

# 2018 DIRT Report

VER 12.0

Ontario Regional  
**ORCGA**  
Common Ground Alliance



## Message from the President and CEO



Damage Prevention Stakeholders,

Underground infrastructure plays a central, but hidden, role in communities across Ontario. By providing reliable access to energy, communication, clean water and other necessities to homes, businesses and public institutions, this infrastructure is essential to the quality of life standards that we all enjoy.

However, underground infrastructure networks have become increasingly dense, more complex and thus, more vulnerable. Managing and protecting vital municipal and utility infrastructure must take on greater importance.

The Ontario Regional Common Ground Alliance (ORCGA) has been collecting underground damage data since 2005 to better understand the root causes that lead to these events and to develop and target public awareness plans to minimize the risk of future events. As damage events continue to increase in the professional excavator category, the ORCGA's members and committees will, through the Dig Safe program, highlight the need to Call or Click before you dig to this group. Further, the committees will explore partnerships with colleges and trade schools to design education programs around safe digging practices.

However, the ORCGA must actively encourage and seek out the collection of data from a broader cross section of industry stakeholders, particularly municipal infrastructure owners of water, sewer and streetlighting and local electrical utility distribution companies (LDCs).

By obtaining municipal and Electric LDC data, this report will be able to provide a clear and complete understanding of the total number of annual facility damages in Ontario. Also, all ORCGA stakeholders will benefit through access to a robust DIRT database from which statistical analysis and reports can be developed to determine progress in their respective damage prevention efforts.

Included again this year is the CIRANO data, an infrastructure damage societal cost tool and formula. When applied to DIRT Report data, this formula provides an estimate of the costs, both Direct and Indirect, that society bears when underground infrastructure is damaged.

Direct Costs arise from repairing the damaged facility, while Indirect Costs arise from the damage and its economic assessment of all resulting disruptions.

CIRANO data underlines the importance of damage prevention and helps:

- To justify investments toward best practices training programs for excavators;
- To aid municipalities and other stakeholders allocate resources targeted at damage prevention;
- Municipalities and other stakeholders to better assess a project's actual risks.

Included in this year's report in Section 4 is a sample and a link to the first comprehensive National DIRT Report (2017 data) which includes data from across Canada through the Regional Partners of the Canadian Common Ground Alliance (CCGA).

The overall number of damages in 2018 decreased slightly from 2017 by approximately 6%; with a 2.8% increase in requests; and also a 10% decrease in One Call notifications (due to process changes at One Call); a slight improvement over 2017. Damage events in the high construction activity areas saw reductions in the 10% range, with notable decreases of 8.7% (178) in Toronto and 12.8% (54) in Ontario East. Conversely, increases in damage events of 20% (36) in Ontario North and 23.7% (9) were realised. Similar to 2017, there were a significant number of damages where no locate was requested, with 36.5% or 1839 of 5042 damages had no call was made to Ontario One Call (38% in 2017).

Clearly there is much work to do to educate excavators on safe digging practices and the need to Call or Click before you dig.

The 2018 DIRT Report is the result of the dedicated volunteers on the ORCGA Reporting and Evaluation Committee, led by Co-Chairs Richard Durrer and Brandon Denton of Ontario One Call.

On behalf of the ORCGA Board of Directors, I would like to extend a sincere thank you to the Reporting and Evaluation Committee for ensuring that the 2018 DIRT Report was accessible on the ORCGA website, as well as being distributed to all members before April 1st, the start of the 2019 Dig Season.

Sincerely,

A handwritten signature in black ink, appearing to read 'Doug Lapp', written over a blue horizontal line.

**Douglas Lapp**  
President and CEO, ORCGA

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## 1.0 INTRODUCTION

The Ontario Regional Common Ground Alliance (ORCGA) is a non-profit organization that is working towards effectively eliminating damages to underground infrastructure through influential advocacy, meaningful education and impactful engagement and is also leading Ontario to enhance safety through the collaborative prevention of damage to underground infrastructure

The ORCGA is a growing organization with over 500 active members and sponsors representing a wide cross-section of stakeholders:

Electrical Distribution	Land Surveying	Railways
Electrical Transmission	Landscape/Fencing	Regulator
Engineering	Locator	Road Builders
Equipment & Suppliers	Municipal & Public Works	Safety Organization
Excavator	Oil & Gas Distribution	Telecommunications
Homebuilder Insurance	One Call	Transmission Pipeline

The ORCGA works to foster an environment of safety throughout Ontario for all workers and the public. This is accomplished by offering practical tools while promoting public awareness and compliance of best practices in regards to underground infrastructure and ground disturbance practices.

The ORCGA welcomes open participation and new members on its various committees. In order to submit a suggestion, or to join a meeting, please visit [www.orcga.com](http://www.orcga.com) to learn about the scope of the various committees.

General inquiries about the ORCGA can be made to:

Ontario Regional Common Ground Alliance (ORCGA)  
545 North Rivermede Road, Unit 102  
Concord, ON L4K 4H1  
Telephone: (905) 532-9836  
Toll Free: (866) 446-4493

To learn more about the ORCGA's Dig Safe Program, visit [www.digsafe.ca](http://www.digsafe.ca).

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## 1.1 REPORTING AND EVALUATION COMMITTEE RECOMMENDATIONS

### #1 Improper Excavation Practices Not Listed Above

Excavation Practices Not Sufficient remains a large cause of events. Excavators notified the One Call centre to have underground utilities marked, but an event still occurred due to the lack of careful excavation practices, such as:

- Excavator failed to maintain clearance after verifying marks
- Marks faded or not maintained
- Excavator dug prior to verifying marks by test-hole (pot-hole)
- Excavator failed to protect/shore/support facilities
- Failure to use hand tools where required

Although 2018 has seen a decrease in this category, emphasis should be made to reduce events due to Improper Excavation Practices Not Listed Above. Targeted outreach and educational information should be provided to excavators to reduce events resulting from this root cause.

### #2 No Notification to One Call Centre

No Locates remains a significant issue as there has been an observed increase in the number of No Locate events in the last 3 years.

This must be addressed as a primary focus of ORCGA education efforts within 2019 and subsequent future campaigns. Successes in this area have occurred from Dig Safe efforts but these efforts need to be reinforced and strengthened.

Particular focus should be placed on Dig Safe messaging to geographic areas which show abnormally high percentages of No Locate events (Figure 3).



## 1.2 DATA

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The Damage Information Reporting Tool (DIRT) is the result of the efforts made by the ORCGA to gather meaningful data about the occurrence of facility events. An “event” is defined by the DIRT User’s Guide as “the occurrence of downtime, damages, and near misses.” Gathering information about these types of events give the ORCGA the opportunity to analyze the contributing factors and recurring trends. This allows the ORCGA to identify potential educational opportunities to meet our overall goals of reducing damages and increasing safety for all stakeholders.

The annual DIRT Report provides a summary and analysis of the known events submitted during the prior year, and as additional years of data are collected, it also provides the ability to monitor trends over time. The 2018 report focuses on the data gathered throughout Ontario during the three-year period between 2016 and 2018. This data can be helpful for all stakeholders to use as a benchmark for their damage prevention performance. It identifies current issues facing the industry, region and province.

**Data Analysis Disclaimer:** Industry stakeholders have voluntarily submitted their underground facility event data into DIRT. The data submitted is not inclusive of all facility events that occurred during the report year as it represents only the information voluntarily submitted by industry stakeholders.

The information presented in this report is based on current information provided to the ORCGA for events that occurred, or were updated, in 2018.

Note that due to the change from the Legacy to the 2018 standard, graphs may show fluctuations of incidents reported by Root Cause.

When reviewing statistics published in this report, it is important to note that a major contributor is doing extensive retroactive submissions for 2016 and 2017, as well as others who are also updating events. This will cause the volume of facility events submitted by year to change in each report.

It is also important to note as of January 1st, 2018, a new data standard for the DIRT Form has been implemented alongside the current. 2018 data could be submitted under the new standard, but was not required. Due to the variances between 2018 and the legacy formats, we have moved forward and standardized to the 2018 while mapping legacy to the 2018 standard root causes and sub causes. This will continue until the 2020 DIRT Report, as the legacy data will no longer be used.

In addition to the number of events submitted, an important factor is the completion of the associated information which allows for better overall analysis of the contributing factors. Each submitted record contains numerous data elements that are vital to understanding and interpreting the incidents reported in DIRT. It is important that stakeholders align their data collection and reporting practices with those found on the DIRT Field Form.

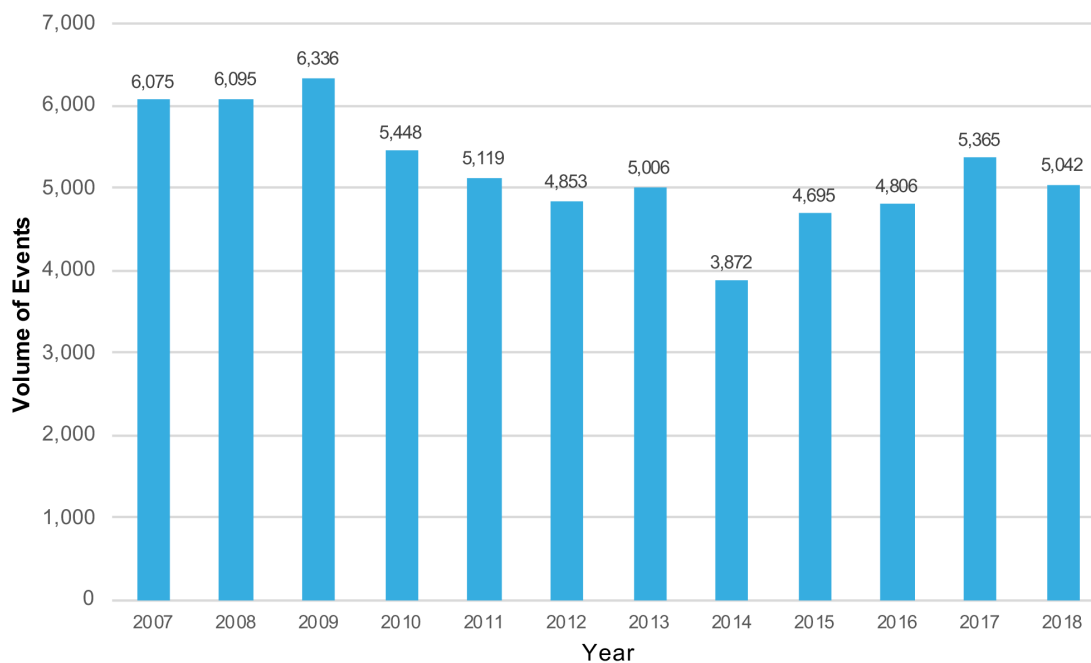
To gauge the overall level of completion of records submitted, the Data Quality Index (DQI) was implemented in 2009. This provides DIRT contributors a way to review the quality of the facility event records they submit.

When reviewing the statistics published in this report, it is important to note that only events with complete data were included; records with missing data were removed from the analysis.

## 2.0 DATA ANALYSIS

### 2.1 FACILITY EVENT ANALYSIS

In 2018, facility events have seen an overall decrease of 9% over 2017. We will break out incidents to gain insight on where attention and efforts are to be made to continue reducing damages in the future.



**Figure 1: Facility Events Submitted by Year**

### 2.2 FACILITY EVENTS SUBMITTED ACROSS ONTARIO

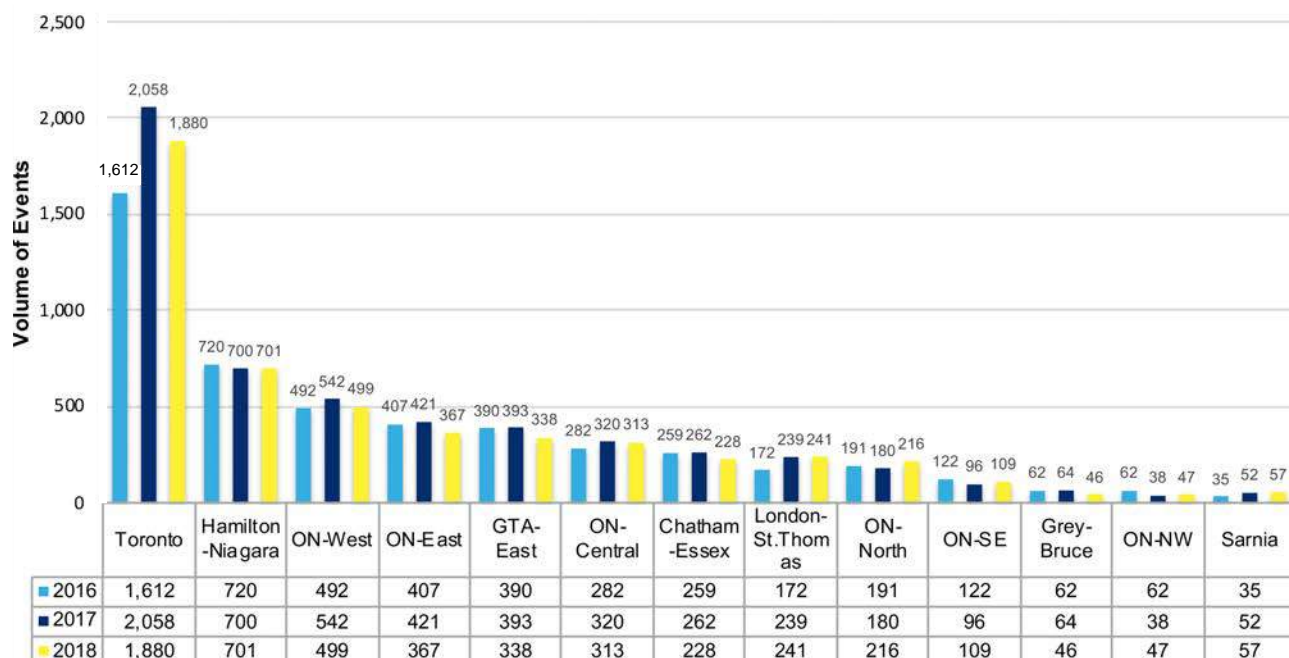
Table 1 outlines The ORCGA geographic areas and the constituent municipalities/cities.

