ensure effective coordination among all response agencies.

**Table 24** lists the public safety response agencies within the Town of Caledon who could be able to assist in a collective emergency response effort and may contribute to the minimization of risk within the community. Identifying the public safety response agencies within the community can help the fire service understand the agencies that may be able to assist in the response to an emergency.

**Table 24: Public Safety Response Agencies**

Identified Public Safety Response Agency	Types of Incidents They Respond To	Agency Role in Incident
Ontario Provincial Police - Caledon Detachment	<ul style="list-style-type: none"> <li>motor vehicle collisions</li> <li>medical incidents</li> <li>fire incidents</li> <li>false fire incidents</li> <li>public assistance</li> <li>Units include:               <ul style="list-style-type: none"> <li>Major Crime Unit (M.C.U.)</li> <li>Street Crimes Unit (S.C.U.)</li> <li>Community Response Unit (C.R.U.)</li> <li>School Resource Officers (S.R.O.)</li> <li>Traffic Unit (T.I.U.)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>traffic control,</li> <li>scene stabilization</li> <li>investigation</li> <li>patient contact, initial first aid evacuation</li> <li>assist in coordinating public information</li> </ul>
Ontario Provincial Police U.C.R.T.	<ul style="list-style-type: none"> <li>CBRNE incidents</li> <li>Missing persons</li> <li>Incidents requiring specialized rescue</li> </ul>	<ul style="list-style-type: none"> <li>Urban search and rescue</li> <li>Chemical, biological, radiological, nuclear, explosive response</li> </ul>
Peel Region Paramedic Services	<ul style="list-style-type: none"> <li>provides pre-hospital primary and advanced paramedic emergency care,</li> <li>motor vehicle collisions</li> <li>medical incidents</li> <li>fire incidents</li> <li>public assistance</li> </ul>	<ul style="list-style-type: none"> <li>patient stabilization, extrication, reporting</li> <li>standby for firefighter safety, patient stabilization, transport, reporting</li> <li>assist in coordinating public information</li> </ul>
Caledon Victim Services	<ul style="list-style-type: none"> <li>Homicide</li> <li>Attempt murder</li> <li>Serious assault (with a weapon, causing bodily harm, aggravated assault, kidnapping/abduction, forcible confinement)</li> <li>Domestic violence</li> <li>Sexual assault</li> <li>Human trafficking</li> <li>Hate crimes</li> </ul>	<ul style="list-style-type: none"> <li>Victim Quick Response Program provides limited financial assistance to eligible victims and their families in the aftermath of a violent crime</li> <li>Victim Crisis Assistance Ontario program (VCAO) that offers 24/7 in person or telephone support and crisis intervention to individuals affected by crime and tragic circumstances</li> <li>comprehensive safety planning</li> <li>needs assessment</li> <li>court support</li> </ul>
Ontario Search & Rescue Volunteer Association (O.S.A.R.V.A.) (several teams across Ontario)	<ul style="list-style-type: none"> <li>Search and rescue missions</li> <li>Missing persons</li> <li>K9 unit if needed</li> </ul>	<ul style="list-style-type: none"> <li>Search and rescue support</li> <li>Work in cooperation with other agencies and emergency services like the Canadian Forces, police, fire and ambulance</li> </ul>
Civil Air Search and Rescue Association (C.A.S.A.R.A.) (several units across Ontario and Canada)	<ul style="list-style-type: none"> <li>Incidents requiring volunteer air search and rescue service throughout Southwestern Ontario</li> </ul>	<ul style="list-style-type: none"> <li>Support Canada's Search and Rescue (S.A.R.) program and to promote S.A.R. Awareness</li> <li>may also be called upon to supply certified C.A.S.A.R.A. members trained as spotters onboard military aircraft</li> <li>tasked on S.A.R. missions by the Joint Rescue Coordination Center (J.R.C.C.), located at C.F.B. Trenton</li> </ul>

Identified Public Safety Response Agency	Types of Incidents They Respond To	Agency Role in Incident
Ontario Volunteer Emergency Response Team (O.V.E.R.T.) – services available through request for assistance	<ul style="list-style-type: none"> <li>• Large scale disasters that may require evacuation including floods, power outages, public health emergencies and more</li> <li>• Incidents requiring technical rescue</li> <li>• Search and rescue/missing persons</li> </ul>	<ul style="list-style-type: none"> <li>• Provides emergency assistance to first responders and emergency management agencies</li> <li>• Incident command</li> <li>• Ground and marine search and rescue</li> <li>• canine unit support</li> <li>• Technical rescue</li> <li>• Communications.</li> </ul>

## 7.1.1

**Mutual/Automatic Aid Agreements**

Mutual aid and automatic aid agreements can provide additional depth of resources and response that may not have been dispatched as part of a municipality's initial response. These agreements establish a mutual relationship between multiple public safety and response agencies whereby emergency services and resources are shared to promote a more effective response and strengthen the depth of emergency response provided by a fire department. Currently, C.F.E.S. is a participant in the **Region of Peel Mutual Aid and Automatic Aid Agreement**.

The Town of Caledon currently has a Fire Protection Agreement/Automatic Aid Agreement in place for a 66 square kilometer portion of the Town of Mono. Fire protection services are provided by the Town of Caledon to the Town of Mono based on the rates set out within the Agreement.

## 7.1.2

**Mutual Assistance Agreements**

In addition to the **Region of Peel Mutual Aid and Automatic Aid Plan and Agreement**, the Town of Caledon is also a party to a Mutual Assistance Agreement with the County of Dufferin, which borders the municipality to the north. The purpose of this agreement is to allow for the provision of personnel, equipment or materials in the case of an emergency per the Emergency Management & Civil Protection Act, 1990. The agreement came into effect in 2015 and provides direction to the corporations as to when and how to call for assistance and also covers insurance and payment for assistance in the event of an emergency.

## 8.0

## Community Services Profile

As referenced in **O. Reg. 378/18**, the community service profile assessment includes analysis of the types of services provided by other entities in the community, and those entities' service capabilities. This includes the presence or absence and potential abilities of other agencies, organizations or associations to provide services that may assist in mitigating the impacts of emergencies to which the fire department responds. The following sections consider these community service characteristics within the Town of Caledon.

## 8.1

### Community Services in the Town of Caledon

Fires and other emergency events can have devastating effects on a community and at times can overwhelm public safety and security agencies' capacity to respond. In an emergency event, community-based agencies, organizations and associations can provide surge capacity to the response and recovery efforts of first responders and a useful resource to call upon if integrated into the emergency management framework of a municipality early on. These types of affiliations can contribute a variety of capabilities essential to response and recovery efforts including support in the areas of communications, health care, logistics, shelter, food and water supply, emergency clothing, and more specialized skill sets.

Investigating new community partnerships and strengthening existing ones may be an effective strategy for consideration towards enhancing the current public fire and life safety education program, fire inspection efforts and emergency response and recovery capabilities of C.F.E.S. **Table 25** lists the community agencies, organizations and associations within the Town of Caledon that could be called upon in such instances as those described above.

**Table 25: Community Service Agencies, Organizations and Associations**

Community Service Agency	Types of Assistance Provided
Canadian Red Cross – Halton and Peel Regional Office	In the event of a fire incident or emergency, The Canadian Red Cross - Halton and Peel Regional Office can provide temporary lodging, clothing and food to persons who cannot return to their homes or, who cannot find alternate accommodations. In larger emergencies requiring evacuation, the organization has the capability to set up reception and information services to greet evacuees, provide information, provide family reunification and control facility access.
Salvation Army	The Salvation Army is capable of providing both immediate and long-term recovery assistance in cooperation with Fire and Police Services. The Salvation Army's Emergency Disaster Services program can provide food and hydration resources, emotional and spiritual care, donations management, social services, long-term recovery and training and volunteers.
St. John's Ambulance	St. John's Ambulance Emergency Preparedness and Disaster Response Teams are integrated into the collective community disaster and emergency response and preparedness effort. The organization has the capability to provide health care and first aid in reception centres, casualty care at the scene of an event, patient transportation, and evacuation assistance.
Region of Peel Human Services	In the event of a fire or emergency, the Region of Peel Human Services branch can support individuals and families in finding accommodations reflecting their needs.
Mennonite Disaster Service Canada (Ontario Office)	Mennonite Disaster Service (M.D.S.) Canada is a volunteer network of Canadian Anabaptist churches dedicated to responding to natural disasters in Canada and the United States. This organization aims to assist the most vulnerable community members, individuals, and families who would not otherwise have the means to recover. M.D.S. volunteers provide the skills and labor needed to respond, rebuild and restore after a disaster occurs. M.D.S. works in collaboration with other groups including faith-based organizations, local recovery committees, and both governmental and non-governmental agencies. M.D.S. Canada is made up of six regional/provincial units (Atlantic, Ontario, Manitoba, Saskatchewan, Alberta and B.C.)
Samaritans Purse Canada	Samaritan's Purse is a nondenominational evangelical Christian organization providing spiritual and physical aid to hurting people around the world. In Canada, Samaritan's Purse provides emergency aid and help with cleanup in the wake of severe wildfires, floods, hurricanes, tornados, and more. Their Disaster Relief Units equip staff and volunteers with tractor trailers outfitted with generators, pumps, hand tools, and safety gear.



Community Service Agency	Types of Assistance Provided
Team Rubicon Canada	Team Rubicon is an international non-profit disaster response organization that unites the skills and experiences of military veterans with first responders to rapidly deploy disaster response teams, free of charge to communities affected by disasters across the country. They are capable of providing incident management, damage and impact assessment, spontaneous volunteer management, debris management, disaster mapping and work-order management, hazard mitigation (flood/fire), and expedient home repair.
Local Radio Broadcaster – C.J.F.B.-F.M. (Bolton)	Public media outlets can provide the fire service with means to disseminate important fire and life safety education messaging to a broad audience. This could include a partnership with local radio such as C.J.F.B.-F.M. radio to provide a fire safety messaging or advertising campaign to inform the public about residential fires and the actions residents can take to prevent incidents from happening. There may also be an opportunity to establish a partnership with local radio for a designated fire service member to appear regularly offering fire safety tips that capture a variety of brief messages around topics such as careless smoking, space heaters, faulty wiring, electrical outlet overloading, etc.).
In the Hills - Local Farm Magazine	<p>In The Hills is delivered to more than 40,000 homes and farms throughout Caledon, Erin, Dufferin, Orangeville and Creemore. It is also available to visitors at local inns, restaurants, specialty retail stores and other tourist locations.</p> <p>Farms and rural properties have unique risks and C.F.E.S. has identified farm/barn fire safety as a key area of fire education on their website. In addition to the resources and links provided on the fire services' website, C.F.E.S. may wish to consider sharing some of these resources further in the local farming magazine "In the Hills".</p>
Farm and Food Care Ontario	Farm & Food Care Ontario operates a lending program of F.L.I.R. (heat sensing) modules to be used as a fire prevention and awareness tool by farmers to increase their awareness of fire safety, potential risks and prevention.
Alcohol and Gaming Commission of Ontario	C.F.E.S. can partner with local organizations that may be able to provide additional support in the area of fire inspection and enforcement. For example, the Alcohol and Gaming Commission of Ontario may be able to assist in the enforcement of occupancy loads in nightclubs through after hour inspections. Establishing lines of communications and collaborative partnerships early on with agencies who share a common concern for people's welfare and safety can inform and strengthen the fire services' inspection and enforcement program.

Community Service Agency	Types of Assistance Provided
Coalition on Hoarding in Peel (C.H.I.P.)	Hoarding presents unique fire risks due to the large amount of flammable materials in the home which may contribute to a fire burning faster and hotter and due to the falling objects or sharp objects concealed within clutter that may injure or trap residents and responding firefighters. The Coalition on Hoarding in Peel (C.H.I.P.) can assist C.F.E.S. in identifying occupancies that may present code violations and unsafe hoarding practices requiring follow up and inspection.
Peel District School Board	As reported in <b>Section 5.2 – Population Age</b> , the 2016 Census data indicates that children aged 14 and under represent 18.58% of the Town’s total population. The proportion of children in the Town is significant, especially when considering the opportunity for public education. This percentage supports the development of enhanced public education programming that targets children/youth of all ages. Partnering with school boards and other agencies that work with children can provide opportunities for fire and life safety education.
Peel Children’s Aid Society (C.A.S.)	The Peel Children’s Aid Society is responsible for providing child protection services to children who live in Peel Region. It is common practice for this agency to investigate and inspect living conditions where there is a concern for a child’s welfare. C.A.S. workers may encounter property conditions that they feel warrant follow up by C.F.E.S. due to unsafe conditions or fire hazard related concerns.
Scott Mission Camp (S.M.C.)	Summer camp at S.M.C. runs throughout the summer months of July and August, offering overnight camps for children and youth ages 8 to 20 years. Most camp sessions are 1 week long beginning on Monday and ending on Saturday mornings. A partnership between the camp and C.F.E.S. could enhance the fire services’ efforts in providing fire and life safety education.
Caledon Parent-Child Centre	The Caledon Parent-Child Centre has a mission to provide support, resources and education that strengthen families and promote the optimal development of children. They offer services that include both the child and the parent or caregiver such as the <b>Parent/Caregiver Education Program</b> and the <b>Rural Community Outreach Program</b> . C.F.E.S. could partner with the centre to optimize on some of these programs in order to provide fire and life safety education to both parents or caregivers and children at the same time.

Community Service Agency	Types of Assistance Provided
Caledon Community Services	<p>As reported in <b>Section 5.2 – Population Age</b> of this C.R.A., seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the Province based on residential fire death rate. According to the 2016 Census, seniors represent 13.19% of the Town’s total population. It also identified that of the Town’s total population, 31.04% fall into the age range of 45 to 64 years, representing a cohort aging towards the seniors demographic of 65 years or older.</p> <p>Agencies, organizations and facilities that support seniors can make a significant impact in reducing this risk by supporting the fire service in a variety of ways. <b>Caledon Community Services</b> offers several programs that support seniors in the Caledon community including Seniors Helping Seniors, a Health and Wellness Program, 24/7 Assisted Living, Transitional Care and Respite services. Caledon Community Services is an agency that can assist C.F.E.S. in disseminating public fire and life safety education materials among senior population in Caledon and identifying occupants who are at increased fire risk due to unsafe living conditions (e.g. absence of a working smoke alarm) which may require follow up or inspection.</p> <p>The C.F.E.S. can also partner with the <b>Caledon Seniors Recreation Centre</b> to assist in distributing public fire and life safety education to seniors in Caledon.</p>
Peel Victorian Order of Nurses (VON)	<p>V.O.N. Canada is a not-for-profit, charitable home and community care organization who’s nurses, therapists and other health care providers care for Canadians in their own homes providing services such as <b>Meals on Wheels</b> and <b>Supportive Housing</b> options. Volunteers who provide at-home care and assisted living services to seniors can be trained to assist the C.F.E.S. in identifying occupants who are at increased fire risk due to unsafe living conditions (e.g. absence of a working smoke alarm) which may require follow up or inspection.</p>
Peel Amateur Radio Club	<p>Local amateur radio club can provide communications support in the event of an emergency.</p>

## 9.0

## Economic Profile

As referenced in **O. Reg. 378/18**, the economic profile assessment includes analysis of the economic sectors affecting the community that are critical to its financial sustainability. This involves economic drivers in the community that have significant influence on the ability of the community to provide or maintain service levels. The following sections consider these economic characteristics within the Town of Caledon.

