CCGA
Canadian Common Ground Alliance

DIRT Report 2021

October 2022

DIG SAFE

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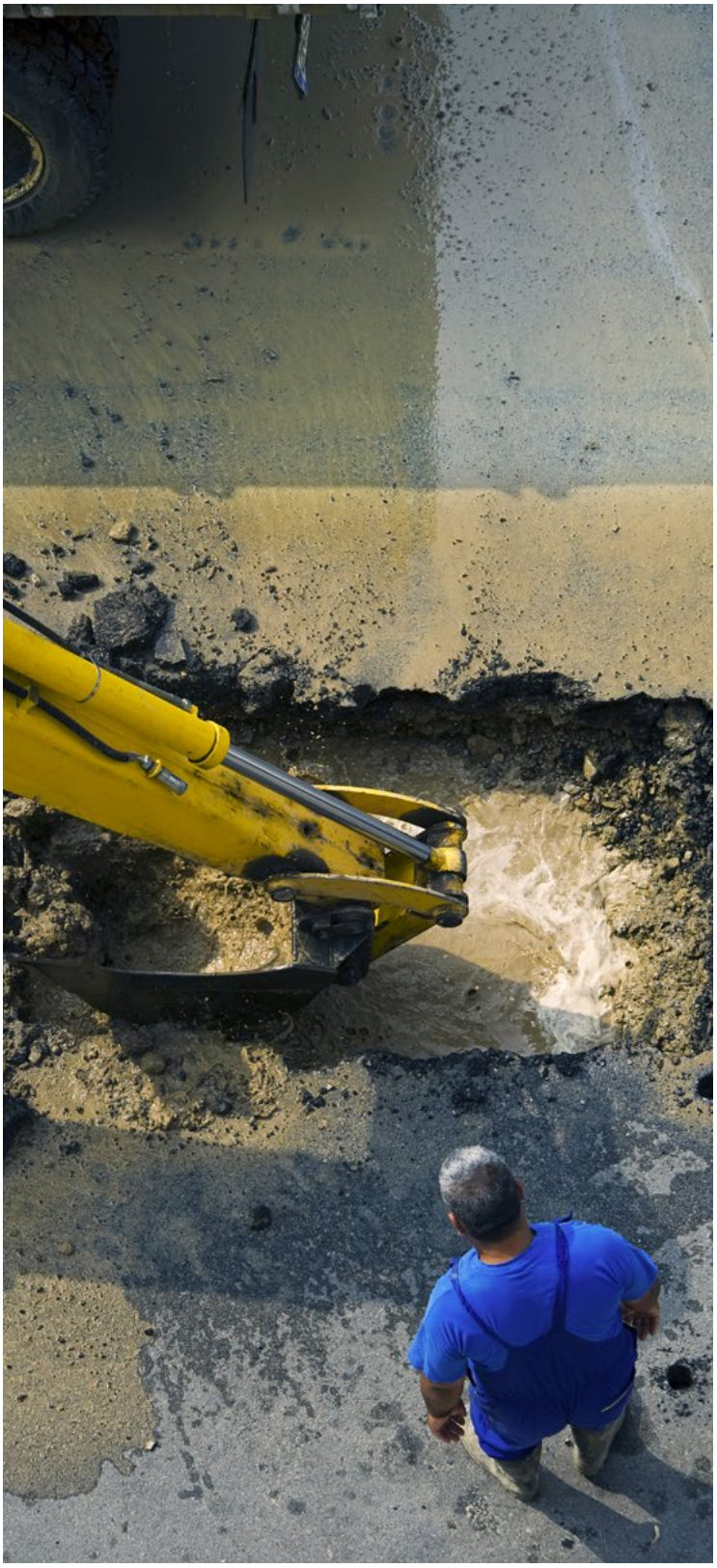


Chair's Message

On behalf of the Canadian Common Ground Alliance (CCGA) Board of Directors, I am pleased to provide the fifth annual CCGA National DIRT (Damage Information Reporting Tool) Report for 2021.

The DIRT report provides us with valuable information on the state of Damage Prevention in Canada. Like previous years, this report presents characteristics, themes and contributing factors leading to buried infrastructure damages in Canada as reported through the DIRT reporting system.