Geographic Area	Cities
Chatham-Essex	Chatham-Kent ~ Essex
Grey-Bruce	Bruce ~ Grey
GTA-East	Durham ~ Kawartha Lakes ~ Northumberland ~ Peterborough
Hamilton-Niagara	Haldimand ~ Halton ~ Hamilton-Wentworth ~ Niagara ~ Norfolk
London-St. Thomas	Elgin ~ Middlesex
ON-Central	Dufferin ~ Simcoe
ON-East	Akwesasne ~ Lanark ~ Ottawa ~ Prescott & Russell ~ Renfrew ~ Stormont, Dundas & Glengarry
ON-North	Algoma ~ Cochrane ~ Greater Sudbury ~ Haliburton ~ Manitoulin ~ Muskoka ~ Nipissing ~ Sudbury ~ Temiscamingue ~ Timiskaming
ON-Northwest	Kenora ~ Rainy River ~ Thunder Bay
ON-Southeast	Frontenac ~ Hastings ~ Leeds & Grenville ~ Lennox & Addington ~ Prince Edward
ON-West	Brant ~ Huron ~ Oxford ~ Perth ~ Waterloo ~ Wellington
Sarnia	Lambton
Toronto	Peel ~ Toronto ~ York

**TABLE 1: Geographic Area Breakdown By Region/Municipality/City**

## 2.2 FACILITY EVENTS SUBMITTED ACROSS ONTARIO

Figure 2 illustrates the number of events for each geographic area over the past three years. There have been minor fluctuations, however the majority of Geographic Councils are seeing an downward trend in events. On a positive note, Toronto's incidents saw a decrease over 2017.



**Figure 2: Volume of Events Submitted Per Geographic Area**

Due to Ontario One Call's initiatives and what the Excavator maps out in the locate, there has been a 10% decrease in notifications.

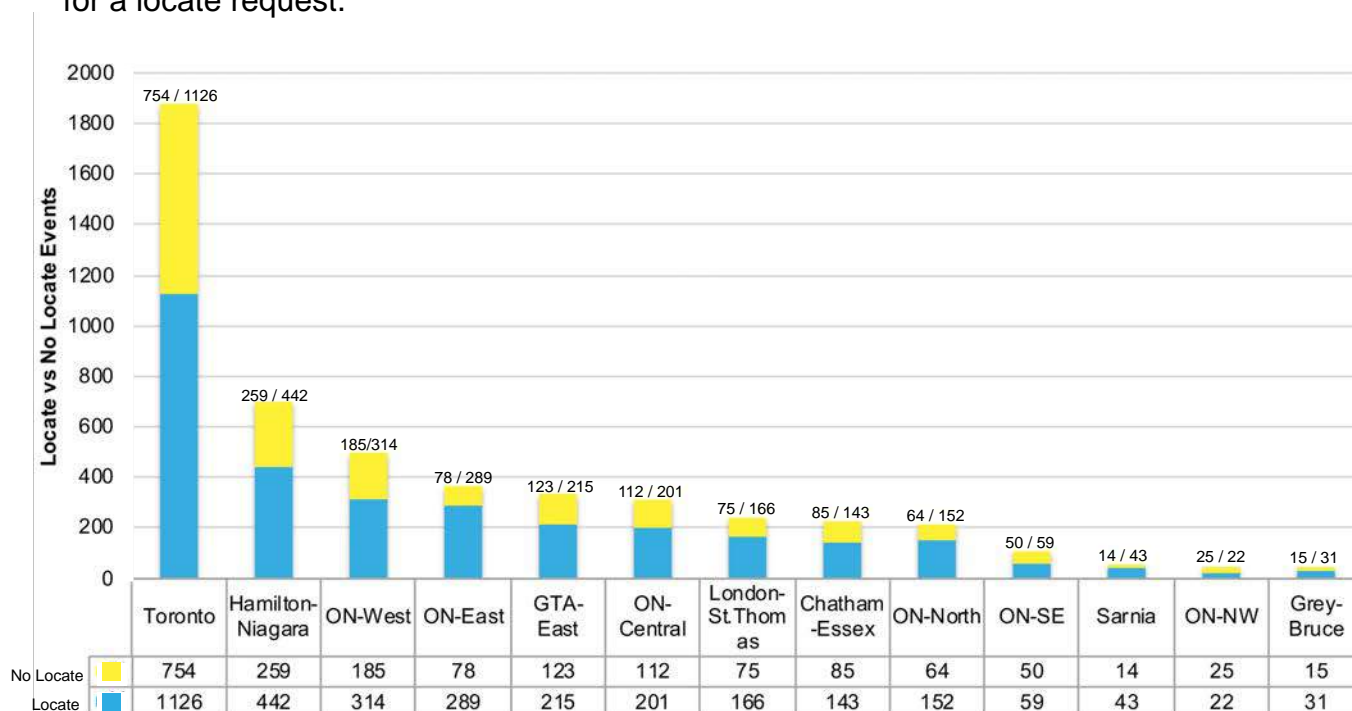
Geographical Area	2016	2017	2018
Chatham-Essex	240,533	295,231	279,196
Grey-Bruce	75,670	73,940	64,692
GTA-East	426,826	432,933	409,834
Hamilton-Niagara	1,051,814	1,025,378	886,731
London-St. Thomas	238,602	260,871	236,992
ON-Central	268,260	270,453	260,003
ON-East	595,851	610,348	620,086
ON-North	226,611	228,432	207,652
ON-NW	74,833	74,359	68,907
ON-SE	135,373	129,913	130,370
ON-West	575,108	573,568	516,517
Samia	87,807	98,112	83,041
Toronto	2,546,712	2,705,414	2,356,650
Grand Total	6,560,690	6,778,240	6,101,675

**TABLE 2: Notifications Per Geographic Council**



## 2.2 FACILITY EVENTS SUBMITTED ACROSS ONTARIO

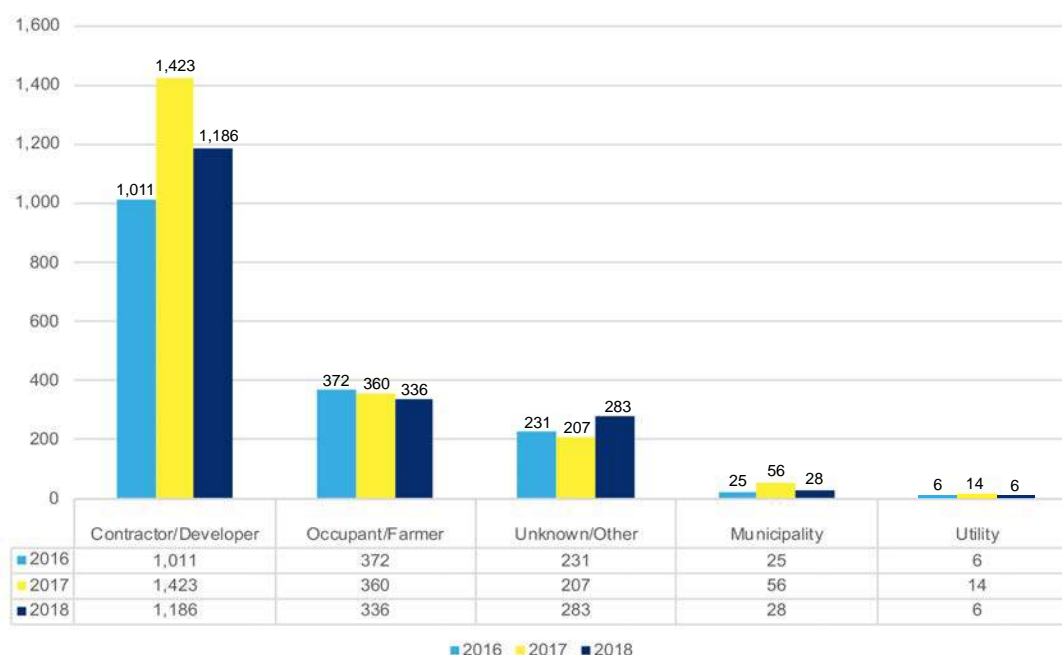
Figure 3 illustrates a distribution by geographic area comparing the number of events in 2018 where Ontario One Call was notified for a locate request versus not being notified for a locate request.



**Figure 3: Locate Versus No Locate Events by Geographic Area**

Figure 4 provides further analysis on the categories of excavators that are not submitting locate requests.

This information provides focus on the Excavator type that requires further education in adhering to legal requirements of obtaining a locate prior to an excavation.

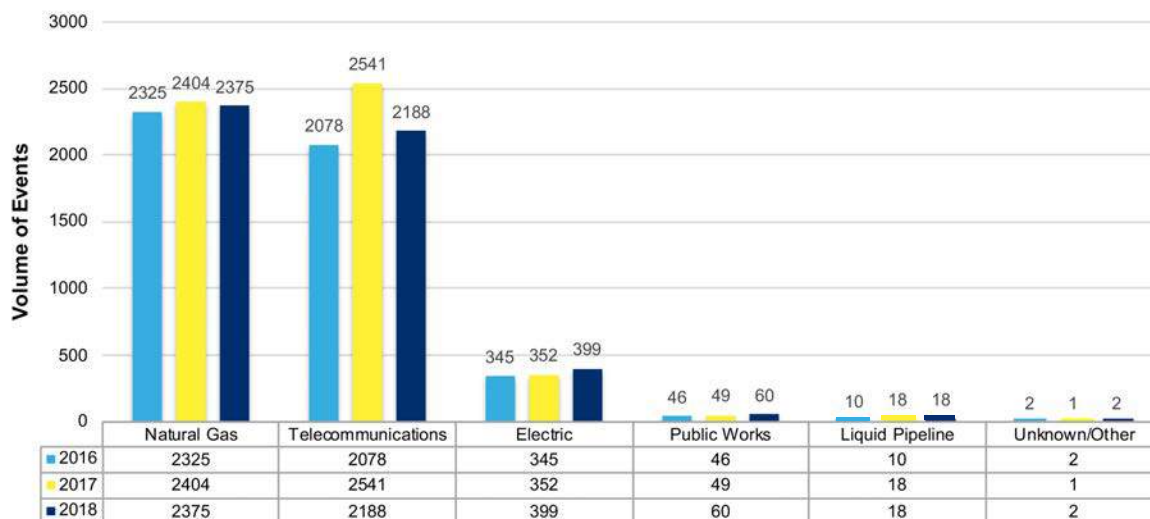


**Figure 4: No Locate Damages by Excavator Type**

## 2.3 SUBMITTED FACILITY EVENTS BY STAKEHOLDER GROUP

Figure 5 illustrates a distribution of events by stakeholder group for the past three years. Based on the figure it can be seen that Telecommunications and Natural Gas continue to submit the highest volumes of events.

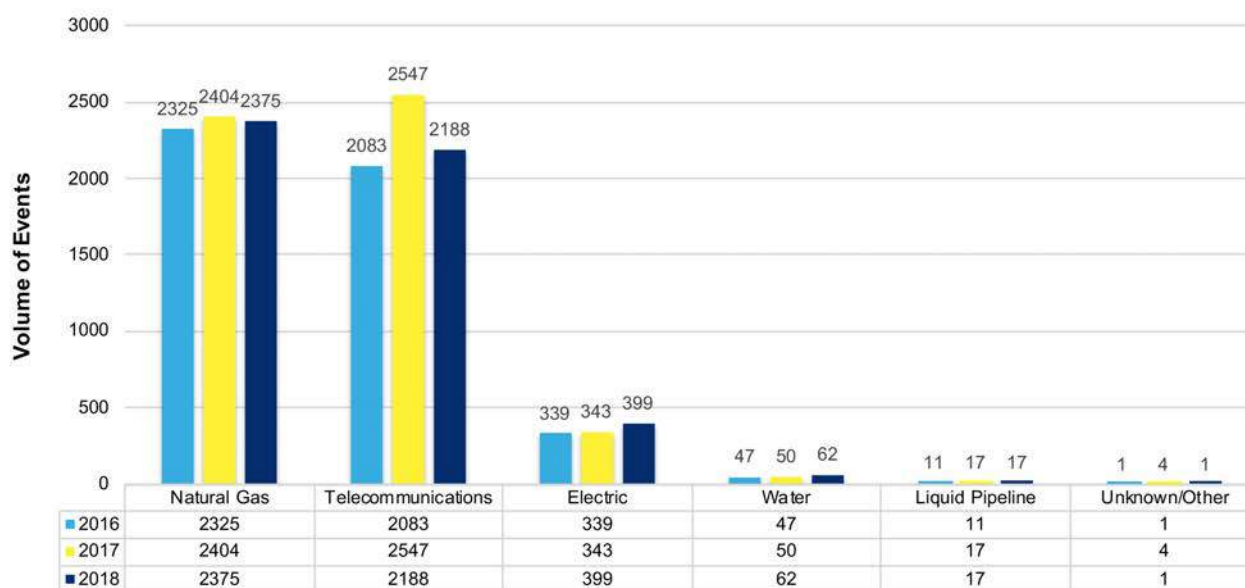
Opportunity exists for additional stakeholders to submit events which would support future trend analysis.