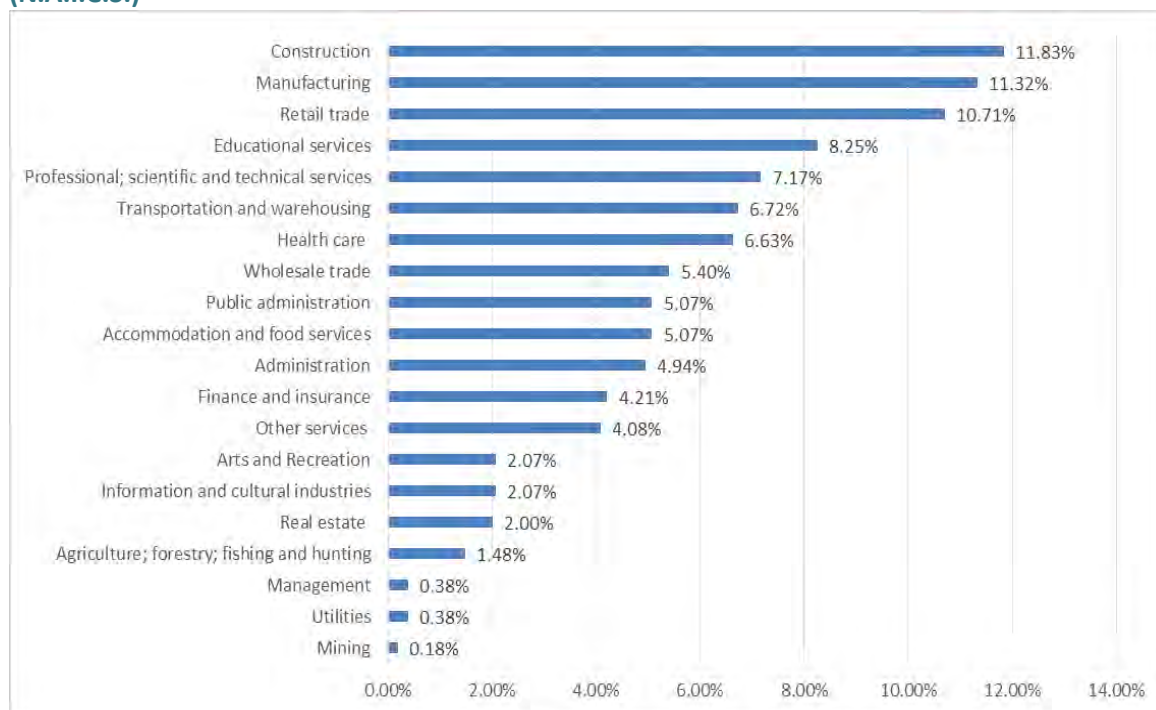
## 9.1

### Economic Sectors and Employers in Caledon

Certain industries, employers and events contribute to the financial sustainability and economic vitality of a community. A fire or other emergency at key sectors and employment facilities within a community could have significant impacts on local economy and employment.

Located within the GTA, the Town of Caledon is a strategic location to connect to world markets, and innovative labour force. The top industries that employ Caledon's labour force are summarized in **Figure 20** below. According to the Statistics Canada 2016 Census, over 33% of the labour force that lives in Caledon is part of the construction, manufacturing or retail trade industries. It should be noted that **Figure 20** statistics include the workforce from Caledon that commute to outside the Town for work.

**Figure 20: Labour Force by Industry in Caledon by North American Industry Classification System (N.A.I.C.S.)**



**Figure Source: 2016 Census, Statistics Canada<sup>38</sup>**

Caledon has been growing and diversifying its economic base by providing a foundation for growth sectors including advanced and industrial machinery manufacturing, food processing and agri-business, professional, management, scientific and technical services, specialized design and engineering services, and tourism.

Caledon's 2016 Competitive Analysis Report, identified that the transportation, warehousing, and construction sectors were leading performers and economic drivers helping the community build a sustainable economic base. The "Caledon 2020-2030, An Economic Development Strategy for the Town of Caledon" document adopted by Council in 2020 continues to identify the transportation, warehousing and the construction sectors as core sectors to the Town's economic growth. This strategy confirms the largest number of employment sectors within the Town include transportation and warehousing (19%), construction (19%) and professional, scientific and technical services (9%) industries. With a labour force of over five-thousand, the manufacturing industry accounts for approximately 3.7% of all businesses in

<sup>38</sup> Statistics Canada. 2017. Caledon, T [Census subdivision], Ontario and Ontario [Province] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. (Accessed July 26, 2020).

Caledon and over 54% of all exports. As part of the data collection process for this C.R.A., top employers were provided by the Town of Caledon.

**Table 26** identifies the sixteen largest employers as identified by the Town through the data collection process to develop this C.R.A. These employers provide a significant benefit to the Towns overall economic sustainability. Therefore, a significant fire or other emergency involving one of these employers sustainability may have an impact on this economic sector and the sectors that are supported by the innovation and research taking place within them.

**Table 26: Largest Employers in Caledon**

Employer	North American Industry Classification System (N.A.I.C.S.) Classification	Number of Employees
Amazon	Transportation and Warehousing	1,500
Husky	Manufacturing	1,200
Verdi Alliance Group of Companies	Construction	1,000
Canadian Tire (Distribution Centre)	Transportation and Warehousing	900
Town of Caledon	Municipal administration	750
Mars	Manufacturing	400
Delgant Limited	Construction	300
Rafat	Construction	250
GAP Canada	Transportation and Warehousing	213
Walmart	Retail trade	200
Sardo	Manufacturing	150
CCRW	Arts; Entertainment and Recreation	141
OPP	Public Administration	140
Cavalier Transportation	Transportation and Warehousing	130
Davis Centre	Healthcare and Social Assistance	110
A&G Road Cleaners	Construction	100

Source: Major Employers Spreadsheet, Town of Caledon

Source: Caledon Competitive Analysis Report, Town of Caledon

To reduce potential losses, the fire services can consider increasing public fire and life safety activities that focus on fire safety concerns within facilities or focus on fire safety inspections to reduce the probability of an incident occurring at one of these sites.

**Key Finding: The Town has identified top employers that contribute to the economic vitality of the community. If a fire were to occur at one of these facilities it could have a negative impact on the financial well-being of the Town.**

**Key Finding: The industries within Caledon that are experiencing significant growth and are major employers include the transportation, warehousing industries and the construction industry.**

## 10.0

## Past Loss and Event History Profile

As referenced in **O. Reg. 378/18**, the past loss and event history profile assessment includes the analysis of a community's past emergency response experience, including the number and types of emergency responses, the number of injuries and fatalities, the amount of dollar loss as a result of fires, and a comparison of the community's historical fire loss statistics with provincial fire loss statistics. The evaluation of previous emergency response data has shown to be an effective tool to inform a municipality's decision-making process with regards to future fire protection services and programs, including enhanced public fire and life safety education and fire safety inspection programs. The following sections consider these past loss and event history characteristics within the Town of Caledon.

## 10.1

### Past Loss

Analysis of a community's historical emergency response data provides valuable insight into understanding the specific fire protection trends that may be present. Expanding this analysis to include assessing the life safety and fire risks in relation to provincial statistics provides a foundation for evaluating where specific programs or services may further enhance the fire prosecution services being provided.

As a result of the current COVID-19 pandemic, the provincial historical fire related statistics are currently only available for the time period ending December 31<sup>st</sup>, 2018. Therefore, where provincial comparative analysis is presented within this section, it will focus primarily on the historical five-year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018. Where applicable, the statistical data for the year 2019 as provided by the C.F.E.S. will also be presented.

## 10.1.1

#### Total Fire Loss

Analysis of the total fire loss within the Town over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, as displayed in **Table 27**, includes three categories representing the primary types of fires and the total amount of dollar loss associated with these fires. This includes 151 structure fires, 14 outdoor fires, and 156 vehicle fires, accounting for \$25,962,341 in total dollar loss.

Over this five year period, Caledon averaged 64 fires per year, and \$5,192,468 in property loss per year. On average, 30 structure fires occurred each year, with an average structural fire property loss of \$4,053,586 per year.



**Table 27: Total Fire Loss – Town of Caledon**

	Structure		Outdoor		Vehicle		Total	
Year	# of Fires	Loss (\$)	# of Fires	Loss (\$)	# of Fires	Loss (\$)	# of Fires	Loss (\$)
2014	25	1,500,268	3	8,500	24	1,359,600	52	2,868,368
2015	32	6,169,300	0	0	30	752,600	62	6,921,900
2016	41	5,431,499	5	2,450	31	868,010	77	6,301,959
2017	26	2,500,700	4	13,100	28	1,166,100	58	3,679,900
2018	27	4,666,164	2	10,050	43	1,514,000	72	6,190,214
Total	151	20,267,931	14	34,100	156	5,660,310	321	25,962,341
% of All Fires	47.07%	78.07%	4.63%	0.13%	48.60%	21.80%	100%	100%
Average	30	4,053,586	3	6,820	31	1,132,062	64	6,580,954

Source: O.F.M.E.M. Standard Incident Reporting

**Table 28** compares the number of structure fires and the associated total property loss within the Town of Caledon for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 to the number of structure fires and total property loss that occurred across Ontario during the same period.

The Town of Caledon experienced an average of 30 structure fires per year over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup> 2018, representing an average of 9.41% of all fires that occurred within the Town during that time period. Over this same period, the Province experienced structure fires representing an average of 13.07% of all fires that occurred. The average of all fire loss in Caledon of 15.61% was lower than that of the Province of 17.88%.

**Table 28: Structure Fires and Property Loss – Town of Caledon and Province of Ontario**

	Town of Caledon				Province of Ontario			
Year	Structure Fires	Loss (\$)	% All Fires	% All Loss (\$)	Structure Fires	Loss (\$)	% All Fires	% All Loss (\$)
2014	25	1,500,268	6.56%	5.78%	7,065	784,681,080	13.14%	20.12%
2015	32	6,169,300	8.40%	23.76%	7,240	658,957,595	13.46%	16.89%
2016	41	5,431,499	10.76%	20.92%	7,169	654,514,771	13.33%	16.78%
2017	26	2,500,700	6.82%	9.63%	6,679	657,580,390	12.42%	16.86%
2018	27	4,666,164	7.09%	17.97%	7,000	732,673,155	13.02%	18.78%
Average	30	4,053,586	9.41%	15.61%	7,030.60	\$697,681,398	13.07%	17.88%
Total for Structure Fires	151	\$20,267,931	47.04%	78.07%	35,153	3,488,406,991	65.37%	89.42%
Total for All Fires with a Loss (Structure, Vehicle, Outdoor)	321	25,962,341	100%	100%	53,774	3,900,958,780	100%	100%

Source: O.F.M.E.M. Standard Incident Reporting

**Key Finding: Over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, the Town averaged 30 structure fires per year.**

### 10.1.2 Fires by Occupancy Type

This section assesses the structure fires that occurred over the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 based on the type of occupancy. Information retrieved from the O.F.M.E.M.'s Standard Incident Reporting was utilized to inform this analysis.

The analysis in **Table 29** indicates that during this period, Caledon experienced a total of 151 structure fires, 109 of these fires, or 72.19%, occurred in Group C -Residential occupancies. These fires account for 87.77% of the Town's total fire loss for this period. In comparison, structure fires in Group C-Residential Occupancies accounted for 73.49% of structure fires across the Province and 61.97% of all fire loss. Over this period, Caledon experienced a 1.3% lower rate of fires in Group C-Residential occupancies but a 25.8% higher dollar loss when compared with the Province.

The second most significant source of property loss in the Town accounting for 12.58% of structure fire loss and 9.14% of the total structure fires over the same period are Group F – Industrial occupancies (higher than the Provincial structure fire loss within this occupancy type by 5.08%).

Some of the trends within this historical fire loss reporting for the Town could be explained by the distribution of Property Stock by Major Occupancy classification within the Town. For example, as found within **Section 3.2.1 – Town of Caledon Existing Major Building Occupancy Classification Summary** of this C.R.A., 85.50% of the property stock classified by the Ontario Building Code is Group C – Residential. It is reasonable to expect that Group C would account for the highest proportion of structure fires. Similarly, Group D & E – Business & Mercantile occupancies account for 0.64% of occupancies and only 2.65% of structure fires.

**Table 29: Fires by O.B.C. Major Occupancy Classification – Town of Caledon and Province of Ontario 2014-2018**

Group	Occupancy Classification	Fires	Town of Caledon			Province of Ontario	
			% of Structure Fires	Fire Loss	% of Fire Loss	% of Structure Fires	% of Fire Loss
Group A	Assembly	2	1.32%	\$104,000	0.51%	3.92%	3.34%
Group B	Care or Detention	0	0.00%	\$0	0.00%	1.45%	1.61%
Group C	Residential	109	72.19%	\$17,788,623	87.77%	73.49%	61.97%
Group D	Business and Personal services	3	1.99%	\$13,100	0.06%	2.47%	2.28%
Group E	Mercantile	1	0.66%	\$2,500	0.01%	3.35%	4.86%
Group F	Industrial	19	12.58%	\$1,853,500	9.14%	7.50%	18.43%
Other	Not Classified within the O.B.C.	10	6.62%	\$224,200	1.11%	5.15%	1.17%
Farm	Classified within the N.F.B.C.	7	4.64%	\$282,008	1.39%	2.67%	6.35%
Total		151	100%	\$20,267,931	100%	100.00%	100.00%

Source: O.F.M.E.M. Standard Incident Reporting

**Key Finding:** Over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 Caledon experienced a total of 109 structure fires in Group C - Residential occupancies (72.19%). This accounts for 87.77% of the Town's total fire loss for this period, which is 25.91% higher than the proportion of fire loss for Group C-Residential occupancies in the Province (61.97%).

**Key Finding:** Over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 structure fires occurring in Group F – Industrial occupancies accounted for 12.58% (19) of total structure fires within the Town.

**Key Finding:** Over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 structure fires occurring in Group F – Industrial occupancies account for 9.14% (\$1,853,500) of total structure fire loss within the Town, higher than the Province by 5.08%.

### 10.1.3 Civilian Fire Fatalities and Injuries

As shown in **Table 30**, according to O.F.M.E.M. Standard Incident Reporting, over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, there were four reported injuries and one reported fire fatality within the Town of Caledon. All of the injuries and the fatality occurred in Group C – Residential occupancies. This finding is consistent with the fire loss statistics by occupancy type, whereby the majority of fire losses within the Province and within the Town occurred in Group C – Residential occupancies.

**Table 30: Civilian Fire Fatalities and Injuries by O.B.C. Major Occupancy Classification - Town of Caledon**

Group	Occupancy Classification	Injuries	Fatalities
Group A	Assembly	0	0
Group B	Care or Detention	0	0
Group C	Residential	4	1
Group D	Business and Personal services	0	0
Group E	Mercantile	0	0
Group F	Industrial	0	0
Other	Not Classified within the O.B.C.	0	0
Total		4	1

Source: O.F.M.E.M. Standard Incident Reporting

**Key Finding:** From January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, there were four reported injuries and one reported fire fatality within the Town of Caledon, all of which occurred in Group C – Residential occupancies.