Underground infrastructure provides crucial and essential services to homes, businesses, public institutions, and communities. Whether it is delivery of natural gas for heating, electric power for lighting, high speed fiber for communications, or water supply; these are all critical for both business and day-to-day living. The risk of disruption to the delivery of these services through this vital infrastructure exists every day, and at every excavation job site.

The ongoing COVID-19 Pandemic throughout 2021 continued to present challenges to Canadians, disrupting their daily lives both personally and professionally. The criticality of this essential infrastructure to individuals has been intensified exponentially with most being forced to not only work from home, but also to stay and remain in their homes to prevent the spread.

However, the introduction of vaccines provided hope to control the impacts of the Pandemic on underground infrastructure construction and would assist to move towards the return to "normal".

To provide the best defense against underground strikes, the understanding and analysis of infrastructure damages or events and drilling down into their root cause will help determine which aspects of the excavation process should be targeted for awareness, training, and oversight to reduce the frequency and consequences of these events.

In reviewing the 2021 report and comparing with previous years, underground infrastructure damages were at similar levels to 2020, with a 1.5% decrease, however, the number of locate requests increased by just under 10%. This resulted in a notable improvement in the overall damages per 1,000 requests in 2021 of 3.93 versus 5.16 in 2020. As in previous years, the most prevalent root cause continues to be Excavation Issues.

While reporting damages in DIRT continues to be voluntary, the data is critical for the CCGA to determine root causes and develop mitigating measures to reduce and eliminate them.

On behalf of the CCGA Board of Directors, I would like to extend a sincere thank you to the Reporting and Evaluation Committee for their efforts in completing this 2021 National DIRT Report.

The complete 2021 DIRT Report is available to download at www.canadiancga.com .

Sincerely,

Douglas Lapp, P. Eng.
Board Chair
Canadian Common Ground Alliance

Introduction

In the modern world, we rely on an endless grid of underground infrastructure to deliver unceasing supplies of vital utilities to our homes and businesses.

Millions of petabytes of data, billions of kWh of electricity, and trillions of liters of water are transmitted to consumers throughout Canada every year, made possible through vast networks of buried utilities and the concerted efforts of thousands of operators.

These utilities are strategically buried at an accessible, yet fragile, depth just beneath the surface of the earth. The convenient and cost-effective choice to bury most utilities at this depth comes with it an increased risk of a utility strike, unintentional daylighting, or severe accident.

The CCGA and its regional partners have made and continue to make an intensive effort to educate, advocate, and increase general awareness among the digging community of the risk their activities can pose to buried infrastructure. The protection of underground lines is essential to ensuring the health, safety, and livelihoods of all who live in Canada. Being able to reasonably track, understand, and ultimately prepare for utility strikes gives superior flexibility to utility owners to respond with greater speed, increased efficiency, and concise solutions.

The Damage Information Reporting Tool (DIRT) was developed by the Common Ground Alliance (CGA). It was designed to record the data found in damage reports for damages made to underground infrastructure during excavation work. It provides a summary and an analysis of damages reported throughout Canada in the DIRT system.

Important note about the DIRT Data

- The Damage Information Reporting Tool (DIRT) is a confidential database where various stakeholders may enter information related to damages to buried utilities.
- Participation to DIRT is made on a voluntary basis. The report does not reflect the total number of damages that take place in Canadian provinces and there is no legal obligation for reporting such damages.
- In 2018, important changes were made to the damage reporting form, increasing the accuracy of the information written on the form and has resulted in comparing statistics year over year less accurate.
- The data collected is a rich source of industry intelligence on damages related to buried facilities from excavation activities. Despite this, uncertainties remain that limit the ability to draw firm conclusions on the trends over time and across jurisdictions. For one, since damages are reported to DIRT on a voluntary basis, they do not reflect the total number of damages that take place in a given year. For example, an increase in damages in one year, relative to another, could reflect a difference in actual damages, or it could reflect an increase in the number of damages being reported. In addition, not all regions have adopted the database to the same extent. As a result, some jurisdictions contain more comprehensive data than others do. Results may vary from one yearly report to another, due to retroactive data being entered from time to time, thus making comparison difficult from one report to the next.
- Damage is defined as ‘any impact, near miss 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.