**Figure 5: Facility Events Submitted by Stakeholder Group**

## 2.4 SUBMITTED FACILITY EVENTS BY TYPE OF FACILITY OPERATION AFFECTED

Figure 6 illustrates that Telecommunications and Natural Gas can be seen as the primary facilities affected by events reported in DIRT. This aligns with the fact that



**Figure 6: Submitted Facility Events by Type of Facility Affected**

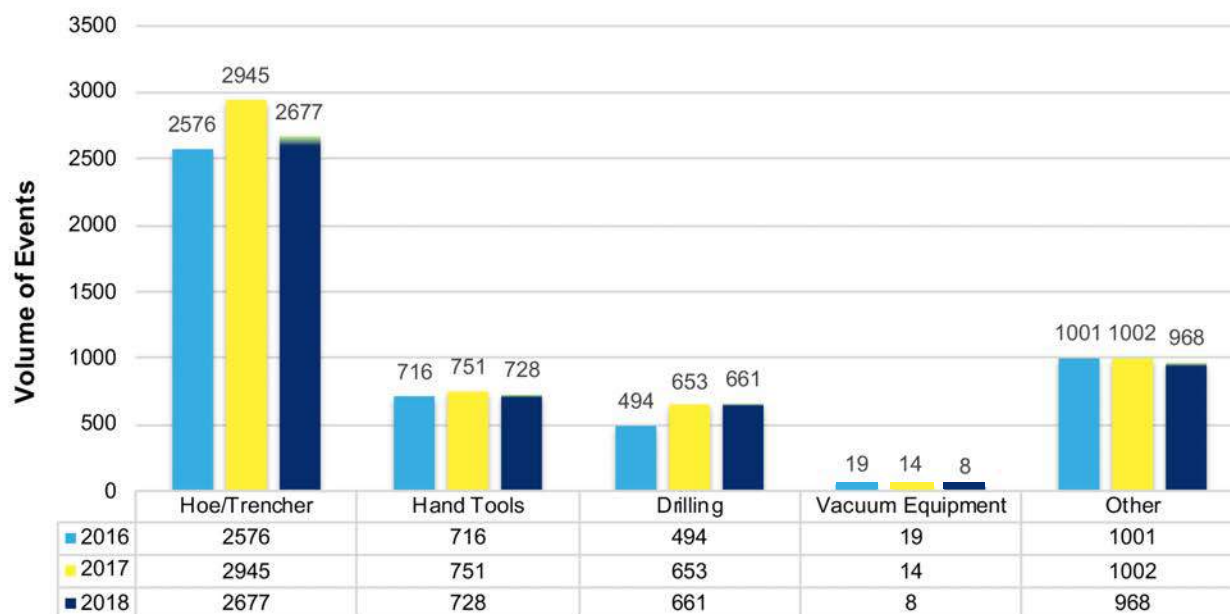
## 2.5 VOLUME OF EVENTS BY EXCAVATION EQUIPMENT GROUP

Table 3 outlines the types of excavation equipment included in each equipment group.

Group	Excavation Equipment Type	
Hoe/Trencher	Backhoe/Trackhoe	Trencher
Hand Tools	Hand Tools	Probing Device
Drilling	Auger	Directional Drilling
	Boring	Drilling
Vacuum Equipment	Vacuum Equipment	
Other	Bulldozer	Grader/Scraper
	Data Not Collected	Milling Equipment
	Explosives	Other
	Farm Equipment	

**Table 3: List of Equipment Groups**

Figure 7 illustrates a distribution of events caused by various groups of excavation equipment. In 2018 the Hoe/Trencher group continues to account for the largest volume of events, despite a significant drop in overall incidents. Efforts should be made by reporting groups to minimize listing equipment as “Other” in order to improve the accuracy of data.



**Figure 7: Submitted Facility Events by Excavation Equipment Group**

## 2.6 FACILITY EVENTS BY ROOT CAUSE

Table 4a details the Root Cause subcategories included in each main category.

\* Indicates Category/Subcategory change in 2018 / \*\* Moved to Locating Issue / \*\*\* Deleted from Report

Legacy Root Causes and Subcategories		
Root Cause Category	Root Cause Subcategory	
Excavation Practices Not Sufficient	Failure to maintain the marks*	Failure to support exposed facilities*
	Failure to use hand tools where required***	Failure to verify location by test-hole (pot-holing)*
	Improper backfilling*	Other insufficient excavation practices*
	Failure to maintain clearance	
Locating Practices Not Sufficient*	Facility could not be found/located*	Facility marking or location not sufficient
	Facility was not located or marked	Incorrect facility records/maps***
Miscellaneous Root Causes	Abandoned facility**	Data Not Collected***
	Deteriorated facility*	One-Call center error***
	One-Call notification center error*	Other***
	Previous damage*	
One Call Notification Practices Not Sufficient*	No notification made to the one-call center*	Notification to one-call center made but not sufficient
	Wrong information provided*	

**Table 4a: Legacy Root Cause Category and Subcategory**

Table 4b denotes the new data standard for the 2018 DIRT Form which has been implemented alongside Table 4a.

2018 Root Causes and Subcategories		
Root Cause Category	Root Cause Subcategory	
Excavation Practices Not Sufficient	Marks faded or not maintained	Excavator failed to protect/shore facilities
		Excavator dug prior to verifying marks by test-hole (pothole)
	Improper backfilling practices	Improper excavation practice not listed above
	Failure to maintain clearance	
Locating Issue	Facility not marked due to : Abandoned Facility	Facility not marked due to : Unlocatable Facility
	Facility not marked due to : Incorrect Facility records/maps	Facility marked inaccurately due to: Abandoned facility
	Facility not marked due to : Locator error+	Facility marked inaccurately due to: Incorrect facility records/maps
	Facility not marked due to : No response from Operator/contract locator+	Facility marked inaccurately due to: Locator error
	Facility not marked due to : Tracer wire issue+	Facility marked inaccurately due to: Tracer wire issue
Miscellaneous Root Causes	Deteriorated facility	
	One-Call notification center error	Root Cause not listed (comment required)+
	Previous damage	
Notification Issue	No notification made to the one-call center/811	Excavator dug outside area described on ticket+
	Excavator provided incorrect notification information	Excavator dug prior to valid start date/time+
		Excavator dug after valid ticket expired+

**Table 4b: 2018 Root Cause Category and Subcategory**

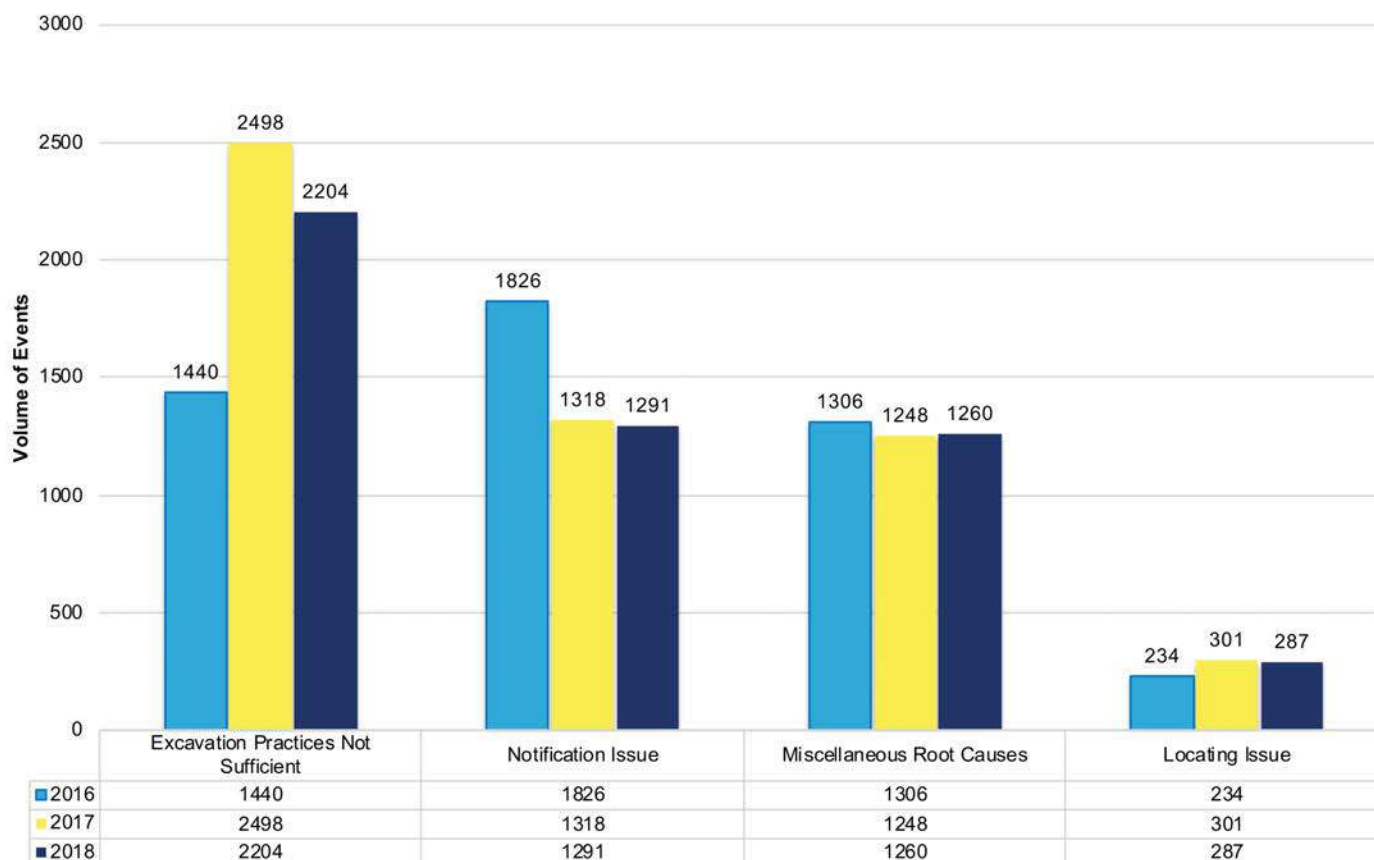
As of 2018, these are the root causes and subcategories we will be using. In order to develop useful educational tools to improve the damage prevention performance in Ontario, it is important to examine the causes of reported events. To further understand the most common reasons for facility events, the distribution of Root Cause subcategories will be examined on the following pages.

## 2.6 FACILITY EVENTS BY ROOT CAUSE

Figure 8 illustrates the distribution of events by Root Cause category. The most common identified causes of events are a result of Excavation Practices Not Sufficient, Notification Issues, Miscellaneous Root Causes and Locating Issues.

Although we have seen a decrease in Excavation Practices Not Sufficient, emphasis should be made to reduce events in this category by providing targeted outreach/educational information to excavators.

In order to improve the completeness of data, efforts should be made by reporting groups to minimize using Miscellaneous Root Causes.



**Figure 8: Facility Events by Root Cause Category**

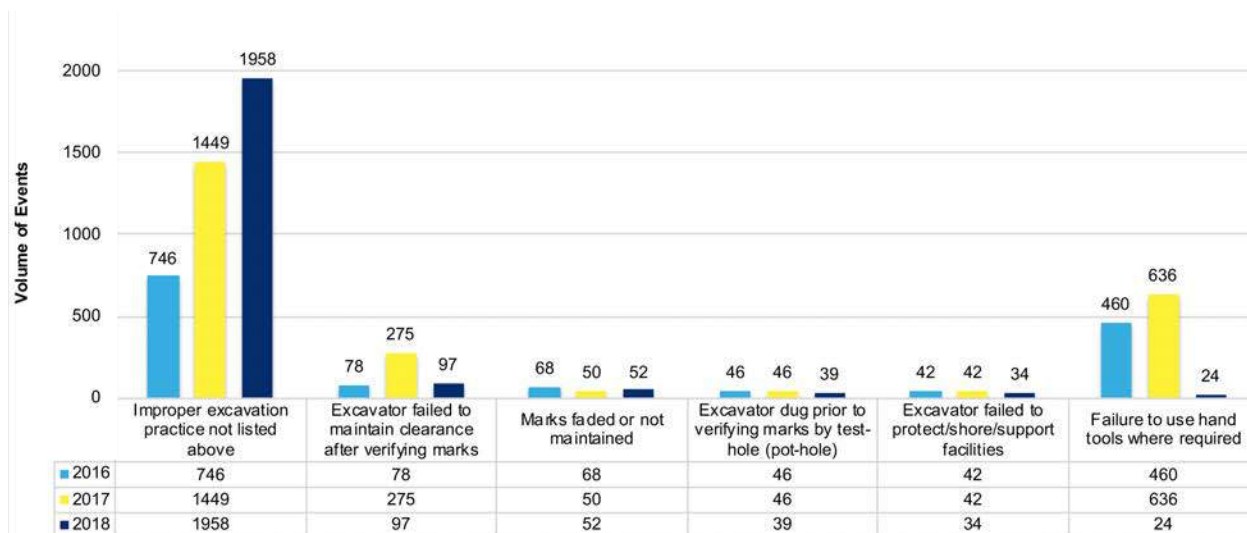
Due to the change from the Legacy to the 2018 standard, graphs may show fluctuations of incidents reported by Root Cause.



## 2.6 FACILITY EVENTS BY ROOT CAUSE

Figure 9 illustrates a breakdown of the Root Cause subcategories for Excavation Practices Not Sufficient. As seen below, Improper Excavation Practice Not Listed Above has seen a dramatic increase over the previous year. This Root Cause subcategory is defined as any other excavator error, which cannot be classified as one of the other six Root Cause subcategories within Excavation Practices Not Sufficient.