### 10.1.4 Reported Fire Cause

The N.F.P.A. defines fire cause as “the circumstances, conditions, or agencies that bring together a fuel, ignition source, and oxidizer (such as air or oxygen) resulting in a fire or a combustion explosion.”<sup>39</sup> Assessing the possible cause of the fires reported is an important factor in identifying potential trends or areas that may be considered for introducing additional public education or fire prevention initiatives. Within O.F.M.E.M. fire loss reporting, there are four categories of cause used to classify the cause of a fire. These include intentional, unintentional, other, and undetermined.

**Table 31** presents the reported fire causes for the Town compared to the Province over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018.

The “intentional” category recognizes the cause of a fire to be started for a specific reason. These are typically classified as arson fires, acts of vandalism, or to achieve personal gain. As indicated in **Table 31**, 7.05% of the fires reported (arson and vandalism combined) during the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 were classified as intentional, which is similar to the Provincial total of intentional fires (7.77%).

The “unintentional” category recognizes a number of the common causes of a fire that represent both human behavioural causes (e.g., playing with matches) and equipment failures (e.g., mechanical failure). In total, unintentional fire causes represented 70.86% of the cause for the 107 fires during this period (compared to 68.09% within the Province). This suggests a need for targeted education programs about fire causes and prevention. The leading cause of unintentional fires in Caledon occurred due to mechanical/electrical failure at 25.83% (39 fires), compared to 15.45% in the Province, followed by misuse of ignition source at 21.85% (33 fires), compared to 29.96% in the Province.

During this same period, 20.59% of fires within the Town of Caledon were classified as “undetermined” fire cause. It is understood that the destruction caused by a fire may leave little or no evidence from which to draw clear conclusions, leading fire department staff to deem the fire cause as undetermined. Although C.F.E.S. has a similar proportion of undetermined fires to the rest of the Province (20.59% and 18.58% respectively), additional training for those responsible for performing fire investigations and overhaul operations may be worth consideration. Such training may enable C.F.E.S. staff to identify a higher percentage of fires, and preserve evidence at a fire scene, enabling deeper analysis of fire trends within the community, and further enabling fire prevention and public education staff to best align activities and programs. This will be discussed further in the Fire Master Plan.

The percentage of fires determined to be attributed to design/construction/maintenance deficiency was 13.53%, higher than the Provincial statistic of 7.37% for the same fire cause. This may suggest there is

<sup>39</sup> Source: N.F.P.A., Glossary of Terms, 2019 Edition.

opportunity to explore targeted public education and fire prevention initiatives with the building department and local trade organizations.

**Table 31: Reported Fire Cause – Town of Caledon and Province of Ontario**

Nature	Fire Cause	Town of Caledon		Ontario	
		# of Fires	% of Fires	# of Fires	% of Fires
Intentional	Arson	9	5.29%	2,107	5.99%
Intentional	Vandalism	2	1.76%	616	1.75%
Intentional	Other Intentional	0	0%	12	0.03%
Unintentional	Children Playing	1	0.59%	138	0.39%
Unintentional	Design/Construction/ Maintenance Deficiency	21	13.53%	2,590	7.37%
Unintentional	Mechanical/Electrical Failure	39	25.88%	5,432	15.45%
Unintentional	Misuse of Ignition Source	33	22.94%	10,532	29.96%
Unintentional	Other Unintentional	4	2.35%	2,483	7.06%
Unintentional	Undetermined	9	5.29%	2,735	7.78%
Unintentional	Vehicle Collision	0	0%	25	0.07%
Other	Other	2	1.76%	1,904	5.42%
Undetermined	Undetermined	31	20.59%	6,532	18.58%
Unknown, not reported	Unknown, not reported	0	0%	47	0.13%
Total		151	100.00%	35,153	100.00%

Source: O.F.M.E.M. Standard Incident Reporting

**Key Finding:** The percentage of fires determined to have been attributed to design/construction/maintenance deficiency by C.F.E.S. is 13.53%, higher than the Provincial statistic of 7.37% for the same period.

**Key Finding:** Of the fires occurring in the Town over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, the leading cause of unintentionally set fires was due to mechanical/electrical failure at 25.88% (107 fires), compared to 15.45% (5,432 fires) in the Province.

**Key Finding:** Of the fires occurring in the Town over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, the second most common cause of unintentionally set fires was due to misuse of ignition source at 22.94% compared to 29.96% in the Province.

**Key Finding:** Of the fires occurring in the Town over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, 20.59% were classified as having an “undetermined” fire cause.

## 10.1.5 Ignition Source

According to the 2019 N.F.P.A. Glossary of Terms, ignition source is defined as “any item or substance capable of an energy release of type and magnitude sufficient to ignite any flammable mixture of gases or vapors that could occur at the site or onboard the vehicle.”<sup>40</sup> Table 32 provides fire loss by source of ignition for the Town of Caledon and the Province.

The most common reported ignition sources within the Town are “electrical distribution” at 16.56% (higher than the Province by 7.67%), “miscellaneous” at 13.91% (higher than the Province by 4.00%), “Open flame/tools/smokers articles” at 11.26% (lower than the Province by 2.46%), “Heating Equipment, chimney, etc.” at 10.60% (higher than the Province by 2.78%), and Cooking Equipment at 10.60% (lower than the Province by 7.12%). This presents the opportunity to incorporate key messages electrical distribution and heating equipment in public education materials.

**Table 32: Source of Ignition - Town of Caledon and Province of Ontario**

Reported Ignition Source	Town of Caledon		Ontario	
	# of Fires	% of Fires	# of Fires	% of Fires
Appliances	8	5.30%	1,635	4.65%
Cooking Equipment	16	10.60%	6,228	17.72%
Electrical Distribution	25	16.56%	3,125	8.89%
Heating Equipment, chimney etc.	16	10.60%	2,750	7.82%
Lighting Equipment	5	3.31%	1,101	3.13%
Open flame tools/smokers articles	17	11.26%	4,822	13.72%
Other electrical/mechanical	11	7.28%	1,667	4.74%
Processing Equipment	4	2.65%	441	1.25%
Miscellaneous	21	13.91%	3,485	9.91%
Exposure	0	0%	1,634	4.65%
Undetermined	28	18.54%	8,210	23.36%
Unknown, not reported	0	0%	55	0.16%
Total	151	100.00%	35,153	100.00%

Source: O.F.M.E.M. Standard Incident Reporting

**Key Finding: Of the fires occurring within the Town over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, 16.56% of the fires had a reported ignition source of “electrical distribution”, which is 7.67% higher than the Province (8.89%).**

<sup>40</sup> Source: N.F.P.A. Glossary of Terms, 2019 Edition.



**Key Finding:** Of the fires occurring within the Town over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, 11.26% of the fires had a reported ignition source of “open flame tools/smokers articles”, which is 2.46% lower than the Province (13.72%).

**Key Finding:** Of the fires occurring within the Town over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, 10.60% of the fires had a reported ignition source of “Heating Equipment, chimney, etc.”, which is 2.78% higher than the Province (7.82%).

### 10.1.6 Smoke Alarm Status Processing Equipment

Smoke alarms are required on every level of a dwelling in the Province of Ontario and are the first line of defence against the negative consequence of a fire. As a result, smoke alarm programs and compliance are a key component of public education and fire prevention activities provided by the municipal fire departments across the Province.

Data is publically available at the provincial level for the smoke alarm status in the event of a fire and municipalities collect smoke alarm status information and report it to the Province. This data was provided by the O.F.M.E.M. as part of the C.R.A. for the Town of Caledon and the Province of Ontario over a five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 for Group C - Residential occupancies. **Table 33** highlights whether a smoke alarm was present and operating on the floor or in the suite of fire origin.

**Table 33: Smoke Alarm Presence and Operation on the Floor of Fire Origin - Town of Caledon and Province of Ontario**

Town of Caledon								Ontario	
Smoke Alarm Status on Floor of Origin	2014	2015	2016	2017	2018	Total	%	Total	%
No Smoke Alarm Present	3	2	1	2	4	12	11.54%	4,289	17.31%
Smoke Alarm Present And Operated	8	10	10	5	5	38	36.54%	11,044	44.57%
Smoke Alarm Present, Did Not Operate	4	3	7	2	2	18	17.31%	3,467	13.99%
Smoke Alarm Present, Operation Undetermined	2	1	3	2	2	10	9.62%	1,907	7.70%
Smoke Alarm Presence Undetermined	4	6	7	4	5	26	25.00%	4,014	16.20%
Unknown, not reported	0	0	0	0	0	0	N/A	59	0.24%

Source: O.F.M.E.M. Standard Incident Reporting

Over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, there was no smoke alarm present for 11.54% of occurrences in the Town compared to 17.31% in the Province. A further 18 incidents (or 17.31%) had a smoke alarm present but it did not operate (compared to 13.99% in the Province). During the same time period, smoke alarm presence was undetermined by C.F.E.S. in 25% of occurrences, 8.8% higher than the Province.

This analysis indicates that over this five year period smoke alarms were found to be present and operational in only 36.54% of the fire related incidents in the Town of Caledon. This indicates that in 63.46% of the fire related incidents the occupancies involved did not have the working smoke alarms required in the Province of Ontario. The absence of working smoke alarms as required in Ontario results in a higher level of public fire safety risk.

Smoke alarm presence or operation combined was undetermined in 25.00% of instances in the Town. Provincial and local statistics support having a targeted and proactive smoke alarm program in place and suggest the need for increased enforcement strategies for those properties that are non-compliant.

**Identified Risk:** Over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, in 63.46% of the fire related incidents the occupancies involved did not have the working smoke alarms required in the Province of Ontario.

**Key Finding:** Over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, of the fire loss incidents in Group C – Residential occupancies, 11.54% of incidents did not have a smoke alarm present compared to 17.31% in the Province.

**Key Finding:** Over the five year period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, of the fire loss incidents in Group C – Residential occupancies, 36.54% of incidents had a smoke alarm present and operating compared to 44.57% in the Province.

## 10.2 Event History

The analysis of the Town's historical emergency response event history provides a statistical assessment of the historical emergency call volumes through assessing different time segments (e.g. annual calls, monthly calls, weekly calls, daily calls, types of calls etc.). As referenced previously in this report, as a result of the current COVID-19 pandemic, the provincial historical fire related statistics are currently only available for the time period ending December 31<sup>st</sup>, 2018. Therefore, the provincial comparative analysis presented in this section includes a comparison of the provincial historical emergency response event history in comparison to that of the Town of Caledon for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 only. Additional analysis for the Town of Caledon's event history for 2019 is presented separately without comparison to the Province.

The volume and frequency of historical emergency calls is beneficial to informing an understanding of emergency response probability. Knowledge of the types of emergency calls is beneficial to informing

the potential consequences of C.F.E.S. responses and calls for service. The combined consideration of these elements provides an understanding of community fire related risk, based on past calls for service.

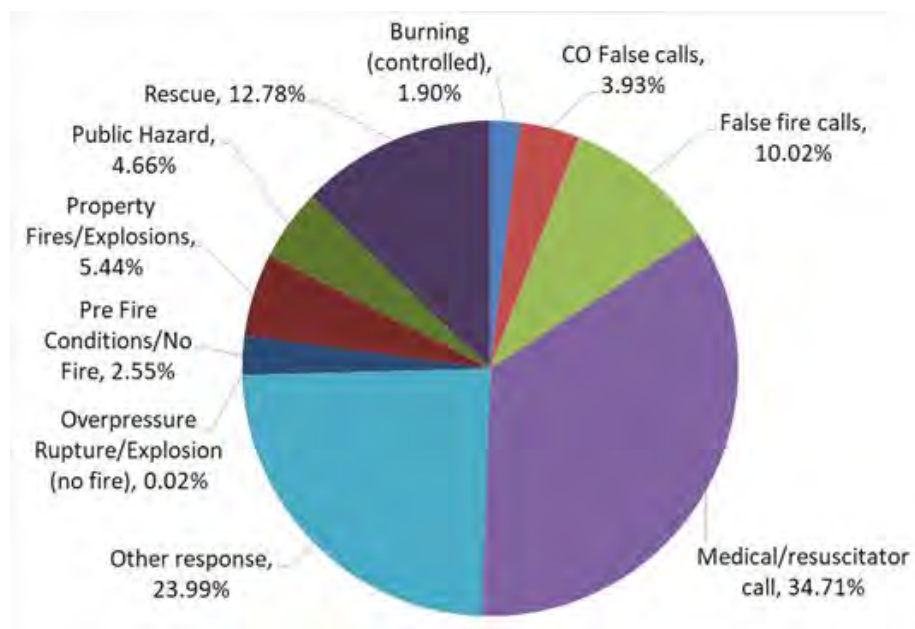
### 10.2.1 Total Emergency Call Volume Caledon/Ontario Comparison – All Incident Types

This section illustrates the analysis of total emergency call volume of the Town of Caledon in comparison to the Province of Ontario for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 by the designated O.F.M.E.M. emergency response codes.

**Figure 21** illustrates that from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 the highest percentage of emergency response calls in Caledon were ‘medical/resuscitator’ calls representing 34.71% of the total emergency call volume. The second highest percentage of emergency responses was related to ‘other responses’ representing 23.99% of the total emergency call volume. It is important to note that the O.F.M.E.M. assignment of response codes can result in some initial responses that are defined as ‘medical/resuscitator’ calls being reported as ‘other responses’. This is because the O.F.M.E.M. definition of ‘other responses’ includes emergency calls canceled on route and assistance not required by another agency, that in many instances in Caledon include a response to a ‘medical resuscitator’ emergency call.

‘False fire calls’ represented 10.02% of the total emergency call volume for this same five year period, and ‘property fire/explosions’ calls represented 5.44% of the total emergency call volume.

**Figure 21: Town of Caledon – Total Emergency Call Volume by O.F.M.E.M. Response Type - January 1st, 2014 to December 31st, 2018**



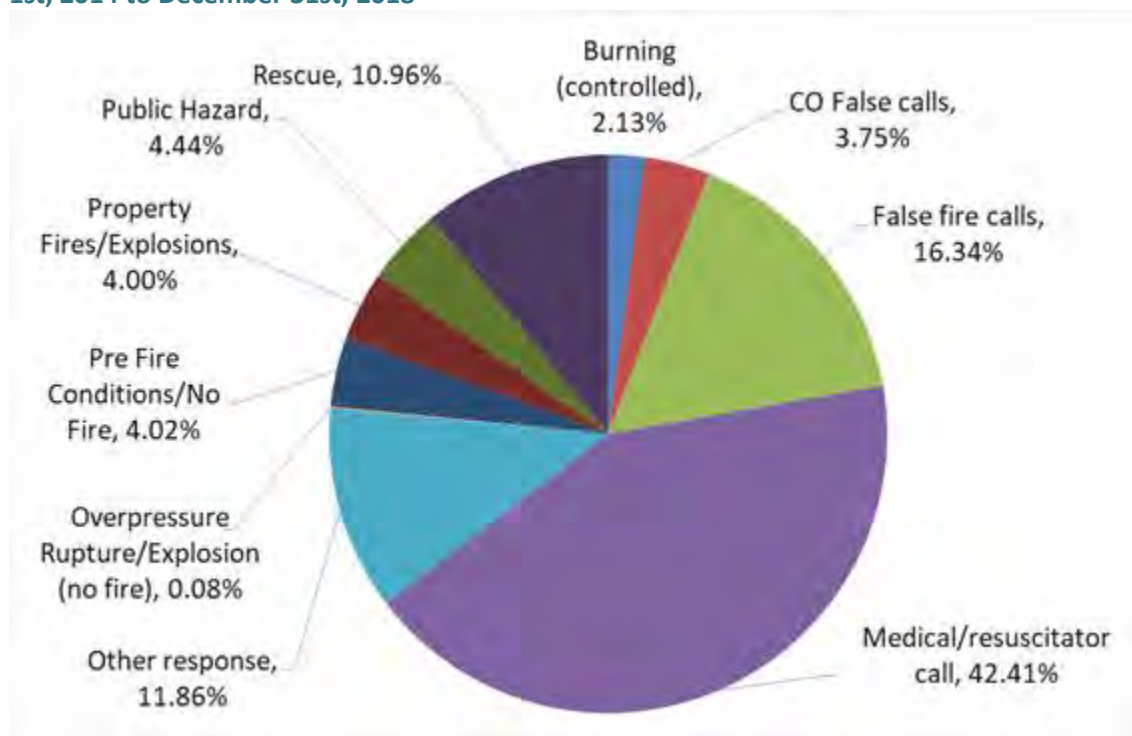
**Figure Source: Office of the Fire Marshal and Emergency Management, Municipal Emergency Calls by Response Type Class**

**Figure 22** illustrates the total emergency call volume by O.F.M.E.M. response type for the same period for that of the province. This comparison illustrates that ‘medical/resuscitator’ calls were also responsible for the highest percentage of all responses in the province representing 42.41% of the total emergency call volume, 7.7% higher than that of Caledon.