2021 Highlights

- More than **45** damages occurred per workday.
- The total number of reported damages Canada-wide totaled **11,573**, which is a drop of **3%** from **11,949** in **2019**, and **4%** from **12,041** in **2018**.
- Natural gas and telecommunication facilities were affected in **83.4%** of damages, **40.9%** and **42.6%** respectively.
- Work on water and sewer systems accounted for **27%** of damages.
- The most common known root cause of damages was excavation issue **(36.7%)**.
- RECALL: Note that damages are reported to DIRT on a voluntary basis and therefore do not reflect the total number of damages that take place in a year in Canadian provinces, often reflecting the major contributors to the DIRT program in each province.

In **2021**, seven Canadian regions reported damages via the DIRT system. The regions and their respective population values are shown in Figure 1.

Figure 1

Province\Region	2021 Population	% of Population	% of Damages
Ontario	14,915,270	39%	39%
Quebec	8,631,147	23%	8%
British Columbia	5,249,635	13%	11%
Alberta	4,464,170	12%	33%
Atlantic	2,480,826	6%	0.13%
Manitoba	1,386,333	4%	2%
Saskatchewan	1,180,867	3%	7%
Canada (incl. Territories)	**38,436,447**	**100%**	**100%**

Data supplied from Stats Can
https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000901

2021 Highlights

In **2021**, the number of damages reported via DIRT for Canada totaled **11,402**, which is down by about **1.5%** over **11,573** for **2020**, and down about **4.6%** over **11,949** from **2019**.

Table 1 presents a summary of key performance indicators related to damages by province/region. Canada-wide, there were on average **45.6** damages per workday (using **250** workdays in **2021**).

Table 1 - Damages, Requests, Notifications by Province/Region 2021

Province/Region	Damages	Damages per Workday	Damages per 1,000 Notifications*	Damages per 1,000 Requests**
British Columbia	1,282	5.1	1.87	5.31
Alberta	3,792	15.2	2.37	8.09
Saskatchewan	789	3.2	1.68	4.74
Manitoba	195	0.8	0.94	2.37
Ontario	4,402	17.6	0.72	4.00
Quebec	927	3.7	1.51	2.77
Atlantic	15	0.06	0.21	0.24
Canada	**11,402**	**45.6**	**1.33**	**3.93**

* Notifications: Ticket data transmitted to underground infrastructure owners.
** Locate Request is defined as "communication between an excavator and a staff member of a One-Call Centre in which a request for locating underground facilities is processed."

Location and Year of Damages

Table 2 illustrates the total number of reported damages per year (2017-2021) by province/region and the percent of total damages by province/region.

Table 2 - Total Damages per Year, by Province/Region 2017-2021

Incident Types by Province	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
	Number of Damages					Percentage of Damages				
Ontario	5,367	5,313	5,005	4,566	4,402	46%	44%	42%	39%	39%
Alberta	2,750	3,139	3,613	3,879	3,792	23%	26%	30%	33%	33%
British Columbia	1,449	1,408	1,304	1,241	1,282	12%	12%	11%	11%	11%
Quebec	1,302	1,235	1,102	911	927	11%	10%	9%	8%	8%
Saskatchewan	716	673	669	753	789	6%	6%	6%	7%	7%
Manitoba	187	219	196	208	195	2%	2%	2%	2%	2%
Atlantic	17	54	60	15	15	0.1%	0.4%	1%	0.1%	0.1%
Grand Total	**11,788**	**12,041**	**11,949**	**11,573**	**11,402**	**100%**	**100%**	**100%**	**100%**	**100%**

In Table 3 below, we have broken out the near misses that are part of the overall Damage numbers. A near miss as defined in the CCGA Best Practices 3.0 glossary is, «An event where damage did not occur, but a clear potential for damage was identified».

These numbers have historically been part of the data and Near Misses are mandated as needing to be reported under the Canada Energy Regulator Event Reporting Guidelines .