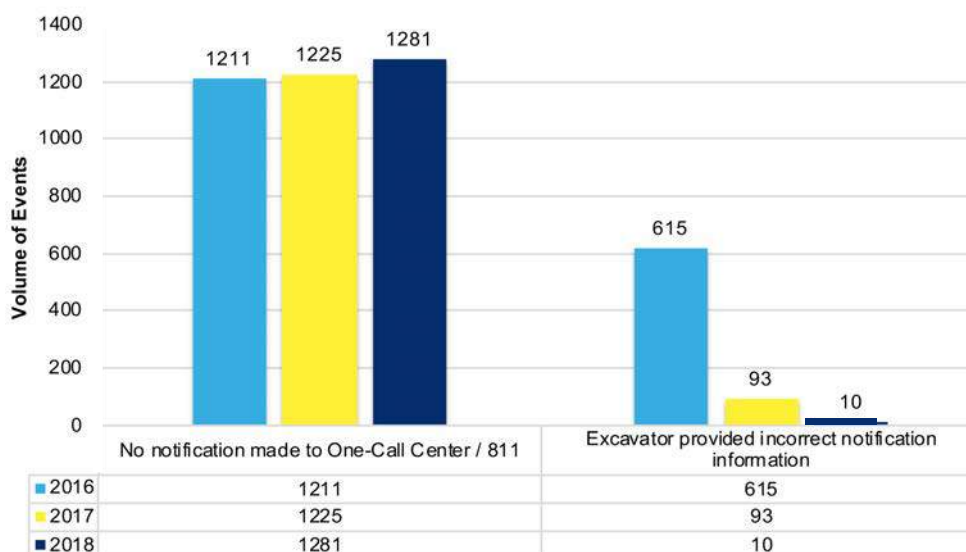
The next highest Root Cause subcategory is the failure to maintain clearance.



**Figure 9: Facility Events by Excavation Practices Not Sufficient**

Due to the change from the Legacy to the 2018 standard, graphs may show fluctuations of incidents reported by Root Cause.

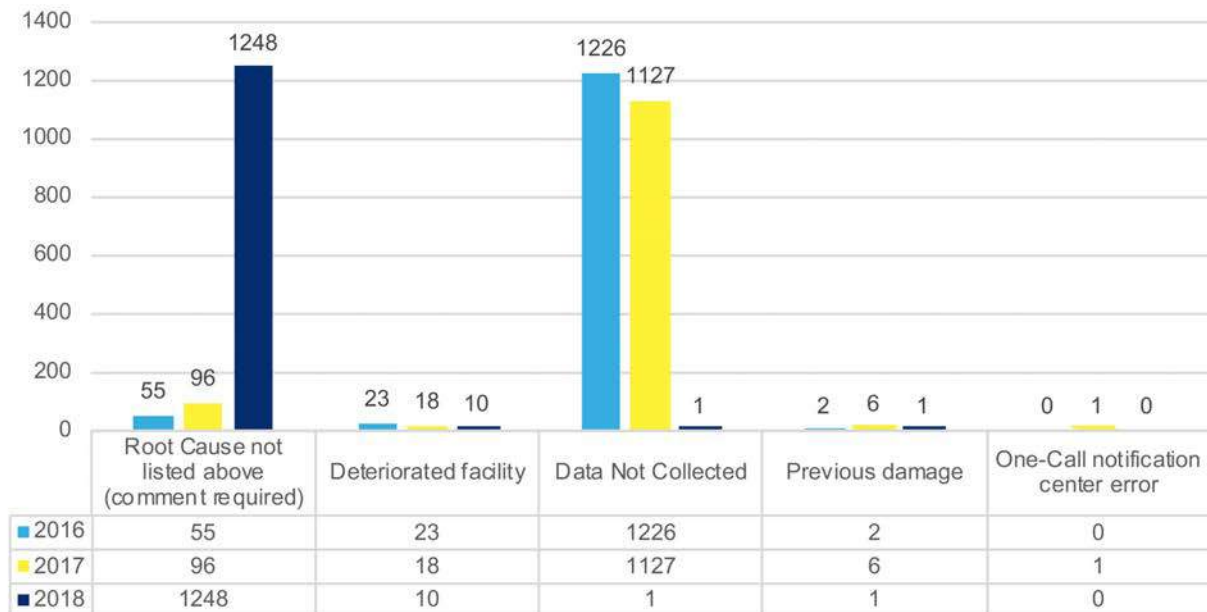
Figure 10 illustrates a breakdown of the Root Cause subcategories for Notification Issues for the past three years. This figure illustrates the need to continuously increase excavator and general public awareness about calling to request a locate before digging starts.



**Figure 10: Facility Events by Notification Issues**

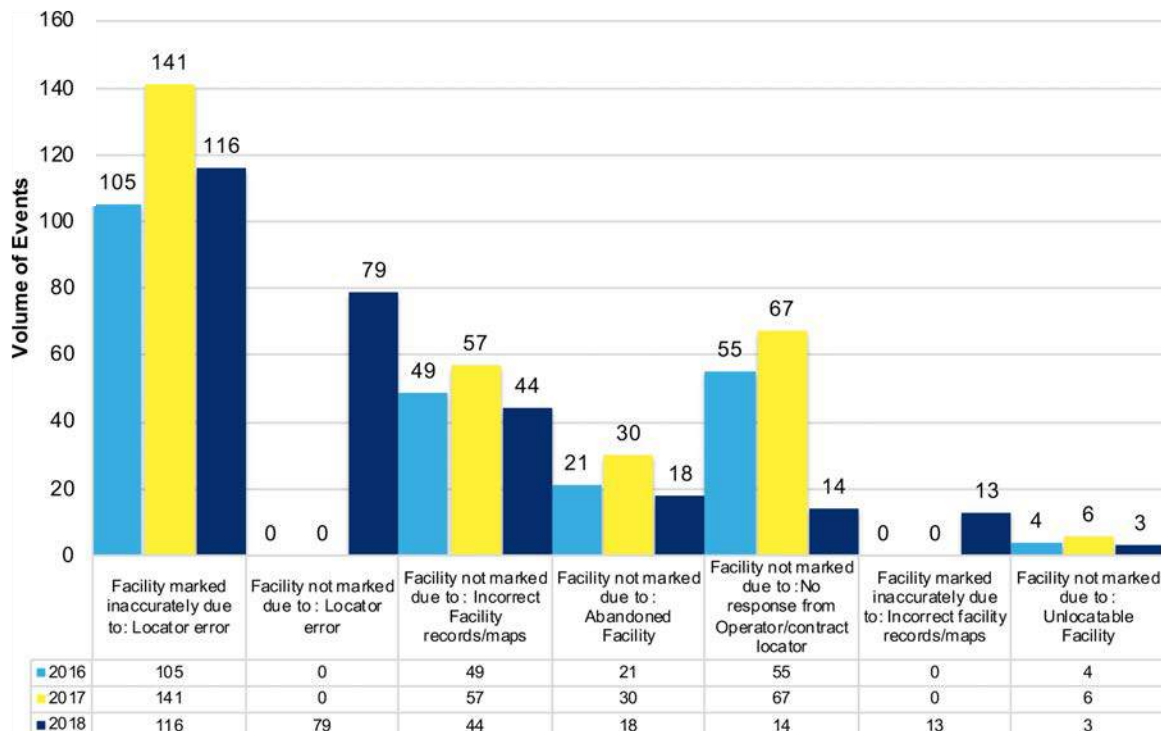
## 2.6 FACILITY EVENTS BY ROOT CAUSE

Figure 11 illustrates a breakdown of the Root Cause subcategories for Miscellaneous Root Causes for the past three years. The most prevalent Root Cause subcategory is Root Cause Not Listed Above, which in previous years was listed as Data Not Collected. Data Not Collected is not an option in the 2018 format.



**Figure 11: Facility Events by Miscellaneous Root Causes**

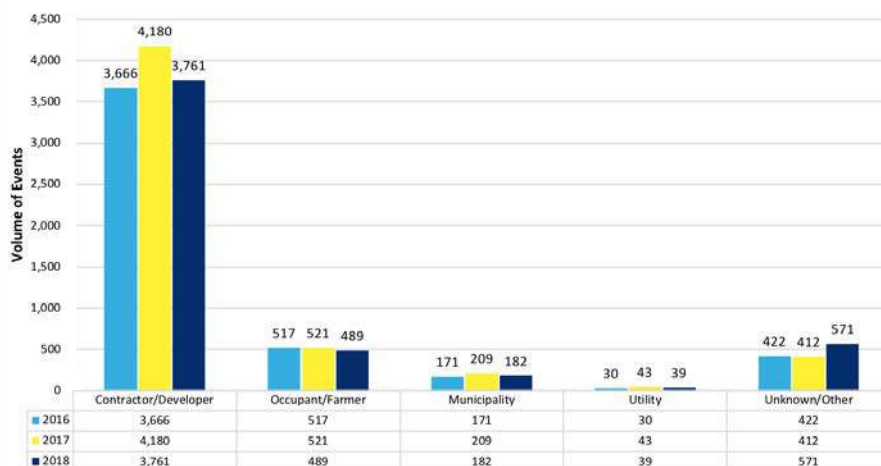
Figure 12 illustrates a breakdown of the Root Cause subcategories for Facility Events by Locating Issues.



**Figure 12: Facility Events by Locating Issues**

## 2.7 FACILITY EVENTS BY EXCAVATOR GROUP

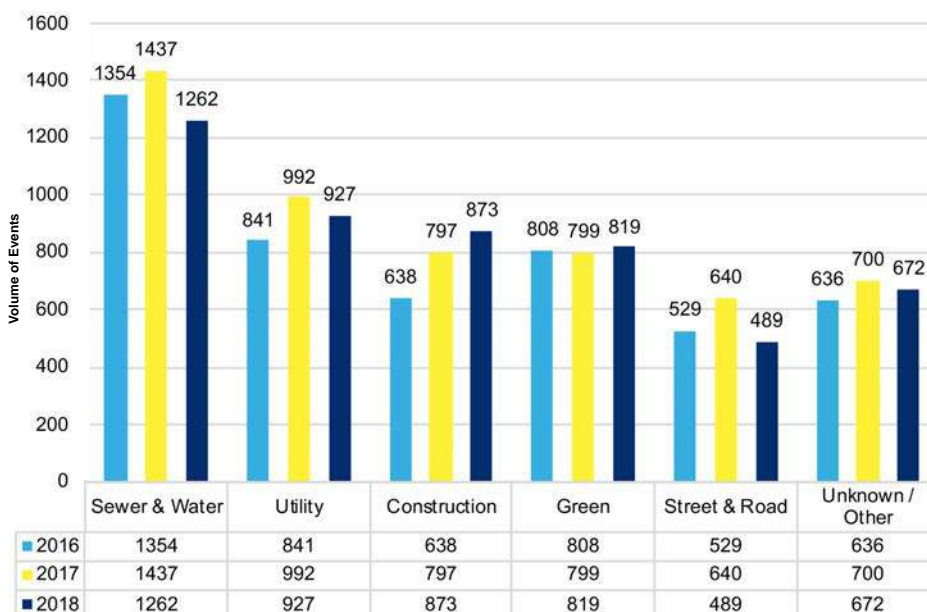
Figure 13 illustrates the distribution of events by Type of Excavator showing that Contractor/Developer continues to be involved in the majority of the reported events, although there has been a decrease from 2017. There has also been an increase in unknown other. In order to develop useful educational tools to improve the damage prevention performance in Ontario, it is important to examine the parties causing reported events. Additional analysis of these groups is provided in the 3.0 Multi-Field Analysis section of this report.



**Figure 13: Facility Events by Type of Excavator**

In order to develop useful educational tools to improve the damage prevention performance in Ontario, we will examine the common Types of Work causing these events on the following page.

Figure 14 illustrates a distribution of Events by Type of Work Performed. Sewer & Water continues to be involved in the majority of the events submitted, but has seen a significant decrease from 2017. Also, of concern is Construction which has shown an increase three years in a row. Those who are responsible for submitting events should strive to reduce the amount listed as Unknown/Other in order to improve data completeness and accuracy.



**Figure 14: Facility Events by Type of Work Performed**

## 2.8 FACILITY EVENTS BY TYPE OF WORK PERFORMED

Table 5 illustrates the largest Type of Work Performed. When broken down into identifiable sub groups, Water is first with 815 events, followed by Building Construction with 633, followed by Telecommunications with 487 events.

This takes into account over one third of events and would provide the greatest impact in being reduced. Unknown other would be the second, however it is not identified.

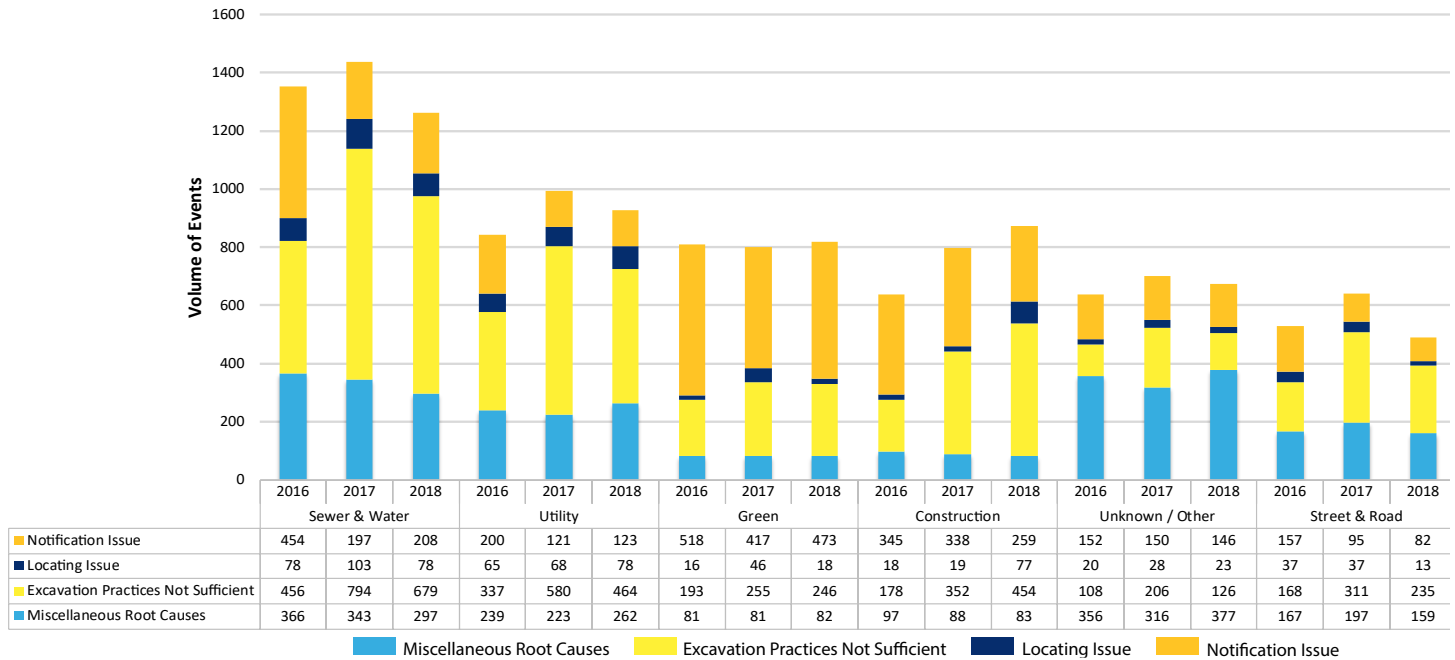
Group & Type of Work	2016	2017	2018
<b>Construction</b>			
Bldg. Construction	387	543	633
Driveway	149	137	129
Site Development	45	63	54
Grading	40	42	37
Bldg. Demolition	17	12	20
<b>Green</b>			
Fencing	437	437	479
Landscaping	358	344	330
Irrigation	8	12	8
Waterway Improvement	3	2	1
Agriculture	2	4	1
<b>Sewer &amp; Water</b>			
Water	839	935	815
Sewer	348	337	274
Drainage	167	165	173
<b>Street &amp; Road</b>			
Road Work	348	343	284
Storm Drain/Culvert	50	108	84
Curb/Sidewalk	74	116	80
Pole	27	34	11
Public Transit Authority		1	9
Street Light	10	16	8
Traffic Signal	9	6	7
Traffic Sign	11	16	6
<b>Utility</b>			
Telecommunications	337	545	487
Electric	296	289	273
Natural Gas	128	113	101
Cable TV	79	45	66
Liquid Pipeline	1		
<b>Unknown / Other</b>			
Unknown/Other	618	682	672
Data Not Collected	17	17	
Engineering/Surveying	1	1	