However, ‘other responses’ in Ontario represented only 11.86% of the total emergency call volume in comparison to 23.99% in Caledon, representing a 12.13% difference. This difference is a further indicator of the potential assignment of the O.F.M.E.M. response codes that include emergency calls canceled on route and assistance not required by other agencies that are included in the ‘other response’ code and may be applied differently across the Province.

This analysis also indicates that other fire services across the Province have experienced a higher call volume (16.34%) of historical ‘false fire calls’ in comparison to Caledon’s experience of 10.02%. Whereas Caledon had experienced a slightly higher percentage of historical ‘property fire/explosion’ calls (5.44%) than that of the province (4.00%).

**Figure 22: Province of Ontario – Total Emergency Call Volume by O.F.M.E.M. Response Type - January 1st, 2014 to December 31st, 2018**



**Figure Source: Office of the Fire Marshal and Emergency Management, Municipal Emergency Calls by Response Type Class**

**Key Finding:** For the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, ‘medical/resuscitator’ calls represented the highest percentage of the total emergency all volume for both Caledon and the Province (Caledon 34.71% compared to the Province 42.41%).

**Key Finding:** For the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, Caledon had a lower percentage of 'false fire calls' than that of the Province (Caledon 10.02% compared to the Province 16.44%).

**Key Finding:** For the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018, Caledon had a higher percentage of 'property fire/explosion' calls (Caledon 5.44% compared to the Province 4.00%).

## 10.2.2 Total Emergency Call Volume Town of Caledon – All Incident Types

This section presents the analysis of the Town of Caledon's total historical emergency call volume by year, month, day of week, and time of day for all types of incidents responded to by C.F.E.S. for the time period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019.<sup>41</sup>

### 10.2.2.1 Annual Emergency Call Volume – All Incident Types

The analysis of annual emergency call volume can be beneficial in garnering an understanding of where trends may be evolving, or changes in community emergency response demand may be occurring. A summary of the total number of emergency calls for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019 is shown in **Table 34**.

**Table 34: Total C.F.E.S. Calls by O.F.M.E.M. Response Type January 1st, 2014 to December 31st, 2019**

O.F.M.E.M. Response Type	2014	2015	2016	2017	2018	2019	Total	%
Burning (controlled)	57	44	61	46	37	40	285	1.85%
CO False calls	90	95	111	88	109	84	577	3.75%
False fire calls	270	231	224	265	304	316	1610	10.47%
Medical/resuscitator call	690	770	992	1018	981	1127	5578	36.27%
Other response	540	621	591	632	646	290	3320	21.59%
Overpressure Rupture/Explosion (no fire)	0	0	1	1	0	1	3	0.02%
Pre Fire Conditions/No Fire	59	62	68	72	63	65	389	2.53%
Property Fires/Explosions	97	154	177	118	151	114	811	5.27%
Public Hazard	104	106	163	95	137	102	707	4.60%

<sup>41</sup> The data used for the analysis is a compilation of each of the 6 years (2014-2019) of unit response times reports. For the majority of statistics, only the first truck is considered; this is to ensure a single incident is not counted multiple times as this would not provide an accurate representation of the data. To determine which entries were the first truck entries, the dataset was sorted by Call Time and Arrival Time. The first entry for each incident number was included in the First Truck dataset. The second entry for each incident number was assumed to be the second truck. It should also be noted that calls from stations outside of Caledon were excluded from the analysis. Similarly, all calls with either zero or more than one response type code were excluded from response type analyses.

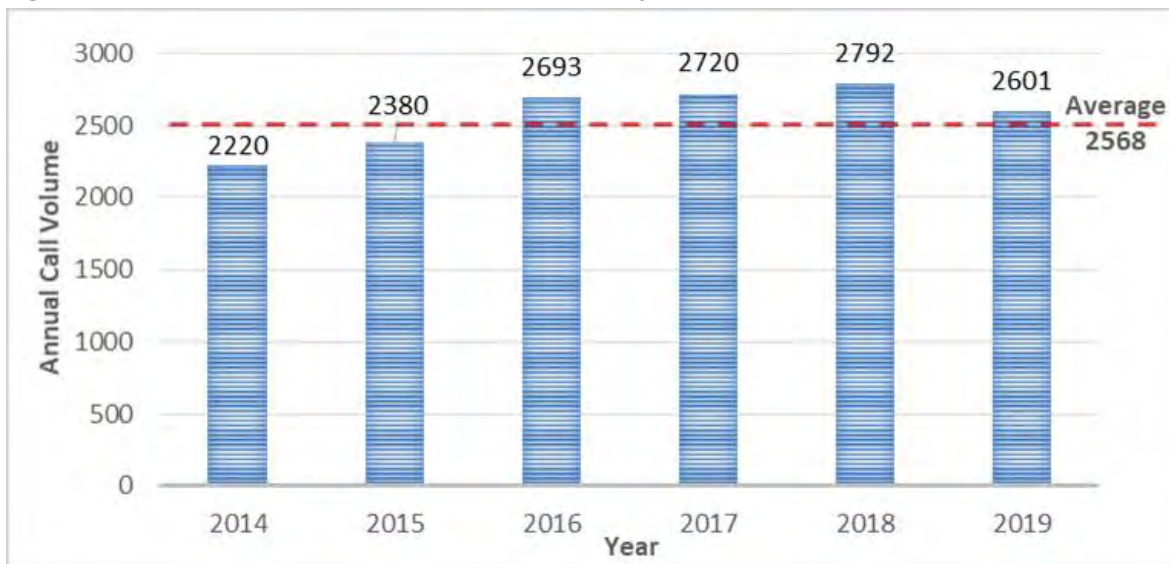
O.F.M.E.M. Response Type	2014	2015	2016	2017	2018	2019	Total	%
Rescue	313	297	305	378	353	452	2098	13.64%
Total	2,220	2,380	2,693	2,720	2,792	2,601	15378	100.00%

Source: C.F.E.S.

**Figure 23** illustrates Caledon's historical total annual emergency call volume by year for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019. This analysis indicates that during this period the total emergency call volume increased from 2,220 to 2,601 total calls representing a 17.16% increase. In 2019, the total emergency call volume declined by 6.84% from 2,792 calls in 2018 to 2,601 calls in 2019. In consultation with C.F.E.S. senior staff, this decline can largely be attributed to the revisions made to the Tiered Response Agreement with the Peel Region Paramedic Services in 2018 that has reduced the number of medical/resuscitator calls the C.F.E.S. is responding to. Due to the application of the O.F.M.E.M. response codes this decline is evidenced in the reduction in the number of 'other responses' category.

Although the total annual emergency call volume decreased from 2018 to 2019 by 6.84%, the 2,601 total emergency calls in 2019 remains 1.28% higher than the average total annual emergency call volume of 2,568 calls per year over this six year period. This may be attributable to the Town's population growth during this time period.

**Figure 23: Annual Call Volume – All Incidents January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019**



**Figure Source: Caledon Fire and Emergency Services Emergency Response Call Data**

**Key Finding:** Over the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019 the total volume of emergency calls responded to by the Caledon Fire and Emergency Services has increased by 17.16%.

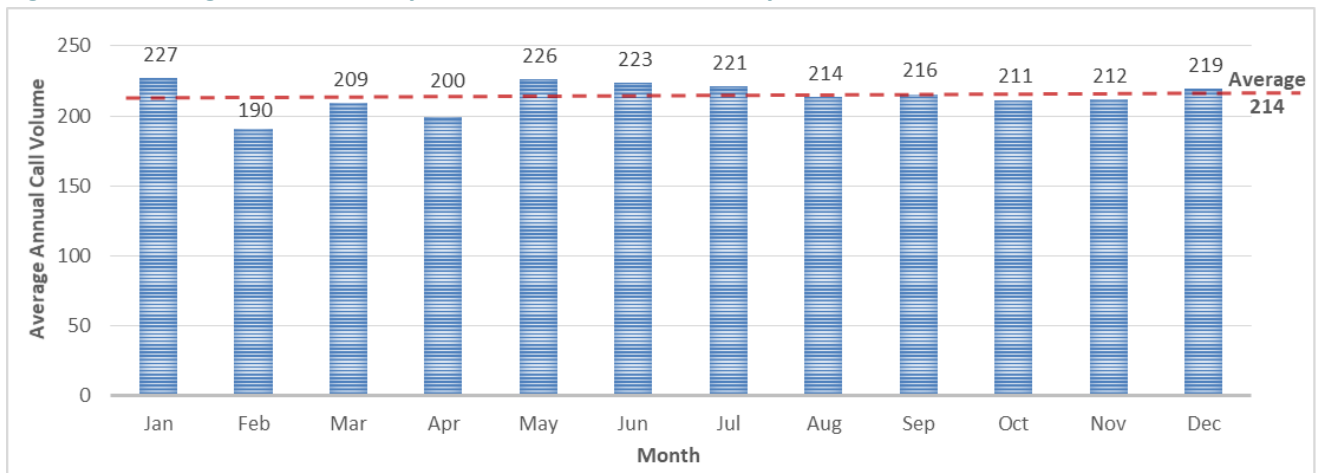


**Key Finding:** Over the period from January 1<sup>st</sup>, 2018 to December 31<sup>st</sup>, 2019 the total annual emergency call volume decreased by 6.8% as a result of revisions to the Town's Tiered Response Agreement.

#### 10.2.2.2 Monthly Average Emergency Call Volume – All Incident Types

The analysis of average emergency call volume by month of the year can be beneficial to identifying any potential variances that may be associated with seasonal trends related to activities such as more motor vehicle travel during summer months, or use of heating devices during winter months. An analysis of the average monthly call volume from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019 illustrates an average monthly emergency call volume of 214 calls. Average monthly call volume is observed to be highest in January and May.

**Figure 24: Average Call Volume by Month – All Incident January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019**



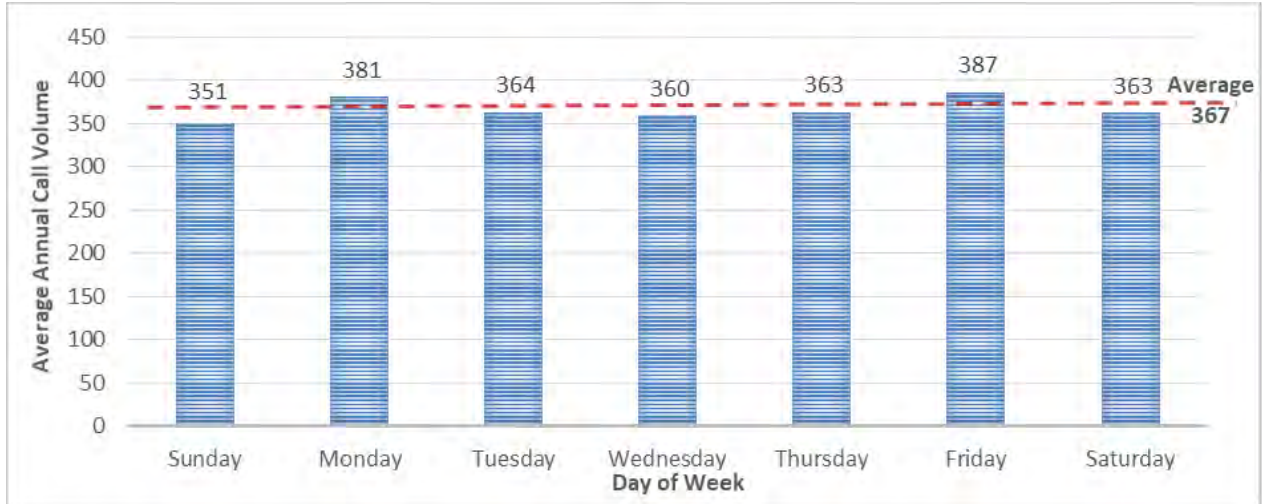
**Figure Source:** Caledon Fire and Emergency Services Emergency Response Call Data

#### 10.2.2.3 Weekly Average Emergency Call Volume – All Incident Types

The analysis of average call volume for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019 by day of the week as shown in **Figure 25** illustrates that on average the highest emergency call volume occurs on Fridays and Mondays, while the lowest emergency call volume occurs on Sundays.



**Figure 25: Average Call Volume by Day of Week – All Incidents January 1st, 2014 to December 31st, 2019**



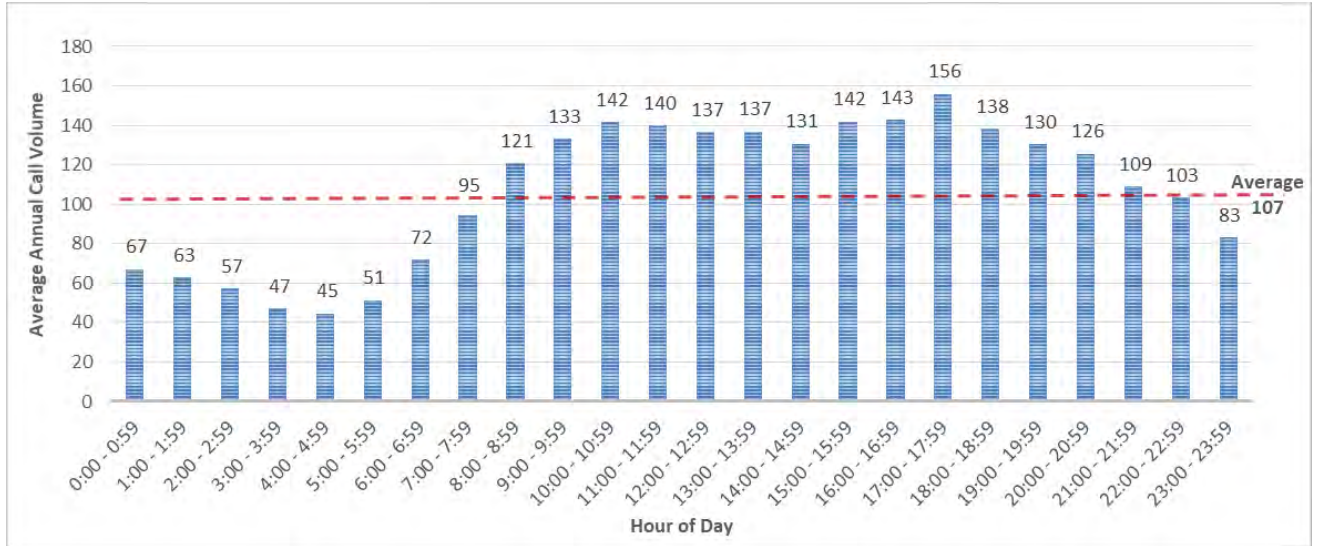
**Figure Source: Caledon Fire and Emergency Services Emergency Response Call Data**

#### 10.2.2.4 Daily Emergency Call Volume – All Incident Types

**Figure 26** indicates that for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019 a higher emergency call volume is typically experienced between 8 A.M. and 9 P.M, with the largest average call volume occurring between 5 P.M. and 6 P.M. The lowest percentage of emergency call volume typically takes place between the hours of 11 P.M. and 7 A.M., with the lowest average call volume occurring between 4 A.M. and 5 A.M.

These trends can be directly associated to when the majority of the population is awake and mobile during the day light hours and when they are resting or sleeping at night.

**Figure 26: Average Call Volume by Time of Day – All Incidents January 1st, 2014 to December 31st, 2019**



**Figure Source: Caledon Fire and Emergency Services Emergency Response Call Data**

### 10.2.3 Emergency Call Volume – Spatial Modelling

The analysis within this section illustrates the distribution of the emergency call volume within the Town for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019. The analysis includes the spatial distribution of all emergency incidents that occurred during this period based on the O.F.M.E.M. response types including medical/resuscitator, rescue, false fire and fire /explosions incidents over this six year period.

#### 10.2.3.1 Spatial Modelling – All Emergency Incidents

**Figure 27** illustrates the distribution and an overview of the concentration of all emergency incidents that occurred within the Town over this six year period. There is a noticeable higher concentration of incidents located in Bolton in residential areas, and in commercial areas along Highway 50 southeast of Fire Station 302. There are other smaller areas of incident concentrations across the Town, which are primarily located in settlement areas northwest of Mayfield Road, and northeast of Airport Road.

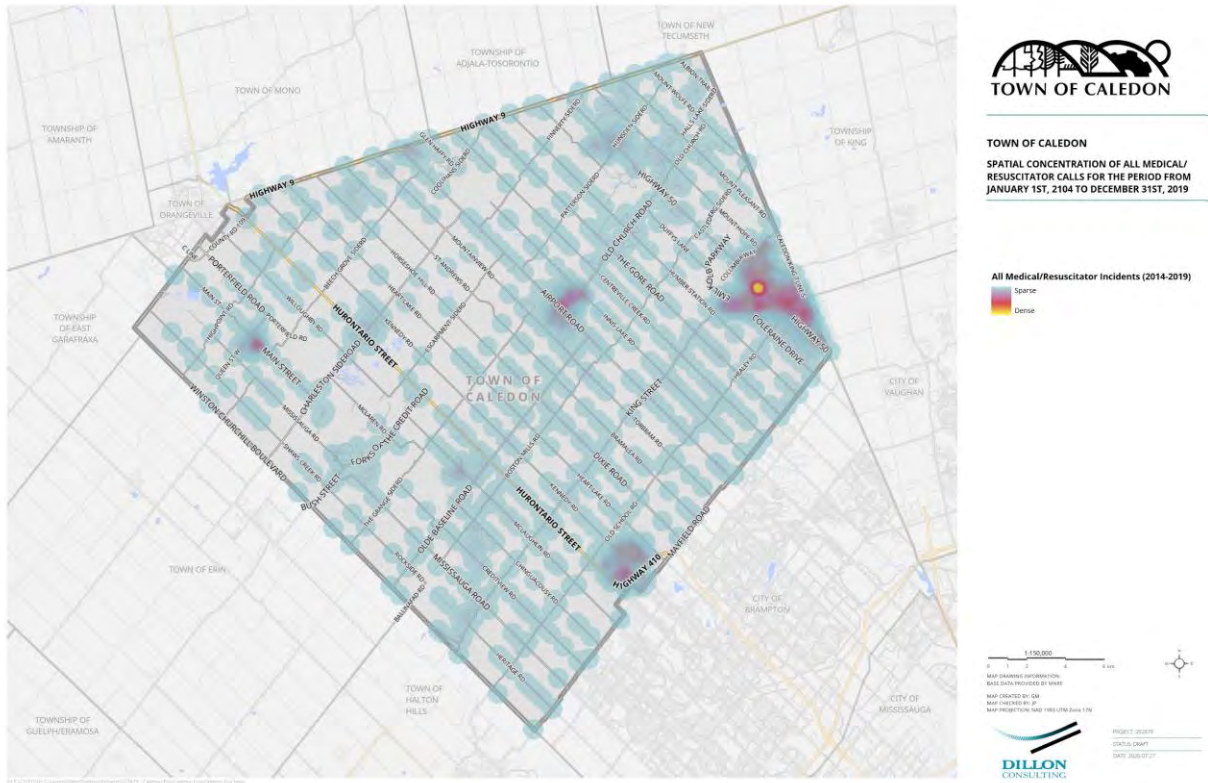
Figure 27: Spatial Concentration – All Emergency Incidents



### 10.2.3.2 Spatial Modelling – Medical/Resuscitator Incidents

**Figure 28** illustrates the distribution and concentration of medical/resuscitator incidents that occurred within Caledon over a six year period. There are noticeable concentrations of medical/resuscitator calls in Bolton near the commercial areas at the corner of Highway 50 (Queen St.) and Highway 9 (King St.), southeast of Fire Station 302. There are other smaller areas of medical/resuscitator call concentrations across the Town, which are primarily located northwest of Mayfield Road, and northeast of Airport Road.

Figure 28: Spatial Concentration – Medical/Resuscitator Incidents



## 10.2.3.3 Spatial Modelling – Rescue Incidents

**Table 35** presents the types of rescue incidents that C.F.E.S. responded to during this six year period. This table indicates that 97.43% of the rescue incidents were related to motor vehicle collisions.

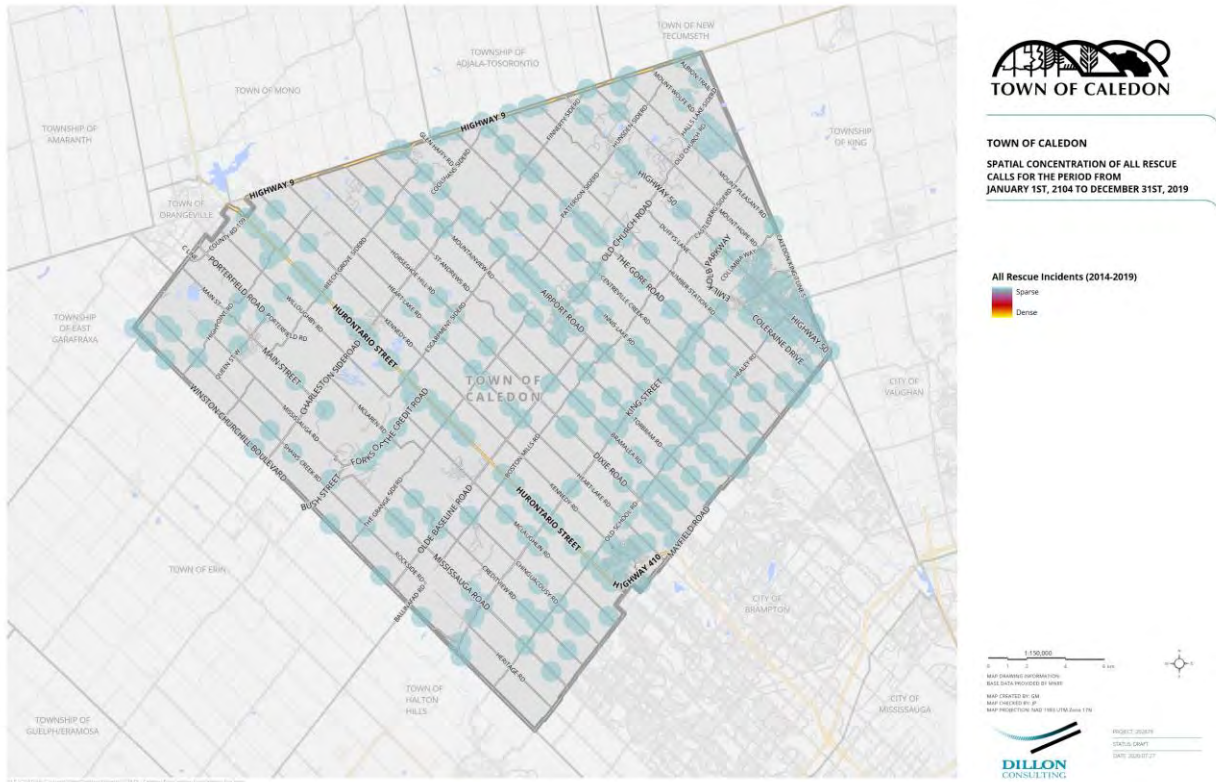
Similarly, **Figure 29** illustrates the distribution and concentration of the locations of rescue calls in Caledon occurring between January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019. As shown in **Figure 29**, the majority of rescue calls are distributed along transportation corridors including Highway 410 and Hurontario Street, Airport Road, and along Highway 50 in Bolton.

**Table 35: Rescue Incidents - Analysis**

Response Type	Number of Calls	% of Calls
Animal rescue	4	0.19%
Commercial/Industrial Accident	10	0.48%
High angle rescue (non-fire)	1	0.05%
Home/Residential Accident	3	0.14%
Other Rescue	19	0.91%
Persons Trapped in Elevator	9	0.43%
Rescue false alarm	1	0.05%
Rescue no action required	1	0.05%
Vehicle Collision	1958	93.33%
Vehicle Extrication	86	4.10%
Water Ice Rescue	1	0.05%
Water Rescue	5	0.24%
Source: C.F.E.S		



Figure 29: Spatial Concentration – Rescue Incidents

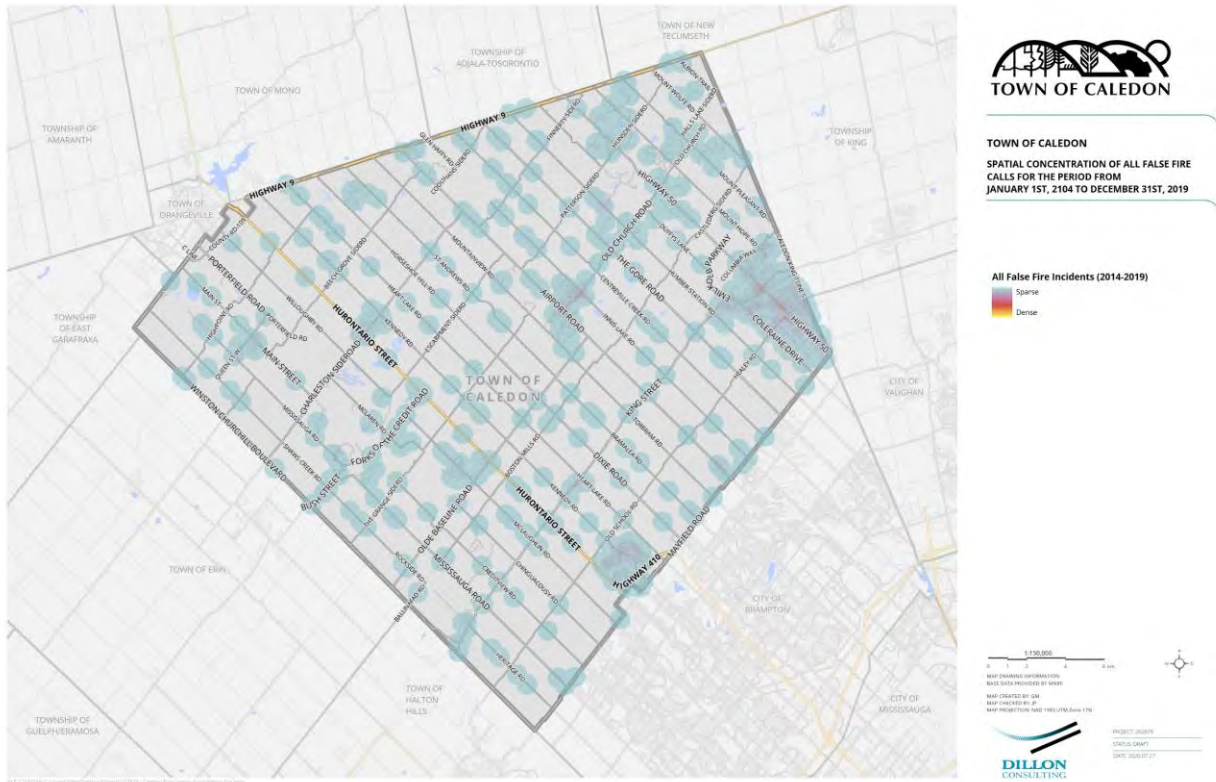




#### 10.2.3.4 Spatial Modelling – False Fire Incidents

**Figure 30** illustrates the distribution and an overview of the concentration of the locations where the false fire incidents occurred during the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019. During this six year period, false fire calls accounted for 10.47% of C.F.E.S. total emergency call volume. This figure illustrates smaller concentrations of false fire calls in Bolton, and northwest of Mayfield Road.