**Table 5: List of Work Included in Each Work Group**

## 3.0 MULTI-FIELD ANALYSIS

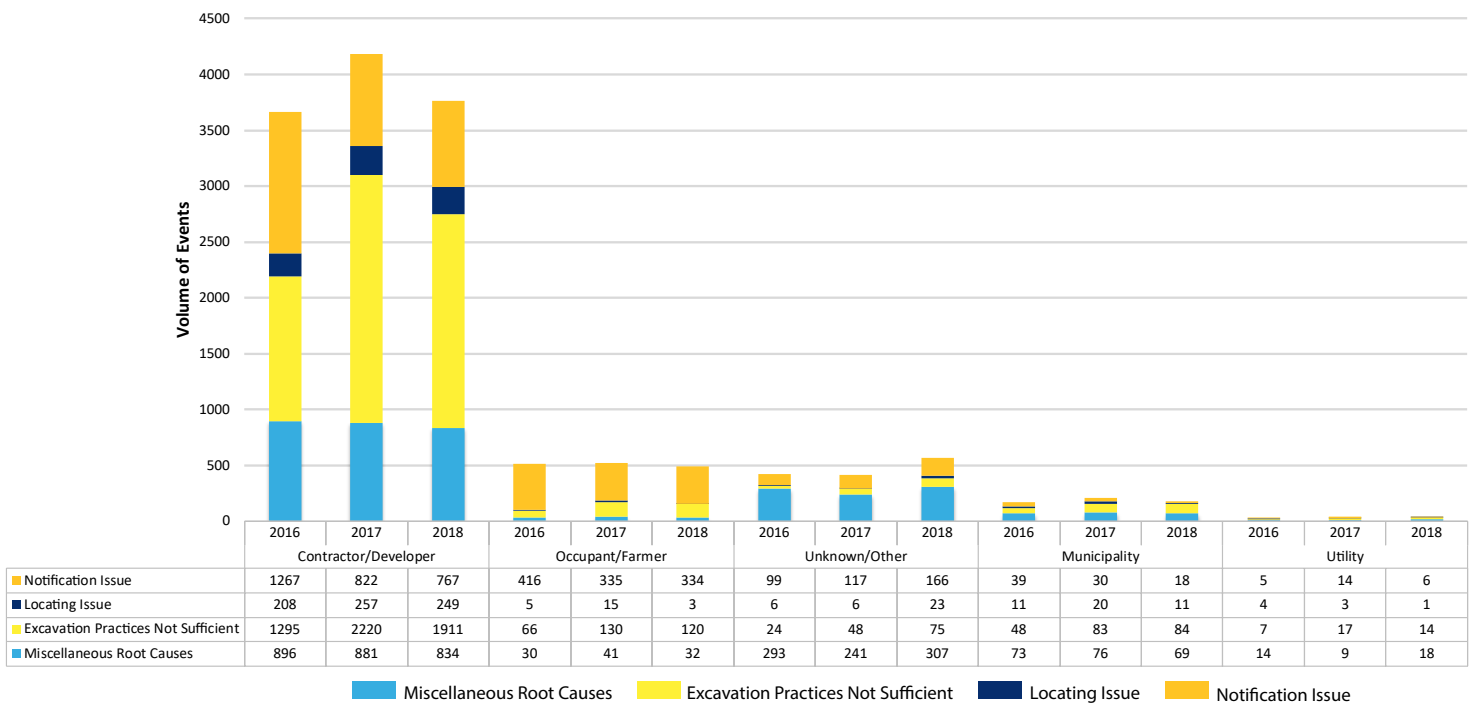
### 3.1 ANALYSIS OF ROOT CAUSE AND FACILITIES AFFECTED BY TYPES OF WORK

The following charts illustrate the known Root Causes of events for the six work groups of Sewer and Water, Utility, Green, Construction, Unknown/Other and Street & Road Work for the years 2016, 2017 and 2018.



**Figure 15: Facility Events by Root Cause Group and Industry**

Figure 16 illustrates that the Contractor/Developer excavator type still represents the majority of events submitted under Excavation Practices Not Sufficient category, and has seen a decrease in 2018.



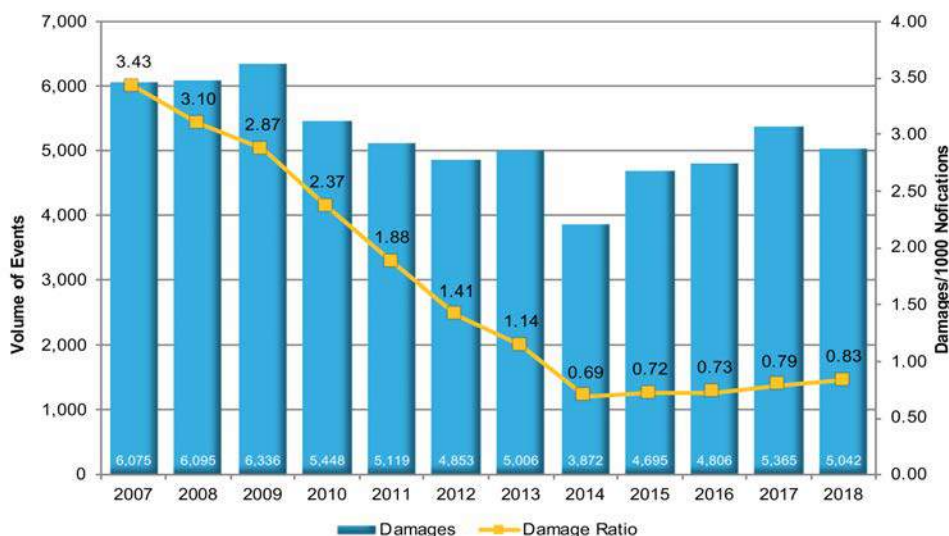
**Figure 16: Facility Events by Root Cause Category and Excavator Type**



### 3.1 ANALYSIS OF ROOT CAUSE AND FACILITIES AFFECTED BY TYPES OF WORK

Figure 17 illustrates the damage ratio relative to the volume of events over the past decade. Industry practice is to measure damage prevention performance by the volume of damages per thousand notifications.

Due to change in Ontario One Call process, notifications are down 10% which affects the Damage Ratio.



**Figure 17: Damage Ratio- Damages/1000 Notifications**

In response to the Ontario One Call changes, this chart was created to show damages per 1000 requests as this has remained consistent and is driven by either public awareness or economic events.

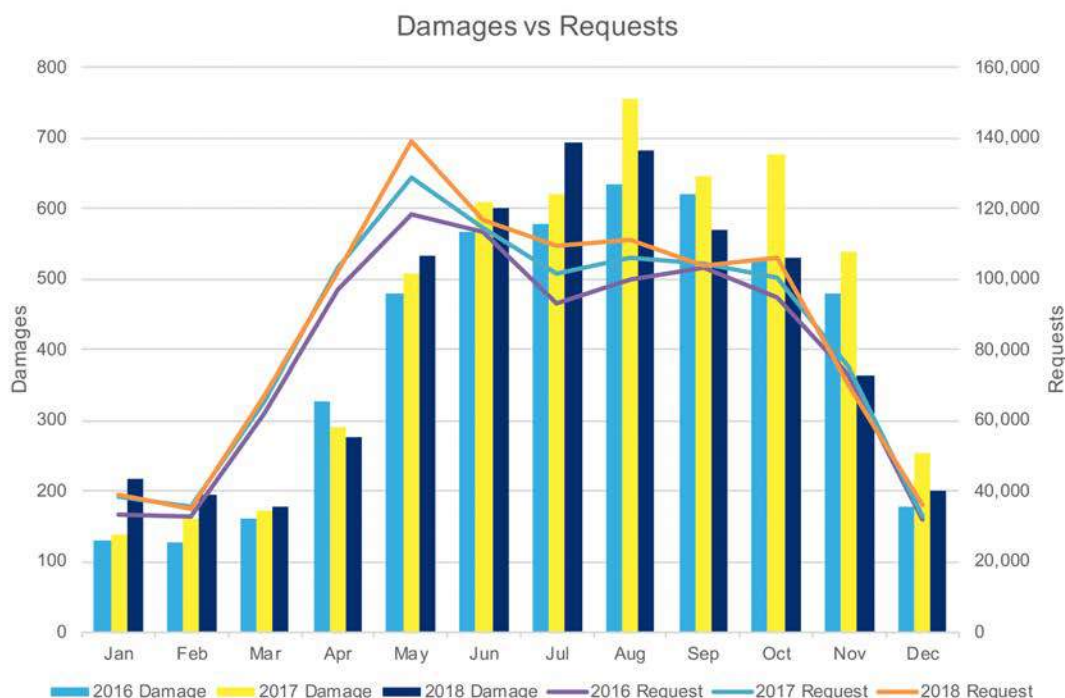
The 2018 Damage to Request Ratio shows a decrease reversing an upward trend from 2014. This appears to disagree with Figure 17, however as explained there, this is due to a process change at the One Call Centre.



**Figure 18: Request Ratio**

### 3.1 ANALYSIS OF ROOT CAUSE AND FACILITIES AFFECTED BY TYPES OF WORK

The following is chart is new for 2018 and shows that although the peak of locate requests happens in May, the peak for damage incidents occurs around Q3.

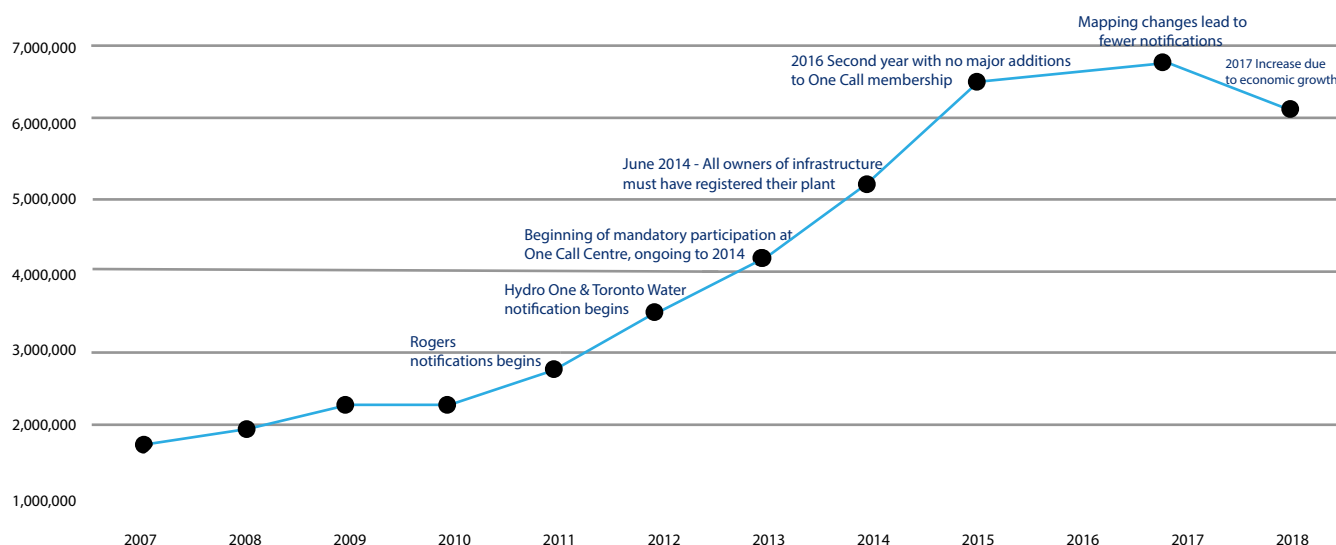


**Figure 19: Damages by Month**

#### Figure 20: History of Notifications

This graph demonstrates that up until 2015, notifications rose significantly as major stakeholders became members of Ontario One Call.

**Any further changes would be due to outside economic events.**



**Figure 20: History of Notifications**

## 4.0 REGIONAL PARTNER DATA

The number of damages reported via DIRT for Canada in 2017 totaled 11,383. Table 1 presents a summary of key performance indicators related to damages by province/region. Canada wide, there were on average 45 reported damages per work day (assuming 254 work days per year).

Damage ratio per 1,000 locate requests varied by province ranging from a low of 1.9 damages per 1,000 locate requests in Atlantic Canada to a high of 7.8 damages per 1,000 locate requests in British Columbia.

Damage ratio per 1,000 notifications sent to member companies ranged from 0.7 in Ontario to 1.7 in British Columbia and Alberta.

Table 1: Damages, requests, notifications, by Province/Region, 2017

Province/Region	Damages	Damages per work day	Damage ratio per 1,000 locate requests*	Damage ratio per 1,000 notifications**
British Columbia	1,477	5.8	7.8	1.7
Alberta	2,764	10.9	7.3	1.7
Saskatchewan	483	1.9	3.3	1.1
Manitoba	177	0.7	2.9	1.3
Ontario	5,184	20.4	5.0	0.7
Quebec	1,232	4.9	4.7	2.2
Atlantic	66	0.3	1.9	1.2
Total	11,383	44.8	5.4	1.0

\* Locate request is defined as 'communication between an excavator and One Call Centre personnel in which a request for locating underground facilities is processed'.

\*\* Notifications take place when One Call Centres transmit locate requests to their member facility operators. Each incoming notice of intent to excavate will generate several notifications to the electric, gas, water, sewer, cable TV, telecommunications, etc.

To view the 2017 CCGA DIRT Report in its entirety, please go to the ORCGA website <https://orcga.com/publications/dirt-report/>

5.0 ARTICLES

ARTICLE 1: The Dollars and Cents of Damage Prevention

In 2018, there were 5042 Facility Events. Each of those events represents Direct and Indirect Costs.

Direct Costs arise from repairing the damage and are related to the:

Costs of replacement materials used	Costs of materials used;	Labour costs;	Administrative costs needed to rehabilitate the damaged infrastructures.
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Indirect Costs arise from the damage and its economic assessment of all resulting disruptions. They are varied and can cover a wide range of areas, such as:

Service disruption following damages to infrastructures	Intervention of emergency services	Evacuating businesses and residential sectors	Risk of injury and death	Loss of product	Environmental impact
Economic impact on businesses and companies	Work delays	Administrative and legal costs	Negative impact for owner companies	Disturbances to neighbouring lands and infrastructures	Traffic disturbances

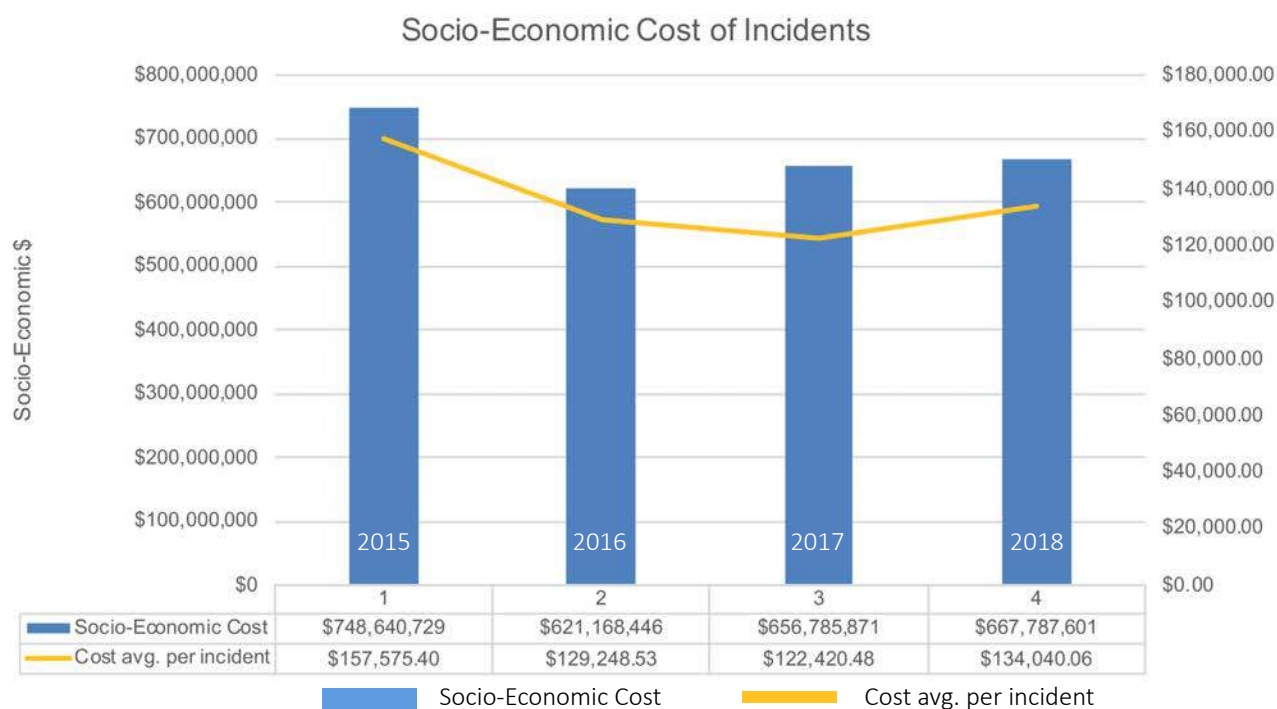
The direct costs are quite small when contrasted with the indirect costs.

By delineating the actual costs related to underground infrastructure damage, the DIRT Report hopes to:

Highlight the economic importance of damage prevention	Demonstrate to other stakeholders that they too should allocate resources	Show the importance of developing partnerships amongst all excavation stakeholders	Help stakeholders understand the monetary risk of excavation projects
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This year we are hoping to start looking at the trends in the costs related to the incidents recorded in the DIRT report.

As seen in the chart (Fig. 21) below, as of this point there is no discernable trend in the four years of data we have. Also as of this point and time, we have no breakout of what infrastructure was damaged. This limits our ability try to peer deeper and see if the variation in the average cost per incident is related to the distribution of the damages between the different Stakeholders.



**Fig 21 Socio-Economic Cost of Incidents**



## ARTICLE 2: The First Comprehensive Municipal DIRT Report is In!

Each year, many of Ontario's utility owners submit their Damage Investigation Reporting Tool (DIRT) findings to the ORCGA. This information is used to compile the annual DIRT report, published each spring. Historically, no medium or large municipal utility has completed the voluntary reporting, which has limited knowledge and awareness across the industry. Halton Region is the first municipality to submit information which will be included in the 2018 report. This article takes a closer look at their findings for water system damages.

Municipalities own the majority of infrastructure buried within roadway corridors. In Ontario, this typically includes water systems, wastewater and storm sewers, street lighting, traffic control systems, and some small fiber optic communications. While a small percentage of municipalities voluntarily became members of Ontario One Call, most did not until June 19, 2014, when it became required under the Ontario Underground Infrastructure Notification System Act.

Since then, municipal membership in ORCGA has grown from 27 municipalities to 46. Despite ORCGA membership including over 10% of the province's 444 municipalities, the current members reflect many medium and large municipalities, representing the majority of Ontario's population. These members have increased their attendance and participation in ORCGA events, including a dedicated panel discussion at the most recent 2019 Damage Prevention Symposium in Niagara Falls.



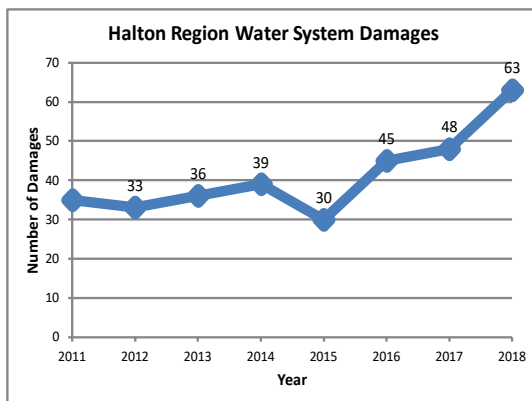
As relatively new ORCGA members, municipalities had not yet participated in the annual voluntary DIRT reporting.

As a new member, Halton Region wanted to contribute to the organization's goals by submitting the first comprehensive reporting done by a municipality.

Halton Region is an excellent candidate to submit information because, just like Ontario itself, it has a mix of large and growing cities, small towns and hamlets, and a considerable rural area.

Water system reporting was selected as the first submission because system damages always require Halton Region to be informed of the incidents and attend all repairs. In preparing their submission, Halton Region wanted to provide data for as many years as possible, to show trends.

Fortunately, they were able to mine the data within their computerized maintenance management system that went live in 2010. The system was used to examine every water system damage work order record from 2011 to 2018 and complete a DIRT report for each damage incident. The incident details were then entered into ORCGA's shared system at the end of the year. This eight-year review period allowed Halton Region to consider damages pre-and-post Halton Region's June 19, 2014 membership to Ontario One Call.



Generally, the findings show that between 2011 and 2018, the number of damage incidents did not improve. The review also made it clear that, like other industries, water system damages are mostly caused by contractor hoes/trenchers. However, unlike other reporting utilities, water system damages were almost exclusively caused by water/sewer jobs and rarely by other types of work performed.

The DIRT reporting program then allowed Halton Region to compare themselves to other types of utility owners for the first time using an 'apples-to-apples' approach to gain a better understanding of their damage prevention program. In doing so, they discovered that their damages per notification ratio has been 'best-in-class' for several years. Halton Region's locates program can already be considered successful, and the DIRT reporting now provides them with strategic information to shift to a more proactive model for damage prevention.

While all utility owners are now mandated to be members of Ontario One Call, Halton Region observes that most ORCGA participants tend to be excavators, operations, dedicated damage prevention teams, or LSPs. Project designers and project owners do not yet have a notable presence or engagement. At the same time, the DIRT report shows that the ratio of damages per notification has stalled industry-wide since 2014. This stalled momentum may be the best that can be expected given that project owners delegate the majority of damage prevention responsibility through their contractors to an assembly of locators under a 5-day response constraint.



The CCGA Best Practices V3.0 outline many proactive damage prevention measures that could be done by project designers and project owners prior to tendering and construction. The industry may need to consider that damage per notification ratios will remain flat until more design-stage practices are voluntarily undertaken, or provincially required.

**About the authors: Eric Boere is the Manager of Water & Wastewater System Services at Halton Region. Shweta Salil is a Civil Engineering, Honours, Co-operative Program student at the University of Waterloo.**

## **ARTICLE 3: Plan before you dig on Construction Projects**

### **What does Compliance Look Like under Ontario's Health and Safety Legislation & Who is Responsible?**

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The hazards associated with digging an excavation can lead to serious incidents involving workers at construction sites. Workers can be critically injured or die from shock and electrocution or flammable explosive gases as a result of contact with and subsequent damage to underground services like hydro and gas. For this reason, Ontario's health and safety legislation enforced by Ministry of Labour (MOL) inspectors outlines the duties and prescribes the regulatory requirements that must be complied with to ensure underground utilities are accurately located prior to digging an excavation. The MOL understands that the formal language used in the Provincial legislation can be confusing for work places trying to identify what their duties are under the Occupational Health and safety act (the Act) to ensure worker safety and more specifically what needs to be done to comply with the regulatory requirements pertaining to locates and excavations.

This article is intended to provide clarification regarding work place party duties under the Act and precautions prescribed under the Construction Regulation 213/91 that excavators and locate service providers must take prior to digging an excavation on a construction project. The goal is to assist the digging community in making a determination if compliance with the regulatory requirements pertaining to utility locates has been achieved before an order is issued by the Ministry of Labour (MOL) inspector.

#### **The Ministry of Labour's Definition of an Excavation**

The MOL's definition of an excavation differs somewhat from other regulators in Ontario. The MOL defines an excavation as 'soil displacement' as opposed to 'ground disturbance.' Consequently, unless there is a visible displacement of soil, the locate section of Regulation 213/91 would not apply.

For example, piercing the ground with a diagnostic tool such as a "gas sniffer" or "pogey bar" may not be considered an excavation and so may not require a locate. In this situation, the MOL health and safety inspector would take into consideration such factors as the size of the tool and the depth of ground penetration in addition to visible soil displacement when determining if compliance has been achieved.

#### **Duties under the Act and Construction Regulation**

On a project in Ontario, employers, including locate service providers (LSP's) and excavators that are locating underground services and digging / excavating have general duties as employers under section 25 of the Act to:

Take every precaution reasonable in the circumstances for the protection of a worker.

Provide information, instruction and supervision to a worker to protect the health or safety of the worker.

Acquaint a worker or a person in authority over a worker (such as the Supervisor) with any hazard in the work.

In conjunction with the general duties under the Act, excavators and locate service providers are obliged to comply with the locate requirements prescribed in section 228 of the Construction Regulation 213/91 (O.Reg 213/91). The Excavation Section of O.Reg 213/91 prescribes what the employer excavating must do before and while digging takes place in order to keep workers safe. This includes:

All utilities, including gas, hydro, sewer/water, telecomm etc. are located and the ground visibly marked in or near the area to be excavated [section 228. (1)(a)].

If a service poses a hazard, the excavator shall contact the service owner to shut off and disconnect the service before the excavation activity begins [section 228 (1)(c)].

If a potentially hazardous service cannot be disconnected, the service owner – for gas, hydro, water, telecommunications, etc.- must be asked to supervise the service's uncovering during the excavation [section 228(2)].

Pipes, conduits and cables for gas, electrical and other services in an excavation shall be supported to prevent their failure or breakage [section 228(3)].

Note: If the electrical service is “live” and has not been shut off and disconnected, then the LDC that owns the utility must be contacted to send workers, who are authorized and qualified to support and protect their energized infrastructure. This is not the job for the excavators' workers.

Section 228 of O.Reg 213/91 also prescribes the obligation of the LSP employer and their worker locating and marking the services to:

Ensure that they are accurately located and marked.