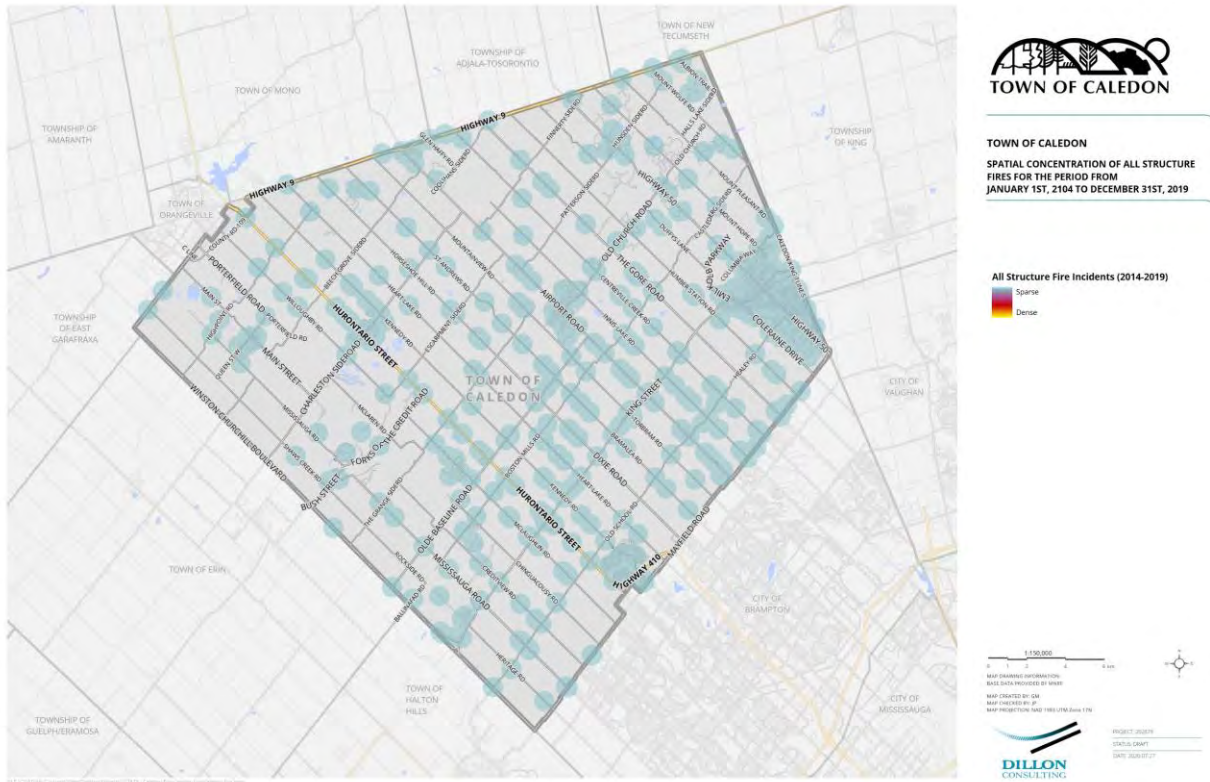
Figure 30: Spatial Concentration – False Fire Incidents



#### 10.2.3.5 Spatial Modelling – Fire/Explosion Incidents

**Figure 31** illustrates the distribution and concentration of the locations where fire/explosion calls occurred during the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019. During this six year period, property fire/explosion incidents accounted for 5.27% of C.F.E.S. total emergency call volume. This analysis illustrates that the property fire/explosion calls had a relatively consistent concentration throughout Caledon, and a denser occurrence of incidents in the southeast portion of the Town, specifically in the settlement area of Bolton and northwest of Mayfield Road.

Figure 31: Spatial Concentration – Fire/Explosion Incidents



#### 10.2.4 Emergency Call Volume – Summary

The spatial analysis of the Town's historical emergency call volume for the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2019 indicates a consistent distribution of emergency call types throughout the Town of Caledon, with concentrations of emergency calls in Bolton, northeast of Airport Road and northwest of Mayfield Road. Settlement areas that are observed to have a higher concentration of emergency call volume including medical/resuscitator, false fire, and property fire/explosion include Bolton (near Fire Station 302), Caledon East (near Fire Station 303), Mayfield West (near Fire Station 307), and Alton (near Fire Station 301). Emergency calls in rural areas appear to be less dense and randomly distributed, with a slightly higher density towards the southeast of the Town. The exception to this is an increase in the occurrence of rescue calls occurring along transportation corridors including Hurontario Street, Airport Road, and Highway 50 in Bolton.

**Identified Risk:** For the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 there is a higher concentration of medical/resuscitator, false fire and fire/explosion calls in the areas of Bolton (Fire Station 302), Caledon East (Fire Station 303), Mayfield West (Fire Station 307), and Alton (Fire Station 301).

**Key Finding:** For the period from January 1<sup>st</sup>, 2014 to December 31<sup>st</sup>, 2018 there are higher concentrations of rescue incidents involving motor vehicle collisions and vehicle extrication along Hurontario Street (Highway 10), Airport Road, and Highway 50.

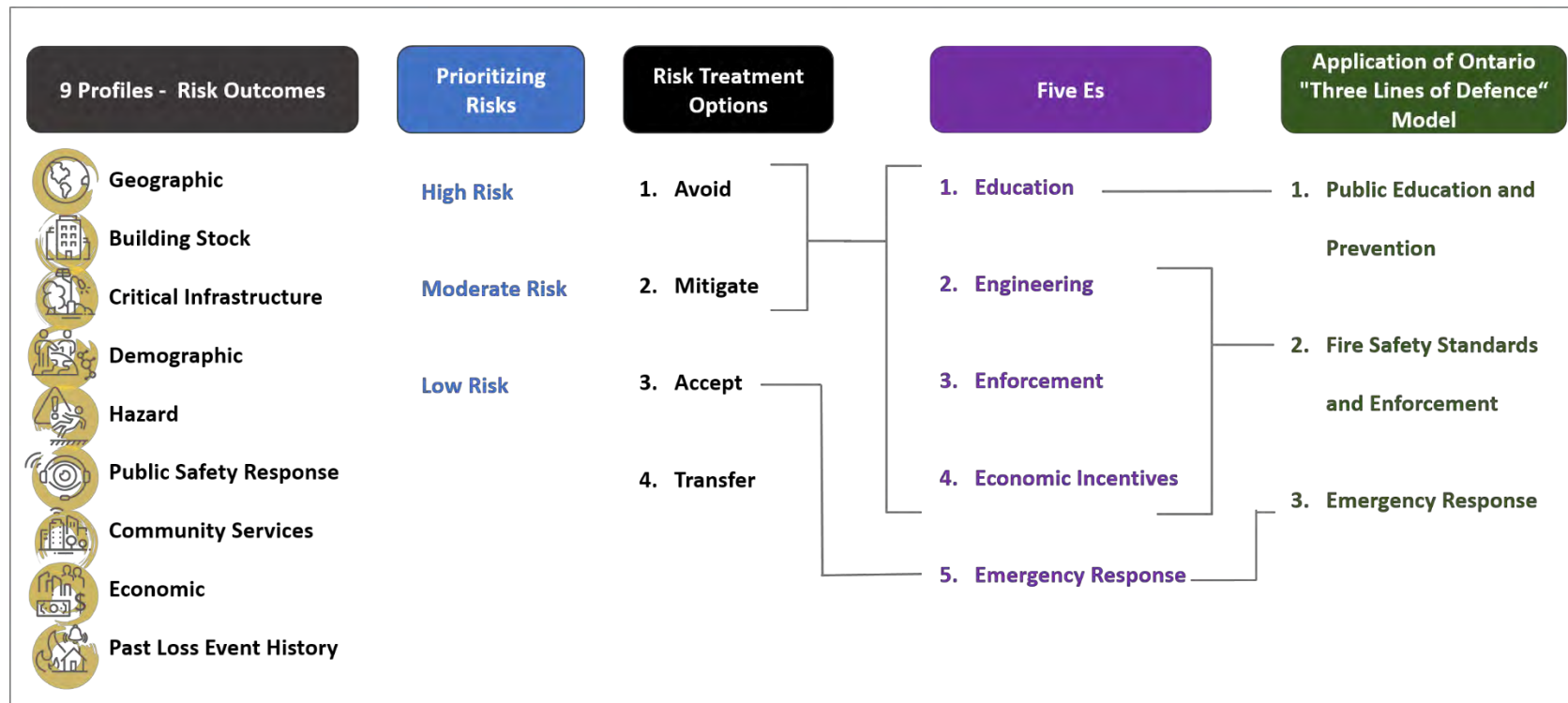
## 11.0

## Applying Key Findings and Identified Risks

The purpose of a C.R.A. is to identify risks that are then used to inform decision-making regarding the provision of fire protection services. The analysis throughout this C.R.A. identifies '**Key Findings**' and '**Identified Risks**' to be considered within the F.M.P. In alignment with O.F.M.E.M. T.G.-02-2019, this section takes the identified risk conclusions (both the key findings and the identified risks) through a risk assignment process to assist in the prioritization of risks, as well as a risk treatment process.

This section of the C.R.A. brings together all of the key findings and identified risks and frames how they will be used to inform the F.M.P. They are taken through a risk treatment process and aligned with the "Five E's" of Community Risk Reduction and the Three Lines of Defence Model in order to inform the analysis and recommendations within the Fire Master Plan as shown in **Figure 32**.

Figure 32: Risk Conclusions Application Process



## 11.1 Prioritizing Risks

N.F.P.A 1300 and O.F.M.E.M. T.G.-02-2019 identify that risks can be prioritized based on probability and consequence. The O.F.M.E.M. T.G.-02-2019 further emphasizes that all the risk findings and profiles should be considered together.

Following the probability and consequence levels identified by the O.F.M.E.M. as described in the subsections below, the risk assignment process considers probability and consequence of each identified risk. This will result in each risk having a risk level (e.g., low, moderate, or high) assigned. These risk levels will then be used to assist in the prioritization of risks as part of the Fire Master Plan.

### 11.1.1 Risk Assignment Process Overview

The risk assignment methodology used as part of this C.R.A is informed by the O.F.M.E.M. Technical Guideline 02-2019 Community Risk Assessment Guideline.

There are three steps included in the risk assignment exercise used for this C.R.A.:

1. Determine a probability level;
2. Determine a consequence level; and
3. Establish the risk level (i.e., low, moderate or high) for each based on the identified probability and consequence for each event.

The following sections provide additional insight into the assignment process.

#### 11.1.1.1 Step 1 - Probability Levels

The probability of a fire or emergency event occurring can be estimated in part based on historical experience of the community and that of the province as a whole. The likelihood categories, and the values presented, follow the O.F.M.E.M. T.G.-02-2019 Community Risk Assessment Guideline. **Table 36** presents the probability levels and the adjusted descriptions.

**Table 36: Probability Levels**

Likelihood Category*	Numerical Value	Description (Adjusted)
Rare	1	<ul style="list-style-type: none"> <li>may occur in exceptional circumstances</li> <li>no incidents in the past 15 years</li> </ul>
Unlikely	10	<ul style="list-style-type: none"> <li>could occur at some time, especially if circumstances change</li> <li>5 to 15 years since the last incident</li> </ul>
Possible	100	<ul style="list-style-type: none"> <li>might occur under current circumstances</li> <li>1 incident in the past 5 years</li> </ul>
Likely	1,000	<ul style="list-style-type: none"> <li>will probably occur at some time under current circumstances</li> <li>multiple or recurring incidents in the past 5 years</li> </ul>



Likelihood Category*	Numerical Value	Description (Adjusted)
Almost Certain	10,000	<ul style="list-style-type: none"> <li>• expected to occur in most circumstances unless circumstances change multiple or recurring incidents in the past year</li> </ul>

## 11.1.1.2

**Step 2 - Consequence Levels**

The consequences of an emergency event relate to the potential losses or negative outcomes associated with the incident. There are four components that should be evaluated in terms of assessing consequence. These include:

1. **Life Safety:** Injuries or loss of life due to occupant and firefighter exposure to life threatening fire or other situations.
2. **Property Loss:** Monetary losses relating to private and public buildings, property content, irreplaceable assets, significant historic/symbolic landmarks and critical infrastructure due to fire.
3. **Economic Impact:** Monetary losses associated with property income, business closures, downturn in tourism, tax assessment value and employment layoffs due to fire.
4. **Environmental Impact:** Harm to human and non-human (e.g., wildlife, fish and vegetation) species of life and general decline in quality of life within the community due to air/water/soil contamination as a result of fire or fire suppression activities.

Table 37 presents the consequence levels.

**Table 37: Consequence Levels**

Consequence Category	Numerical Value	Description
Insignificant	1	<ul style="list-style-type: none"> <li>• No life safety issue</li> <li>• Limited valued or no property loss</li> <li>• No impact to local economy and/or</li> <li>• No effect on general living conditions</li> </ul>
Minor	10	<ul style="list-style-type: none"> <li>• Potential risk to life safety of occupants</li> <li>• Minor property loss</li> <li>• Minimal disruption to business activity and/or</li> <li>• Minimal impact on general living conditions</li> </ul>
Moderate	100	<ul style="list-style-type: none"> <li>• Threat to life safety of occupants</li> <li>• Moderate property loss</li> <li>• Poses threat to small local businesses and/or</li> <li>• Could pose threat to quality of the environment</li> </ul>
Major	1,000	<ul style="list-style-type: none"> <li>• Potential for large loss of life</li> <li>• Would result in significant property damage</li> <li>• Significant threat to businesses, local economy, and tourism and/or</li> <li>• Impact to environment would result in a short term, partial evacuation of local residents and businesses</li> </ul>

Consequence Category	Numerical Value	Description
Catastrophic	10,000	<ul style="list-style-type: none"> <li>• Significant loss of life</li> <li>• Multiple property damage to significant portion of the municipality</li> <li>• Long term disruption of businesses, local employment, and tourism and/or</li> <li>• Environmental damage that would result in long-term evacuation of local residents and businesses</li> </ul>

## 11.1.1.3

**Step 3 - Risk Level**

Once probability and consequence are determined the level of risk is calculated by multiplying the numerical values for probability and consequence. The relationship between probability and consequence as it pertains to risk levels can be illustrated in a risk matrix. In a risk matrix, probability and consequence are defined on separate scales with varying descriptors providing direction on how to assign the probability and consequence of an event. **Table 38** shows the risk matrix for this C.R.A.

**Table 38: Risk Matrix**

Consequence		Insignificant	Minor	Moderate	Major	Catastrophic
Probability		1	10	100	1,000	10,000
Almost Certain	10,000	Moderate	Moderate	High	High	High
Likely	1,000	Moderate	Moderate	Moderate	High	High
Possible	100	Low	Moderate	Moderate	Moderate	High
Unlikely	10	Low	Low	Moderate	Moderate	Moderate
Rare	1	Low	Low	Low	Moderate	Moderate

## 11.1.2

**Assigned Risk Levels**

The purpose of assigning a risk level is to assist in the prioritization of the range of risks that were identified as part of this C.R.A.

The results of the risk assignment process are presented in **Table 39**. Where possible, quantitative data was used to inform the risk assignment as described in the rationale in the table. It is important to recognize that with the availability of new or updated data, the probability levels could change or be refined. It should also be recognized that, as identified in O.F.M.E.M. T.G.-02-2019, “professional judgment based on experience should also be exercised in combination with historical information to estimate probability levels” (pg. 12). Similarly, O.F.M.E.M. T.G.-02-2019 acknowledges the role of

professional judgment and reviews of past occurrences in determining consequence levels. The rationale provided for both probability and consequence takes into account information from the nine profiles, as O.F.M.E.M. T.G.-02-2019 supports consideration of the profiles together in order to inform decision making about the provision of fire protection services in the specific municipality/community.