### **Identifying The Hazard And Mitigating The Risk Of Making Contact With Underground Utilities When Excavating - Who Is Responsible?**

A hazard is something that can cause harm and the ‘risk’ refers to how great the chance or likelihood is that someone will be harmed by the hazard. Along with identifying the hazard the Employer has a general duty to take every reasonable precaution to protect the health and safety of workers, which includes assessing the risk or likelihood that someone will be harmed by the hazard and put controls in place to reduce the risk. This includes controlling the risks associated with making contact with underground infrastructure during an excavation.

Although up to this point we have focused on the duties and obligations of the excavating employer and the LSP employer for accurately locating and marking the ground, it should be noted that under the Internal Responsibility System (IRS) all workplace parties have a role to play to prevent injuries, illnesses and fatalities on the job. A properly functioning IRS means that each person on the project including the **Constructor, Employer, Supervisor and Workers** are responsible for addressing health and safety issues in the workplace. The IRS is based on the concept that all the workplace parties ought to work together to solve health and safety problems on the job and make improvements on an on-going basis. We have already identified some of the Employer duties under the Act but below are duties of the other workplace parties which contribute to worker safety during in terms of identifying hazards and mitigating the risks during excavation activities at a project:

**Constructor duty** – Constructors shall ensure that every employer and every worker performing work on the project complies with the Act and the regulations so that the health and safety of workers on the project is protected.

**Supervisor duty** – Supervisors must take every precaution reasonable in the circumstances for the protection of a worker which includes making workers aware of the dangers, ensuring workers follow established safe work procedures and that they wear any required personal protective equipment (PPE).

**Worker duty and rights** – Workers have a duty to report any hazard that he/she knows of to the supervisor/employer and have a right to refuse work that they believe is unsafe.

### **What the MOL Inspector Looks for When Determining Compliance with section 228 of O.Reg 213/91 – Precautions Concerning Services**

The MOL inspector may ask to see “valid” locates and/or a confirmation of an “all clear” to ensure that:

All utilities are identified;

The paperwork is up to date and not expired;

The dig parcel on the locate matches the dig location on the project;  
the marks on the ground are preserved and sufficiently observable for their intended purpose;

The locate report contains sufficient information and instructions so that parties relying on it will be able to correctly interpret the marks in the field and identify the limits of the located area;

A copy of the locate report has been provided to the machine operator before digging starts; and,

Hand digging/Hydro vac method is used when exposing the identified utility.



## Frequently Asked Questions by Excavators

### Who is required to request a locate under the Construction Regulation?

Section 228 is silent on who shall request the locate. The MOL inspector does not look at the name of the party who requested the locate because the regulation is very clear that the employer doing the excavation is responsible for:

Making sure that all the underground utilities are located or a written “all clear” is provided for the extent of the dig area before digging begins. [section 228(1)(a)].

That the ground is visibly marked and the markings corresponds to the locate sketch [section 228(1)(a)].

If the constructor or primary employer requests the locate(s) on behalf of the excavator, the excavator is still responsible for complying with section 228(1)(a) and ensuring that the locate is valid.

### Does the MOL require the employer to use the Ontario One Call Service to obtain locates prior to excavating on public property?

The MOL recognizes that the One Call Service is easier for the employer to use to obtain all locates rather than contacting each utility individually. However, the MOL will accept locates done by independent locate service providers (LSPs) for excavations on public land.

Regardless of whether the LSP is an independent provider or Ontario One Call, the regulation requires that the **employer and worker locating and marking the services** ensure that they are **accurately** located and marked as per section [228(1)(b)] of the regulation.

### Who is Responsible under the Regulation for Locating Underground Utilities on Private Property?

Underground utilities located on public rights of way or Crown land include municipal utilities, lines for telecommunication, electricity distribution, natural gas, cable television, fiber optics, traffic lights, street lights, storm drains, water mains and wastewater pipes.

These utility owners are required under the Ontario Underground Infrastructure Notification System Act to provide and update mapping to the One Call Service on an ongoing basis. Under the Notification Act it is the utility owner’s responsibility to issue the locate, mark its underground infrastructure and issue appropriate instructions including warnings and limitations, to the excavating party. The utility owner may also authorize a party to act on their behalf.

Underground utilities located on private property (residential or commercial) are not subject to the notification requirements under the notification act. Private property owners, including homeowners do not have to submit mapping of underground utilities located on their property to OnOneCall. Typically, private property owners do not know what utilities were installed on their property over time prior to purchasing the property. In addition, it is not typical for homeowners to create as-builts or map newly installed underground infrastructure that can be passed on to the next property owner/occupant.

Consequently, excavators and the independent LSPs must be competent and knowledgeable on how to read the land marks to determine if underground utilities exist. The LSPs must rely on available technology, which has its' limitations, to identify the location of the underground infrastructure where no mapping exists. The technology is limited in that sometimes utilities that are buried deep or abandoned (not live) go undetected until the excavator uncovers them or makes contact with the utility while digging. Excavators in these situations may feel they are digging blind and placing their workers at risk. So, who is responsible for ensuring the workers excavating are safe from striking an unidentified utility?

Section 228 of the regulation refers to duties on the excavator and LSPs. Section 228 does not mention utility owners. Consequently, based on the section of the regulation, the MOL would determine if the LSP had complied with their prescribed obligation to provide an accurate locate and if the excavator complied with their prescribed obligation to identify all utilities in the dig area before digging. A determination of which party is responsible for an unidentified service that was damaged would be made by the MOL inspector on a case-by-case basis depending on the facts of the situation. For further information on precautions concerning services please visit the MOL website at <https://www.labour.gov.on.ca/english/hs/> or call the Ministry of Labour Health & Safety Contact Centre toll-free at 1-877-202-0008.

This information has been prepared to assist workplace parties in understanding their rights and duties under the Occupational Health and Safety Act (OHSA) and its regulations. This article does not constitute legal advice. To determine your rights and duties under OHSA, please contact your legal counsel or refer to the legislation.

**Ruhi Sharma - Provincial Specialist**  
**Construction Health and Safety Program**  
**OHSB, Ministry of Labour**

## ARTICLE 4: KNOW Before You Dig!

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In 2003, Ontario witnessed an increase in public awareness as a result of the tragic Bloor Street incident, where 7 people lost their lives due to a gas line that was struck by an excavator. Consequently, the utility industry called out for a more thorough set of regulations, guidelines, best practices, and standards to prevent a similar incident from happening again. Thus, a new set of rules were created that required the excavation community to comply, without providing the necessary training needed to accomplish this.

As a society, we have many training, testing, licencing, and compliance systems in place to protect the public. For example, the Ministry of Transportation (MTO) driver licensing system in Ontario is one such system that was put in place to teach drivers how to drive and comply with the complex rules of the road. We do not put new drivers on the road without proper training, testing and licensing. They are not simply provided with a driver's handbook and told to drive. It sounds preposterous, but this is what has happened to the excavation community.

These damages resulted in an estimated \$650 million in societal cost expenditures. This estimate is based on 20% direct and 80% indirect costs that are a result of repairs, emergency response, evacuation, service disruptions, environmental impacts, down-time, interruption / loss of production and sales, and the redirection of safety services such as 9-1-1.

Unfortunately, these damage costs are grossly underestimated, as they only account for some public utility owned buried facility damages that are voluntarily reported, and do not account for any damages to privately owned facilities. If all public and private damages were reported, the actual statistics would likely be much higher.

Much time and energy are spent on educating the general public through marketing campaigns such as “Call or Click Before You Dig”. These campaigns are invaluable and necessary; however, they are only targeting 25% of excavators who had damages and did not get locates.

The most alarming statistic is that 75% of damages in Ontario resulted after Ontario One Call had been notified and, in most cases, public locates had been completed. So why did that 75% of excavators still cause a damage? The DIRT report breaks down the root causes for the damages into several categories including: Insufficient Excavation Practices; Insufficient Locating Practices; Insufficient One Call Notification practices; and, other miscellaneous root causes.

Public awareness campaigns for “Call or Click Before You Dig” are essential in reducing the amount of damages by excavators who did not call for locates. However, to make a larger impact on reducing damages and their consequential societal costs, efforts need to be focused on educating the excavation community who are already obtaining locates. Unfortunately, many excavators learn how to manage the locate process the hard way, and sometimes they never learn all the risk factors that influence the quality of the information on the locate paperwork and marks on the ground.

If there was no risk of striking a buried facility, there would be no damages. Unfortunately, the risks are real and so are the damages. The quality of the information on locate reports, the marks on the ground, and the work of excavators around buried facilities, are influenced by three risk factors: human; technological; and, work site limitations.

### Human Factors

Human error (despite appropriate training and motivation) Complacency and frustration with our current locate systems	Inability to consistently undertake responsibilities and perform activities successfully (according to set standards)
Inadequate management of procedures	Poor communication (verbal or written)

### Technological Limitations

Electromagnetic cable and pipe locate equipment and ground penetrating radar used to locate buried facilities have many limitations and can be influenced by many factors that include:

Non-conductive, non-tonable buried facilities that cannot be traced	Missing, broken, or incorrectly installed tracer wires on non-toneable buried facilities
Angled buried facilities	Various site conditions that can influence the accuracy of the ground penetrating radar signal
Distortion or ghosting on buried facilities from congested buried facilities or improper signal application	Inadequate resources and staff (for conducting audits, inspections, and testing to ensure workers are following the rules)

### Work Site Limitations

Rain and snow-covered ground	Inaccurate, unavailable, or non-existent public and/or private utility infrastructure records
Loose surfaces – dusty and/or gravel work sites	No access to connection points for facilities when working on private property
Vehicular traffic	No access to knowledgeable operations personnel when working on
Cluttered work areas	

These risks can be mitigated by the excavator to reduce damages by understanding above and below ground utility infrastructure and knowing how to follow a step by step public and private locate process when planning, requesting, and reviewing locates. Most importantly, the marks on the ground must be respected before excavation begins. However, in order to reduce the risks, it is essential to understand:

- Legislation, Standards, Guidelines & Best Practices
- Utility Structures
- Public Locates
- Private Locates
- Locating and Marking

All these factors present us with a complex public and private locate system in Ontario. If one person on the job makes even a small mistake, the results can be catastrophic for the asset owner, everyone involved on the project, and the general public.

When employing workers for excavation purposes, or when directing excavation contractors, the employer needs people with experience, recognised up-to-date qualifications, and relevant health and safety training. The utility locate industry is in its infancy, as such, the regulations, standards, guidelines and best practices, with respect to excavation safety around buried facilities, are numerous and continuously changing.

This presents a tremendous challenge to employers, and those directing the work of others, to ensure that workers are competent and up-to-date with training when working around buried facilities. With a vast amount of information in a state of constant change, the question we hear regularly is, “How do we ensure that our workers are properly trained to ensure we are in compliance?”.

The Ministry of Labour (MOL) states that when appointing a supervisor, that person must be a competent person. The MOL defines a competent person as one who, “is qualified because of knowledge, training and experience to organize the work and its performance; is familiar with this Act and the regulations that apply to the work; and has knowledge of any potential or actual danger to health or safety in the workplace”.

Based on regulations, the person ultimately responsible for the locates is the excavator. The excavator can be an individual, partnership, corporation, public agency or any other person that causes a ground disturbance. Based on the complex locate system that they must navigate to comply, these “workers” should also be “competent” as defined by the MOL. They need the knowledge, training, and experience to be able to understand and decipher the complex locate reports, work area utility structures, and marks on the ground before they dig.

**Grant Piraine**  
**President, Own Your Safety Inc.**



# EXCAVATOR OF THE YEAR AWARDS

**ORCGA recognizes ongoing achievement in our industry through our Awards Program.**

These awards recognize excavators with the best in-class safe digging practices. Excavator of the Year is determined by each contractor's individual damage rate. A damage rate is a calculation dependent on the volume of locates requests, measured against the number of digging related damages to underground infrastructure. Input from infrastructure owners is also used in the determination.

To qualify, excavators must have a minimum of 500 locate requests to Ontario One Call.

## ELECTRIC



## GAS



## HOMEBUILDER



## LANDSCAPE



## ROAD BUILDER



## SEWER/WATER



## TELECOMMUNICATIONS



## MOST IMPROVED





## 7.0 APPENDICES

### APPENDIX A: REPORT FINDINGS - DATA QUALITY INDEX INDICATIONS

Table 6 indicates the Data Quality Index (DQI) for each individual part of the DIRT Field Form. The DQI is a measure of data quality and consists of the evaluation of each organization that submitted records, in addition to the evaluation of each record submitted to DIRT. The overall average DQI is 74.1%.

The weight assigned to the various DIRT parts varies based upon its value in analyzing the event for damage prevention purposes, with Root Cause receiving the largest weight. The overall DQI for a set of records can be obtained by averaging the individual DQI of each record. The “2018 DQI” column in the table below represents the average of all 5042 submitted events in the 2018 dataset.

DIRT Parts	Relative Weight	2016 DQI	2017 DQI	2018 DQI
A: Who is submitting this information?	5%	100.0	100.0	100.0
B: Date and Location of the event	12%	78.2	79.8	81.9
C: Affected Facility Information	12%	90.7	91.2	77.1
D: Excavation Information	14%	86.3	87.4	86.6
E&F: Notification, Locating, Marking	12%	89.8	90.6	78.5
G: Excavator Downtime	6%	15.1	17.6	29.3
H: Description of Damage	14%	37.1	35.1	47.7
I: Description of the Root Cause	25%	73.5	77.4	75.0
Total Weighted DQI	100%	72.6	74.0	76.2

**Table 6: DIRT Submission Parts and DQI**

Of the various parts of the damage report, Parts G: Excavator Downtime, and H: Description of Damage, are often not included, as most of the organizations inputting data into DIRT do not track this information.

## APPENDIX B: DAMAGE INFORMATION REPORTING TOOL: FIELD FORM

Rev: 11/7/2017

\*\*\* indicates a Required Field

### Damage Information Reporting Tool (DIRT) - Field Form

#### Part A – Original Source of Event Information

<b>Who is providing the information?</b>		
<input type="checkbox"/> Excavator	<input type="checkbox"/> Liquid Pipeline	<input type="checkbox"/> Electric
<input type="checkbox"/> Public Works	<input type="checkbox"/> Railroad	<input type="checkbox"/> Locator
<input type="checkbox"/> Telecommunications	<input type="checkbox"/> Unknown/Other	<input type="checkbox"/> Engineer/Design
		<input type="checkbox"/> Natural Gas
		<input type="checkbox"/> Road Builders
		<input type="checkbox"/> Equipment Manufacturer
		<input type="checkbox"/> Private Water
		<input type="checkbox"/> Federal / State Regulator

Name of person providing the information:

#### Part B – Type, Date, and Location of Event

<b>Type of Event:</b>	<input type="checkbox"/> DIRT Event	<input type="checkbox"/> Underground Damage	<input type="checkbox"/> Underground Near Miss
	<input type="checkbox"/> Non-DIRT Event	<input type="checkbox"/> Above Grade	<input type="checkbox"/> Aerial
		<input type="checkbox"/> Natural Cause	<input type="checkbox"/> Submarine

**\*Date of Event:** (MM/DD/YYYY)

**\*Country**      **\*State**      **\*County**      **City**

**Street address:**      **Nearest Intersection:**

**Latitude/Longitude:** Lat:      Lon      ☐ Decimal Degrees      ☐ D M S

**\*Right-of-Way where event occurred**

<b>Public:</b>	<input type="checkbox"/> City Street	<input type="checkbox"/> State Highway	<input type="checkbox"/> County Road	<input type="checkbox"/> Interstate Highway	<input type="checkbox"/> Public-Other
<b>Private:</b>	<input type="checkbox"/> Private Business	<input type="checkbox"/> Private Land Owner		<input type="checkbox"/> Private Easement	
	<input type="checkbox"/> Pipeline	<input type="checkbox"/> Power /Transmission Line		<input type="checkbox"/> Dedicated Public Utility Easement	
	<input type="checkbox"/> Federal Land	<input type="checkbox"/> Railroad		<input type="checkbox"/> Unknown/Other	

#### Part C – Affected Facility Information

**\*What type of facility operation was affected?**

<input type="checkbox"/> Natural Gas	<input type="checkbox"/> Sewer	<input type="checkbox"/> Steam	<input type="checkbox"/> Cable Television	<input type="checkbox"/> Electric	<input type="checkbox"/> Liquid Pipeline
			<input type="checkbox"/> Telecommunications	<input type="checkbox"/> Water	<input type="checkbox"/> Unknown/Other

**\*What type of facility was affected?**

<input type="checkbox"/> Distribution	<input type="checkbox"/> Gathering	<input type="checkbox"/> Service/Drop	<input type="checkbox"/> Transmission	<input type="checkbox"/> Unknown/Other
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**Was the facility part of a joint trench?**      ☐ Yes      ☐ No      ☐ Unknown

**Did this event involve a Cross Bore?**      ☐ Yes      ☐ No

**Was facility owner One Call Center member?**      ☐ Yes      ☐ No      ☐ Unknown

**If No, is facility owner exempt from One Call Center membership?**      ☐ Yes      ☐ No      ☐ Unknown

**Measured Depth**      ☐ Embedded in concrete/asphalt pavement      ☐ <18" / 46 cm      **Measured depth**

**From Grade**      ☐ 18" – 36" / 46 - 91 cm      ☐ >36" / 91 cm      **from grade** \_\_\_\_\_ in/cm

#### Part D – Excavation Information

**\*Type of Excavator**

<input type="checkbox"/> Contractor	<input type="checkbox"/> County	<input type="checkbox"/> Developer	<input type="checkbox"/> Farmer	<input type="checkbox"/> Municipality
<input type="checkbox"/> Occupant	<input type="checkbox"/> Railroad	<input type="checkbox"/> State	<input type="checkbox"/> Utility	<input type="checkbox"/> Unknown/Other

**\*Type of Excavation Equipment**

<input type="checkbox"/> Drilling	<input type="checkbox"/> Directional Drilling	<input type="checkbox"/> Auger	<input type="checkbox"/> Backhoe/Trackhoe	<input type="checkbox"/> Boring	<input type="checkbox"/> Bulldozer
<input type="checkbox"/> Milling Equipment	<input type="checkbox"/> Probing Device	<input type="checkbox"/> Explosives	<input type="checkbox"/> Farm Equipment	<input type="checkbox"/> Grader/Scraper	<input type="checkbox"/> Hand Tools
			<input type="checkbox"/> Trencher	<input type="checkbox"/> Vacuum Equipment	<input type="checkbox"/> Unknown/Other

**\*Type of Work Performed**

<input type="checkbox"/> Curb/Sidewalk	<input type="checkbox"/> Drainage	<input type="checkbox"/> Agriculture	<input type="checkbox"/> Bldg. Construction	<input type="checkbox"/> Bldg. Demolition	<input type="checkbox"/> Cable Television
<input type="checkbox"/> Fencing	<input type="checkbox"/> Grading	<input type="checkbox"/> Irrigation	<input type="checkbox"/> Driveway	<input type="checkbox"/> Electric	<input type="checkbox"/> Engineering/Survey
<input type="checkbox"/> Natural Gas	<input type="checkbox"/> Pole	<input type="checkbox"/> Public Transit Auth.	<input type="checkbox"/> Landscaping	<input type="checkbox"/> Liquid Pipeline	<input type="checkbox"/> Milling
<input type="checkbox"/> Site Development	<input type="checkbox"/> Steam	<input type="checkbox"/> Railroad	<input type="checkbox"/> Road Work	<input type="checkbox"/> Sewer	<input type="checkbox"/> Telecommunication
<input type="checkbox"/> Traffic Signal	<input type="checkbox"/> Traffic Sign	<input type="checkbox"/> Storm Drain/Culvert	<input type="checkbox"/> Street Light	<input type="checkbox"/> Unknown/Other	
		<input type="checkbox"/> Water	<input type="checkbox"/> Waterway Improvement		

#### Part E – Notification and Locating

**\*Was the One-Call Center notified?**      ☐ Yes      ☐ No      **Ticket Number**

If Yes, type of locator      ☐ Facility Owner      ☐ Contract Locator      ☐ Unknown/Other

If No, is excavation activity and/or excavator type exempt from notification?      ☐ Yes      ☐ No      ☐ Unknown

Was work area white-lined?      ☐ Yes      ☐ No      ☐ Unknown

#### Part F – Intentionally left blank

**Part G – Excavator Downtime**

Did Excavator incur down time?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
If yes, how much time?	<input type="checkbox"/> < 1 hr	<input type="checkbox"/> 1 - <2 hrs
	<input type="checkbox"/> 2 - <3 hrs	<input type="checkbox"/> 3+ hrs
Estimated cost of down time?	<input type="checkbox"/> \$0	<input type="checkbox"/> \$1 -1000
	<input type="checkbox"/> \$25,001 - 50,000	<input type="checkbox"/> >\$50,000
	Exact Value _____	<input type="checkbox"/> Unknown

**Part H – Interruption and Restoration**

*Did the damage cause an interruption in service?		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
If yes, duration of interruption	<input type="checkbox"/> < 1 hr	<input type="checkbox"/> 1 - <6 hrs	<input type="checkbox"/> 6 - <12 hrs	<input type="checkbox"/> 12 - <24 hrs
	<input type="checkbox"/> 24 - <48 hrs	Exact Value _____ hrs	<input type="checkbox"/> Unknown	
Approximately how many customers were affected?				
<input type="checkbox"/> Unknown	<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2 - 10	<input type="checkbox"/> 11 - 50
			<input type="checkbox"/> 51+	Exact Value _____
Estimated cost of damage / repair/restoration:		<input type="checkbox"/> \$0	<input type="checkbox"/> \$1 - 1,000	<input type="checkbox"/> \$1,001 - 5,000
	<input type="checkbox"/> \$25,001 - 50,000	<input type="checkbox"/> > \$50,000	Exact Value _____	<input type="checkbox"/> Unknown

**\*Part I – Root Cause Select only one****Notification Issue**

- ☐ No notification made to One Call Center/ 811  
☐ Excavator dug outside area described on ticket  
☐ Excavator dug prior to valid start date/time  
☐ Excavator dug after valid ticket expired  
☐ Excavator provided incorrect notification information

**Excavation Issue**

- ☐ Excavator dug prior to verifying marks by test-hole (pothole)  
☐ Excavator failed to maintain clearance after verifying marks  
☐ Excavator failed to protect/shore support facilities  
☐ Improper backfilling practices  
☐ Marks faded or not maintained  
☐ Improper excavation practice not listed above

**Miscellaneous Root Causes**

- ☐ Deteriorated facility  
☐ Root Cause not listed (comment required)

**Locating Issue***Facility not marked due to:*

- ☐ Abandoned facility  
☐ Incorrect facility records/maps  
☐ Locator error  
☐ No response from operator/contract locator  
☐ Tracer wire issue  
☐ Unlocatable Facility

*Facility marked inaccurately due to*

- ☐ Abandoned facility  
☐ Incorrect facility records/maps  
☐ Locator error  
☐ Tracer wire issue

**Part J – Additional Comments****Part Z – Images and Attachments: List the file names of any images and attachments to submit with this report**Visit [www.cga-dirt.com](http://www.cga-dirt.com)



## APPENDIX C: GLOSSARY OF TERMS

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**Abandoned Line or Facility:** Any underground or submerged line or facility no longer in use.

**Alternate Locate Agreement (ALA):** A contractual agreement between a facility owner and an excavator that allows the excavator to proceed with their excavation work without receiving a traditional field locate.

**Backfill:** The act of filling the void created by excavating or the material used to fill the void.

**CCGA:** The Canadian Common Ground Alliance's (CCGA) primary role is to manage damage prevention issues of national interest that Regional Partners consider best addressed through a single voice.

**CGA:** The Common Ground Alliance (CGA) is a member-driven association dedicated to ensuring public safety, environmental protection, and the integrity of services by promoting effective damage prevention practices.

**Compliance:** Adherence to acts and regulations.

**Damage:** Any impact, stress and/or exposure that results in the need to repair an underground facility due to a weakening or the partial or complete destruction of the facility, including, but not limited to, the protective coating, lateral support, cathodic protection or the housing for the line, device or facility.

**Daylighting:** The exposure of underground utility infrastructure by minimally intrusive excavation practices to ascertain precise horizontal and vertical position or other attributes. (Note: may also be referred to as "potholing" or "test pitting".)

**Demolition Work:** The intentional, partial or complete destruction by any means of a structure served by, or adjacent, to an underground line or facility.

**DIRT:** Damage Information Reporting Tool.

**Downtime:** Lost time reported by a stakeholder on the Damage Information Reporting Tool (DIRT) field form for an excavation project due to failure of one or more stakeholders to comply with applicable damage prevention regulations.

**DQI:** The Data Quality Index (DQI) is a measure of data quality and consists of the evaluation of each organization that submitted records, in addition to the evaluation of each record submitted to DIRT. Event: The occurrence of an underground infrastructure damage, near miss, or downtime.

**Excavate or Excavation:** An operation using equipment or explosives to move earth, rock or other material below existing grade. (Note: Excavation can include augering, blasting, boring, coring, digging, ditching, dredging, drilling, driving-in, grading, plowing-in, pulling-in, ripping, scraping, trenching and vacuuming).

**Excavator:** Any person proposing to or engaging in excavation or demolition work for themselves or for another person.

**Facility:** See Utility Infrastructure.

**Facility Owner/Operator:** Any person, utility, municipality, authority, political subdivision, or other person or entity who owns, operates, or controls the operation of an underground line/facility.

**Grade (noun):** The surface elevation.

**Grade (verb):** The act of changing the surface elevation.

**Joint Trench:** A trench containing two or more underground infrastructures that are buried together by design or agreement.

**Locate (noun):** The provision of location information by an underground facility owner (or their agent) in the form of ground surface markings and/or facility location documentation, such as drawings, mapping, numeric description or other written documentation.

**Locate (verb):** The process of an underground plant owner/operator or their agent providing information to an excavator which enables them to determine the location of a facility.

**Locate Request:** A communication between an excavator and the facility owner/operator or their agent (usually the One Call Centre) in which a request for locating underground facilities is processed.

**Locator:** A person whose job is to locate underground infrastructure.

**Near Miss:** An event where damage did not occur, but a clear potential for damage was identified.

**Notifications:** Ticket data transmitted to underground infrastructure owners.

**One Call Centre:** A system which provides a single point of contact to notify facility owners/operators of proposed excavation activities.

**ORCGA:** The Ontario Regional Common Ground Alliance (ORCGA) is a Regional Partner of both the Common Ground Alliance (CGA) and the Canadian Common Ground Alliance (CCGA). It is a non-profit organization promoting efficient and effective damage prevention for Ontario's vital underground infrastructure.

**Person:** Any individual or legal entity, public or private.

**Public:** The general population or community at large.

**Root Cause:** The primary reason an event occurred.

**Test Hole(s):** Exposure of a facility by safe excavation practices used to ascertain the precise horizontal and vertical position of underground lines or facilities.

**Ticket:** All data required from an excavator to transmit a valid notification to the underground infrastructure owner.

**Ticket number:** A unique identification number assigned by the one call center to each locate request.

**Tolerance Zone:** The space in which a line or facility is located and in which special care is to be taken.

**Underground:** Beneath the ground surface or submerged, including where exposed by temporary excavation.

**Utility Infrastructure:** a cable, line, pipe, conduit, or structure used to gather, store, or convey products or services. (Note: may also be referred to as "facility" or "plant".)

**Vacuum Excavation:** A means of soil extraction through vacuum where water or air jet devices are commonly used for breaking the ground.

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