Table 39: Risk Assignment

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
The large geographic emergency response area may have a direct impact on travel time by C.F.E.S.	Likely	<ul style="list-style-type: none"> <li>C.F.E.S. responded to 24 calls between January 1<sup>st</sup>, 2014 and December 31, 2019 with travel times that exceeded 10 minutes.</li> </ul>	Minor	<ul style="list-style-type: none"> <li>Potential for extended in emergency response travel time</li> <li>Potential for risk to life safety of occupants</li> <li>Potential risk for property loss</li> </ul>	<b>Moderate</b>
The interconnectivity of the Town's road network has a direct impact on emergency response travel times.	Likely	<ul style="list-style-type: none"> <li>C.F.E.S. responded to a total of 2044 calls pertaining to motor-vehicle related incidents over a five year period (Event History)</li> <li>Some identified hazards including chemical release on a highway or major road, winter weather, crowd disaster or wildland fire could contribute to the disruption of the road network (Hazard)</li> </ul>	Minor	<ul style="list-style-type: none"> <li>Potential for extended in emergency response travel time</li> <li>Potential for risk to life safety of occupants if increase in the number of vehicles on the road leads to motor vehicle accidents</li> <li>Potential risk for property loss</li> <li>Consequence level could be impacted by the magnitude of a hazard event.</li> </ul>	<b>Moderate</b>
Motor vehicle-related incidents on the existing road network represent 13.27% of the total emergency call volume the Caledon Fire and Emergency Services responded to during the six-year period from January 1st, 2014 to December 31st, 2019.	Almost Certain	<ul style="list-style-type: none"> <li>C.F.E.S. responded to a total of 2044 calls pertaining to motor-vehicle related incidents over a five year period (Event History)</li> <li>Winter weather could contribute to motor vehicle incidents (Hazard)</li> </ul>	Moderate	<ul style="list-style-type: none"> <li>Potential for risk to life safety of occupants of motor vehicles</li> <li>Potential risk for property loss</li> <li>Could pose a threat to small local business</li> <li>Could pose a threat to the quality of the environment</li> <li>Consequence level could be impacted by the magnitude of a hazard event.</li> </ul>	<b>High</b>
The presence of waterways within the Town of Caledon creates a potential need for specialized technical ice and water rescue services.	Likely	<ul style="list-style-type: none"> <li>Rivers in Caledon include the Credit River and Humber River both flow through the Town, and have a significant number of tributaries including the Caledon Creek, Cold Creek, and Coffee Creek (Geographic)</li> <li>Six calls pertained to water or ice water rescue (an average of 1.2 water/ice water calls per year) (Event History)</li> </ul>	Minor	<ul style="list-style-type: none"> <li>Potential risk to life safety of individuals needing rescue.</li> </ul>	<b>Moderate</b>
The geography of the Town of Caledon includes a large number of areas where there is wildland-urban interface as described by N.F.P.A. 1730 Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition) that present the potential for a wildland fire.	Likely	<ul style="list-style-type: none"> <li>Historical fire loss data for the Town for the period from January 1st, 2014 to December 31st, 2019 indicates that there were only 14 outdoor fires during this period that resulted in a dollar loss (Fire Loss)</li> <li>Although this historical data indicates a relatively low number of outdoor fires, the geography of the Town includes a large number of wildland-urban interface areas (Geography)</li> <li>The Town has identified wildland fire as a top hazard (Hazards)</li> </ul>	Moderate	<ul style="list-style-type: none"> <li>Potential for loss of life</li> <li>May involve partial evacuation</li> <li>Would result in significant property damage or dollar loss</li> <li>Significant threat to businesses, local economy, and tourism and/or</li> <li>Impact to environment would result in a short term, partial evacuation of local residents and businesses</li> </ul>	<b>Moderate</b>
Group C - Residential Occupancies represent 85.50% of the Town's existing property stock, and were associated with 72.19% of the historical structure fires during the period from January 1st, 2104 to December 31st, 2018.	Almost Certain	<ul style="list-style-type: none"> <li>The majority of property stock is Group C – Residential (Building Stock)</li> <li>109 fires (72.19%) over the five year period occurred in Group C – Residential (Past Loss)</li> </ul>	Moderate	<ul style="list-style-type: none"> <li>Could pose a threat to the life safety of occupants,</li> <li>Could result in moderate property loss,</li> <li>Could pose a threat to small local businesses, and/or pose a threat to the quality of the environment.</li> <li>Potential for vulnerable individuals including seniors and youth within Group C – Residential (Demographic)</li> </ul>	<b>High</b>

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
				<ul style="list-style-type: none"><li>• Most reported fire-related civilian injuries (4) and fatalities (1) occurred in Group C – Residential (Past Loss)</li><li>• Of the fire loss incidents in Group C – Residential occupancies 63.46% of incidents did not have a smoke alarm present and operating (Past Loss)</li><li>• Potential for exposure risk depending on dwelling type and building age (Building Stock)</li><li>• Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock)</li><li>• As the Town continues to grow, construction may include increased numbers of multifamily dwellings and high rise occupancies. (Building Stock)</li></ul>	
83.42% of the Town’s Group C - Residential Occupancies are single-family dwellings as compared to 54.31% within the Province.	Almost Certain	<ul style="list-style-type: none"><li>• The majority of property stock is Group C – Residential (Building Stock)</li><li>• 109 fires (72.19%) over the five year period occurred in Group C – Residential (Past Loss)</li></ul>	Moderate	<ul style="list-style-type: none"><li>• Could pose a threat to the life safety of occupants,</li><li>• Could result in moderate property loss,</li><li>• Could pose a threat to small local businesses, and/or pose a threat to the quality of the environment.</li><li>• Potential for vulnerable individuals including seniors and youth within Group C – Residential (Demographic)</li><li>• Most reported fire-related civilian injuries (4) and fatalities (1) occurred in Group C – Residential (Past Loss)</li><li>• Of the fire loss incidents in Group C – Residential occupancies 63.46% of incidents did not have a smoke alarm present and operating (Past Loss)</li><li>• Potential for exposure risk depending on building age (Building Stock)</li><li>• Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock)</li><li>•</li></ul>	High
33.47% of the Town’s residential building stock was built prior to the adoption of the O.F.C. and as such represents a higher fire risk as a result of its age.	Almost Certain	<ul style="list-style-type: none"><li>• The majority of property stock is Group C – Residential (Building Stock)</li><li>• 109 fires (72.19%) over the five year period occurred in Group C – Residential (Past Loss)</li></ul>	Moderate	<ul style="list-style-type: none"><li>• Could pose a threat to the life safety of occupants,</li><li>• Could result in moderate property loss,</li><li>• Could pose a threat to small local businesses, and/or pose a threat to the quality of the environment.</li><li>• Occupants could be vulnerable individuals including seniors and youth within Group C – Residential (Demographic)</li><li>• Most reported fire-related civilian injuries (4) and fatalities (1) occurred in Group C – Residential (Past Loss)</li><li>• Of the fire loss incidents in Group C – Residential occupancies 63.46% of incidents did not have a smoke alarm present and operating (Past Loss)</li><li>• Potential for exposure risk depending on dwelling type and building age (Building Stock)</li></ul>	High

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
The Town has 70 buildings with a total building area (footprint) that exceed 50,000 square feet (4,655 square meters). These buildings are predominantly located in the employment areas east of Bolton and in Mayfield West.	Almost Certain	<ul style="list-style-type: none"> <li>Group D – Business, Group E - Mercantile, Group F - Industrial or a mix of uses represent 2.88% of the Town's existing property stock (Building Stock)</li> <li>Over the five year period, Group D, E and F were associated with 23 (15.23%) of the structure fires within the Town (Past Loss)</li> <li>Potential for presence and maintenance of fire protection equipment, for example, fire alarm system, sprinklers, etc. (Building Stock)</li> </ul>	Major	<ul style="list-style-type: none"> <li>Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock)</li> <li>Due to the potential for these buildings to contain large volumes of combustible materials, as well as horizontal travel distances for fire suppression activities, an incident occurring could result in a large loss of life</li> <li>Could result in significant property damage</li> <li>Could result in significant threat to large businesses, local economy and tourism, and/or impact to the environment</li> <li>Potential for presence and maintenance of fire protection equipment, for example, fire alarm system, sprinklers, etc. (Building Stock)</li> <li>Over the five year period, Group D, E and F were associated with 9.21% of the structure fire loss within the Town (Past Loss)</li> <li>Some of the identified occupancies may play a role in the economic well-being of the Town (Economic)</li> </ul>	High
The Town of Caledon currently has eight (8) registered vulnerable occupancies.	Possible	<ul style="list-style-type: none"> <li>These vulnerable occupancies may fall into different occupancy types such as Group B – Care or Detention or Group C – Residential (Building Stock)</li> <li>Group B – Care or Detention occupancies represent 0.03% and Group C – Residential occupancies represent 85.50% of the Town's existing property stock (Building Stock)</li> <li>109 fires (72.19%) over the five year period occurred in Group C – Residential and none occurred in Group B – Care or Detention (Past Loss)</li> <li>Ontario Regulation 150/13 requires fire departments to perform annual inspections and approve and witness fire drill scenarios which may influence the probability of a fire occurring in a vulnerable occupancy (Building Stock)</li> </ul>	Catastrophic	<ul style="list-style-type: none"> <li>Ontario Regulation 150/13 requires fire departments to perform annual inspections and approve and witness fire drill scenarios (Building Stock)</li> <li>Presence and maintenance of fire protection equipment, for example, fire alarm system, sprinklers, etc. (Building Stock)</li> <li>Most reported fire-related civilian injuries (4) and fatalities (1) occurred in Group C – Residential (Past Loss)</li> <li>Potential for vulnerable individuals including those who receive special care or treatment within a Group B occupancy (Building Stock)</li> </ul>	High
The Brampton Flight Centre presents a number of unique fire related risks associated with aircraft, supporting infrastructure and the potential transportation of dangerous goods requiring specialized fire protection services.	Special Consideration				
Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the Province based on the historical residential fire death rate.	Almost Certain	<ul style="list-style-type: none"> <li>Seniors represent one of the most vulnerable demographics and are 13.19% of the Town's population (Demographic)</li> <li>The majority of property stock is Group C – Residential (Building Stock)</li> </ul>	Moderate	<ul style="list-style-type: none"> <li>Could pose a threat to the life safety of occupants</li> <li>Could result in moderate property loss</li> <li>Most reported fire-related civilian injuries (4) and fatalities (1) occurred in Group C – Residential (Past Loss)</li> </ul>	High

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
According to the 2016 Census, seniors represent 13.19% of the Town's total population.		<ul style="list-style-type: none"> <li>• 109 fires (72.19%) over the five year period occurred in Group C – Residential (Past Loss)</li> <li>•</li> <li>•</li> </ul>		<ul style="list-style-type: none"> <li>• Of the fire loss incidents in Group C – Residential occupancies 63.46% of incidents did not have a smoke alarm present and operating (Past Loss)</li> <li>• Potential for exposure risk depending on dwelling type and building age (Building Stock)</li> <li>• Potential presence and maintenance of fire protection equipment would influence consequence level (Building Stock)</li> <li>•</li> </ul>	
The Town's commuter population presents a factor that may impact traffic congestion, and the potential occurrence of motor vehicle accidents.	Almost Certain	<ul style="list-style-type: none"> <li>• Congestion during peak travel times such as between 5 PM and 6 PM, can influence emergency response times, in part through commuter populations (Demographic, Event History)</li> <li>• Motor vehicle-related incidents on the existing road network contribute to congestion (Critical Infrastructure, Event History)</li> <li>• Winter weather could contribute to motor vehicle incidents, especially around commuting times (Hazard)</li> </ul>	Minor	<ul style="list-style-type: none"> <li>• Potential for extended in emergency response travel time</li> <li>• Potential for risk to life safety of occupants</li> <li>• Potential risk for property loss</li> <li>• Consequence level could be impacted by the magnitude of a hazard event.</li> </ul>	Moderate
The sustainability of the volunteer firefighter organizational model could be impacted if a large portion of the volunteer firefighters are required to travel outside of their assigned response areas to seek employment.	Almost Certain	<ul style="list-style-type: none"> <li>• Congestion during peak travel times such as between 5 PM and 6 PM, can influence emergency response times, in part through commuter populations (Demographic, Event History)</li> <li>• Motor vehicle-related incidents on the existing road network contribute to congestion (Critical Infrastructure, Event History)</li> <li>• Winter weather could contribute to motor vehicle incidents, especially around commuting times (Hazard)</li> </ul>	Moderate	<ul style="list-style-type: none"> <li>• Potential for extended in emergency response travel time</li> <li>• Potential for risk to life safety of occupants</li> <li>• Potential risk for property loss</li> <li>• Consequence level could be impacted by the magnitude of a hazard event.</li> </ul>	High
Over the five year period from January 1st, 2014 to December 31st, 2018, in 63.46% of fire related incidents, the occupancies involved did not have the working smoke alarms required in the Province of Ontario.	Almost Certain	<ul style="list-style-type: none"> <li>• The majority of property stock is Group C – Residential (Building Stock)</li> <li>• 109 fires (72.19%) over the five year period occurred in Group C – Residential (Past Loss)</li> <li>•</li> </ul>	Moderate	<ul style="list-style-type: none"> <li>• Could pose a threat to the life safety of occupants</li> <li>• Could result in moderate property loss</li> <li>• Most reported fire-related civilian injuries (4) and fatalities (1) occurred in Group C – Residential (Past Loss)</li> <li>• Of the fire loss incidents in Group C – Residential occupancies 63.46% of fire related incidents did not have the working smoke alarms required in the Province of Ontario.</li> <li>• Potential for exposure risk depending on dwelling type and building age (Building Stock)</li> <li>• Potential for presence and maintenance of fire protection equipment, for example, fire alarm system, sprinklers, etc. (Building Stock)</li> </ul>	High

Identified Risk	Probability Level	Rationale	Consequence Level	Rationale	Risk Level
For the period from January 1st, 2014 to December 31st, 2018 there is a higher concentration of medical/resuscitator, false fire and fire/explosion calls in the areas of Bolton (Fire Station 302), Caledon East (Fire Station 303), Mayfield West (Fire Station 307), and Alton (Fire Station 301).	Almost Certain	<ul style="list-style-type: none"><li>Over the five year period, false fires represent 10.47% of total emergency call volume, medical/resuscitator calls represent 36.27% and fire/explosion calls represent 5.27% (Event History).</li></ul>	Moderate	<ul style="list-style-type: none"><li>Could pose a threat to the life safety of occupants</li><li>Could result in moderate property loss</li><li>Could pose a threat to small local businesses, and/or pose a threat to the quality of the environment</li></ul>	High



## 11.2 Risk Treatment Options

N.F.P.A. 1300 and the O.F.M.E.M. T.G.-02-2019 apply the process of identifying a risk treatment option for an identified risk. The risk treatment options include avoidance, mitigation, acceptance, and transfer. Further detail on these options can be found in **Table 40**. There are four risk treatment options:

1. Avoid;
2. Mitigate;
3. Accept; and
4. Transfer.

**Table 40: Risk Treatment Options**

Treatment Option	N.F.P.A. 1300 Description	O.F.M.E.M. O.F.M.E.M. T.G.-02-2019 Description
Avoid	Eliminate the hazard.	Implementing programs and initiatives to prevent a fire or emergency from happening.
Mitigate	Reduce probability or impact (consequence) of the risk.	Implementing programs and initiatives to reduce the probability and/or consequence of a fire or emergency.
Accept	Take no actions.	No specific programs or initiatives will be implement. Accept the risk and respond if it occurs.
Transfer	Transfer the risk to another party.	Transfer the impact and/or management of the risk to another organization or body.

If adopted by a fire department, most of these options will require some action or consideration as they pertain to fire protection services. As part of the application of the risk conclusions, a risk treatment option will be identified for each outcome followed by the application of the Five Es as described in the next section.

### 11.2.1 The 'Five Es' of Community Risk Reduction

N.F.P.A. 1300 defines a Community Risk Reduction plan as a “document that outlines the goals, objectives, programs, and resources used to reduce the risks identified by the community risk assessment”. Establishing service levels in regards to programs and resources in alignment with a C.R.A. is required of Ontario municipalities as part of **O.Reg. 378/18**. As such, the recommendations of the F.M.P. if implemented can be considered a part of community risk reduction plan since it includes a review of Fire Prevention and Public Education.

To apply the risk conclusions to the F.M.P., each risk conclusion ('key finding' or 'identified risk') will be reviewed through the lens of the “Five E’s”. The Five E’s is a framework outlined in N.F.P.A. 1300, and the Institution of Fire Engineers’ Vision 20/20 National Strategy for Fire Loss Prevention. The Five E’s are summarized in **Table 40**. They include:

1. increasing awareness (Education);
2. changes to the physical environment (Engineering);

3. influencing change through economic incentives (Economic Incentives)'
4. enforcing legislation through inspection programs (Enforcement); and
5. mitigating injury, illness and saving lives (Emergency Response).

**Table 41: Overview of the N.F.P.A. 1300 Five “E’s”**

<b>Five E’s</b>	<b>Description</b>
Education	Education influences audiences to refrain from risky or unhealthy behavior or take positive action to reduce risk.
Enforcement	Enforcement reduces risks through enforcing legislation through inspections and fines for noncompliance.
Engineering	Engineering includes incorporating new products and technology to modify the environment to prevent or mitigate injuries and deaths.
Economic Incentives	Economic incentives are typically offered to encourage better choices and changes in behaviour.
Emergency Response	Effective emergency response can mitigate the effects of unintentional injuries and save lives.

Source: Community Risk Reduction: Doing More With More, The N.F.P.A. Urban Fire and Life Safety Task Force, June 2016.

It is important to note that N.F.P.A. 1300 discusses the application of the Five E’s to develop specific goals and objectives to reduce risk. It also acknowledges that some strategies may require policy advocacy or legislative work. These are important considerations for a department but are beyond the purview of the recommendations found within a Fire Master Plan. As a result, the recommendations of the F.M.P. will focus on ways to reduce risk from the perspective of the typical suppression and public education/prevention operations of the department. This includes a focus on a proactive reduction of risk through education, prevention, and enforcement with fire suppression as the fail-safe.

### 11.2.2 Risk Conclusions, Treatment Options, and the Five E’s

When it comes to aligning service levels with risks that define local needs and circumstances, it is important to recognize that not all risk conclusions align with the services provided by a fire department in the same way. For this reason, the risk conclusions are categorized based on the identified treatment options and how they can be used to inform the activities, strategies, and services provided by the department through the lens of the Five E’s. This categorization will then be used to inform the Fire Master Plan. The purpose of the Five E’s as they pertain to this study is shown in **Table 42**.

**Table 42: Risk Analysis Conclusions – 5 E’s Categorization**

<b>Five E’s</b>	<b>Description</b>	<b>Purpose</b>
Education	Education influences audiences to refrain from risky or unhealthy behavior or take positive action to reduce risk.	For consideration within the proposed Public Education Program
Enforcement	Enforcement reduces risks through enforcing legislation through inspections and fines for noncompliance.	For consideration within the proposed Inspection/Enforcement Program
Engineering	Engineering includes incorporating new products and technology to modify the environment to prevent or mitigate injuries and deaths.	For consideration within the proposed Fire Inspection and Enforcement Program
Economic Incentives	Economic incentives are typically offered to encourage better choices and changes in behaviour.	For consideration within the proposed Inspection/Enforcement Program
Emergency Response	Effective emergency response can mitigate the effects of unintentional injuries and save lives.	For consideration within the proposed Emergency Response Deployment Options

**Table 43** presents the identified risks in a matrix format to indicate the ways in which the risks can be addressed by C.F.E.S. and ultimately considered within the Fire Master Plan analysis and recommendations. The same process is applied to the key findings in **Table 44**.

For those risk conclusions that will not be considered within the F.M.P., the department should use the findings of the risk assessment to review other fire protection services provided by the department to help ensure compliance with **O.Reg.378/18** (e.g., training, by-laws, fleet, equipment, all department policies and guidelines, etc.).

Table 43: Treatment Options and Five E's Categorization – Identified Risks

Profile	Identified Risk	Risk Level	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education for consideration within the proposed Public Education Program	Enforcement for consideration within the proposed Inspection and Enforcement Program	Engineering for consideration within the proposed Inspection and Enforcement Program	Economic incentive for consideration within the proposed Inspection and Enforcement Program	Emergency response for consideration within the proposed Emergency Response Program
Geographic	The large geographic emergency response area may have a direct impact on travel time by C.F.E.S.	Moderate	Accept			Yes	Yes	Yes
Geographic	The interconnectivity of the Town's road network has a direct impact on emergency response travel times.	Moderate	Accept					Yes
Geographic	Motor vehicle-related incidents on the existing road network represent 13.27% of the total emergency call volume the Caledon Fire and Emergency Services responded to during the six-year period from January 1st, 2014 to December 31st, 2019.	High	Accept					Yes
Geographic	The presence of waterways within the Town of Caledon creates a potential need for specialized technical ice and water rescue services.	Moderate	Mitigate Accept	Yes				Yes
Geographic	The geography of the Town of Caledon includes a large number of areas where there is wildland-urban interface as described by N.F.P.A. 1730 Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations (2019 Edition) that present the potential for a wildland fire.	Moderate	Mitigate Accept	Yes	Yes			Yes
Building Stock	Group C - Residential Occupancies represent 85.50% of the Town's existing property stock, and were associated with 72.19% of the historical structure fires during the period from January 1st, 2104 to December 31st, 2018.	High	Mitigate Accept	Yes	Yes	Yes		Yes
Building Stock	83.42% of the Town's Group C - Residential Occupancies are comprised of single-family houses as compared to 54.31% within the Province.	High	Mitigate Accept	Yes	Yes	Yes		Yes
Building Stock	33.47% of the Town's residential building stock was built prior to the adoption of the O.F.C. and as such represents a higher fire risk as a result of its age.	High	Mitigate Accept	Yes	Yes			Yes

Profile	Identified Risk	Risk Level	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education for consideration within the proposed Public Education Program	Enforcement for consideration within the proposed Inspection and Enforcement Program	Engineering for consideration within the proposed Inspection and Enforcement Program	Economic incentive for consideration within the proposed Inspection and Enforcement Program	Emergency response for consideration within the proposed Emergency Response Program
Building Stock	The Town has 70 buildings with a total building area (footprint) that exceed 50,000 square feet (4,655 square metres). These buildings are predominantly located in the employment areas east of Bolton and in Mayfield West.	High	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	The Town of Caledon currently has eight (8) registered vulnerable occupancies.	High	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Critical Infrastructure	The Brampton Flight Centre presents a number of unique fire related risks associated with aircraft, supporting infrastructure and the potential transportation of dangerous goods requiring specialized fire protection services.	Special Consideration	Mitigate Accept		Yes	Yes		Yes
Demographic	Seniors (those 65 years and over) are considered to represent one of the highest fire risk groups across the Province based on the historical residential fire death rate. According to the 2016 Census, seniors represent 13.19% of the Town's total population.	High	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Demographic	The Town's commuter population presents a factor that may impact traffic congestion, and the potential occurrence of motor vehicle accidents.	Moderate	Accept					Yes
Demographic	The sustainability of the volunteer firefighter organizational model could be impacted if a large portion of the volunteer firefighters are required to travel outside of the assigned response areas to seek employment.	High	Avoid Accept				Yes	Yes
Past Loss and Event History	Over the five year period from January 1st, 2014 to December 31st, 2018, in 63.46% of fire related incidents, the occupancies involved did not have the working smoke alarms required in the Province of Ontario.	High	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	For the period from January 1st, 2014 to December 31st, 2018 there is a higher concentration of	High	Mitigate Accept	Yes	Yes	Yes	Yes	Yes

Profile	Identified Risk	Risk Level	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education for consideration within the proposed Public Education Program	Enforcement for consideration within the proposed Inspection and Enforcement Program	Engineering for consideration within the proposed Inspection and Enforcement Program	Economic incentive for consideration within the proposed Inspection and Enforcement Program	Emergency response for consideration within the proposed Emergency Response Program
	medical/resuscitator, false fire and fire/explosion calls in the areas of Bolton (Fire Station 302), Caledon East (Fire Station 303), Mayfield West (Fire Station 307), and Alton (Fire Station 301).							

Table 44: Treatment Options and Five E's Categorization – Key Findings

Profile	Key Finding	Risk Treatment Option: Avoid Mitigate Accept Transfer	Education for consideration within the proposed Public Education Program	Enforcement for consideration within the proposed Inspection and Enforcement Program	Engineering for consideration within the proposed Inspection and Enforcement Program	Economic incentive For consideration within the proposed Inspection and Enforcement Program	Emergency response For consideration within the proposed Emergency Response Program
Geographic	Bridges, with restrictions or closures, have the potential to reduce the connectivity of the Town's road network resulting in the potential for delays in emergency response travel times.	Accept					Yes
Geographic	At-Grade level rail crossings could create a physical barrier to the connectivity of the Town's road network that can potentially result in extended emergency response travel times.	Accept					Yes
Building Stock	As the Town continues to grow and develop it's built form the potential fire related risks associated with building density and exposures will increase.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	Caledon currently has one building that meets the O.B.C. definition of a high-rise building with a floor level 18 metres (59 feet) above grade, or 6 storeys. This building is located in Bolton.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Building Stock	The Town of Caledon has an inventory of occupancies that may have a higher fire risk associated with a high volume of fuel load storage, or manufacturing/distribution process.	Mitigate	Yes	Yes	Yes	Yes	Yes
Building Stock	In addition to registered vulnerable occupancies the Town has 30 schools and 11 day care facilities that represent higher fire life-safety risks.	Mitigate Accept	Yes	Yes	Yes		Yes
Building Stock	There are a number of identified heritage buildings within Caledon, many of which were constructed prior to the introduction of the Ontario Fire Code and Ontario Building Code.	Accept		Yes			Yes
Demographic	Of the Town's total population, 31.04% fall into the age range of 45 to 64, representing a cohort aging towards the seniors	Mitigate	Yes				Yes



	demographic of 65 years or older.	Accept					
Demographic	The 2016 Census data indicates that children aged 14 and under represent 18.58% of the Town's total population.	Mitigate Accept	Yes				Yes
Hazard	The Town's 2020 Hazard Identification and Risk Assessment identifies hazards that could each impact the ability of the Town to deliver fire protection services. These include: chemical release; fire / explosion; wildland fire; winter weather; high winds; crowd disaster; and infectious disease.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Economic	The Town has identified top employers that contribute to the economic vitality of the community. If a fire were to occur at one of these facilities it could have a negative impact on the financial well-being of the Town.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Economic	Industries within Caledon that are experiencing significant growth and major employers include the transportation, warehousing industries and the construction industry.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Over the five year period from January 1st, 2014 to December 31st, 2018, the Town averaged 30 structure fires per year.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Over the five year period from January 1st, 2014 to December 31st, 2018 Caledon experienced a total of 109 structure fires in Group C - Residential occupancies (72.19%). This accounts for 87.77% of the Town's total fire loss for this period, which is 25.91% higher than the proportion of fire loss for Group C-Residential occupancies in the Province (61.97%).	Mitigate	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Over the five year period from January 1st, 2014 to December 31st, 2018 structure fires occurring in Group F – Industrial occupancies accounted for 12.58% (19) of total structure fires within the Town.	Mitigate	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Over the five year period from January 1st, 2014 to December 31st, 2018 structure fires occurring in Group F – Industrial occupancies account for 9.14% (\$1,853,500) of total structure fire loss within the Town, higher than the Province by 5.08%.	Mitigate	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	From January 1st, 2014 to December 31st, 2018, there were four reported injuries and one reported fire fatality within the Town of Caledon, all of which occurred in Group C –	Avoid Accept	Yes	Yes	Yes	Yes	Yes

Past Loss and Event History	Residential occupancies. The percentage of fires determined to have been attributed to design/construction/maintenance deficiency by C.F.E.S. is 13.53%, higher than the Provincial statistic of 7.37% for the same period.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Of the fires occurring in the Town over the five year period from January 1st, 2014 to December 31st, 2018, the leading cause of unintentionally set fires was due to mechanical/electrical failure at 25.88% (107 fires), compared to 15.45% (5,432 fires) in the Province.	Mitigate Accept	Yes	Yes	Yes		Yes
Past Loss and Event History	Of the fires occurring in the Town over the five year period from January 1st, 2014 to December 31st, 2018, the second most common cause of unintentionally set fires was due to misuse of ignition source at 22.94% compared to 29.96% in the Province.	Mitigate Accept	Yes	Yes	Yes		Yes
Past Loss and Event History	Of the fires occurring in the Town over the five year period from January 1st, 2014 to December 31st, 2018, 20.59% were classified as having an “undetermined” fire cause.	Mitigate Accept	Yes				Yes
Past Loss and Event History	Of the fires occurring within the Town over the five year period from January 1st, 2014 to December 31st, 2018, 16.56% of the fires had a reported ignition source of “electrical distribution”, which is 7.67% higher than the Province (8.89%).	Mitigate Accept	Yes	Yes	Yes		Yes
Past Loss and Event History	Of the fires occurring within the Town over the five year period from January 1st, 2014 to December 31st, 2018, 11.26% of the fires had a reported ignition source of “open flame tools/smokers articles”, which is 2.46% lower than the Province (13.72%).	Mitigate Accept	Yes	Yes	Yes		Yes
Past Loss and Event History	Of the fires occurring within the Town over the five year period from January 1st, 2014 to December 31st, 2018, 10.60% of the fires had a reported ignition source of “Heating Equipment, chimney, etc.”, which is 2.78% higher than the Province (7.82%).	Mitigate Accept	Yes	Yes	Yes		Yes
Past Loss and Event History	Over the five year period from January 1st, 2014 to December 31st, 2018, of the fire loss incidents in Group C – Residential occupancies, 11.54% of incidents did not have a smoke alarm present compared to 17.31% in the Province.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes

Past Loss and Event History	Over the five year period from January 1st, 2014 to December 31st, 2018, of the fire loss incidents in Group C – Residential occupancies, 36.54% of incidents had a smoke alarm present and operating compared to 44.57% in the Province.	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	For the period from January 1st, 2014 to December 31st, 2018, 'medical/resuscitator' calls represented the highest percentage of the total emergency all volume for both Caledon and the Province (Caledon 34.71% compared to the Province 42.41%).	Accept					Yes
Past Loss and Event History	For the period from January 1st, 2014 to December 31st, 2018, Caledon had a lower percentage of 'false fire calls' than that of the Province (Caledon 10.02% compared to the Province 16.44%).	Mitigate Accept	Yes	Yes		Yes	Yes
Past Loss and Event History	For the period from January 1st, 2014 to December 31st, 2018, Caledon had a higher percentage of 'fire/explosion' calls (Caledon 5.44% compared to the Province 4.00%).	Mitigate Accept	Yes	Yes	Yes	Yes	Yes
Past Loss and Event History	Over the period from January 1st, 2014 to December 31st, 2019 the total volume of emergency calls responded to by the Caledon Fire and Emergency Services has increased by 17.16%.	Accept					Yes
Past Loss and Event History	Over the period from January 1st, 2018 to December 31st, 2019 the total annual emergency call volume decreased by 6.8% as a result of revisions to the Town's Tiered Response Agreement.	Accept					Yes
Past Loss and Event History	For the period from January 1st, 2014 to December 31st, 2018 there are higher concentrations of rescue incidents involving motor vehicle collisions and vehicle extrication along Hurontario Street (Highway 10), Airport Road, and Highway 50.	Accept					Yes