Table 3 - Total Near Misses per Year, by Facility 2017 - 2021

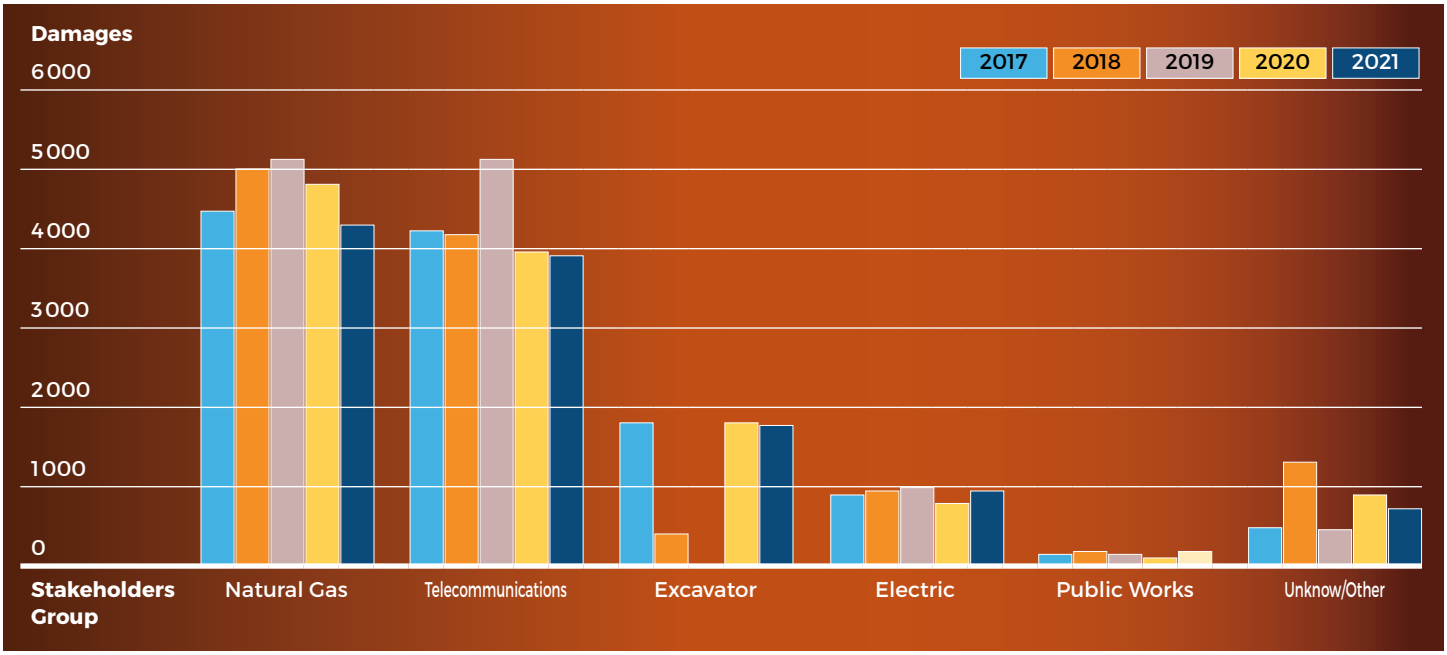
Incident Types	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
	Number of Incidents					Percentage of Near Misses				
Natural Gas	101	105	101	107	47	34%	27%	32%	28%	32%
Telecommunications	67	78	91	94	41	22%	20%	29%	25%	28%
Unknown/Other	64	100	69	91	29	21%	25%	22%	24%	20%
Electric	4	59	26	39	21	1%	15%	8%	10%	14%
Liquid Pipeline	63	44	26	42	5	21%	11%	8%	11%	3%
Water & Sewer	0	8	6	10	2	0%	2%	2%	3%	1%
Total	**299**	**394**	**319**	**383**	**145**	**100%**	**100%**	**100%**	**100%**	**100%**

Reporting Stakeholders

Stakeholders involved with telecommunications and natural gas report damages most often.

Figure 2 shows total damages by the seven most common stakeholder groups for the 2017-2021 period.

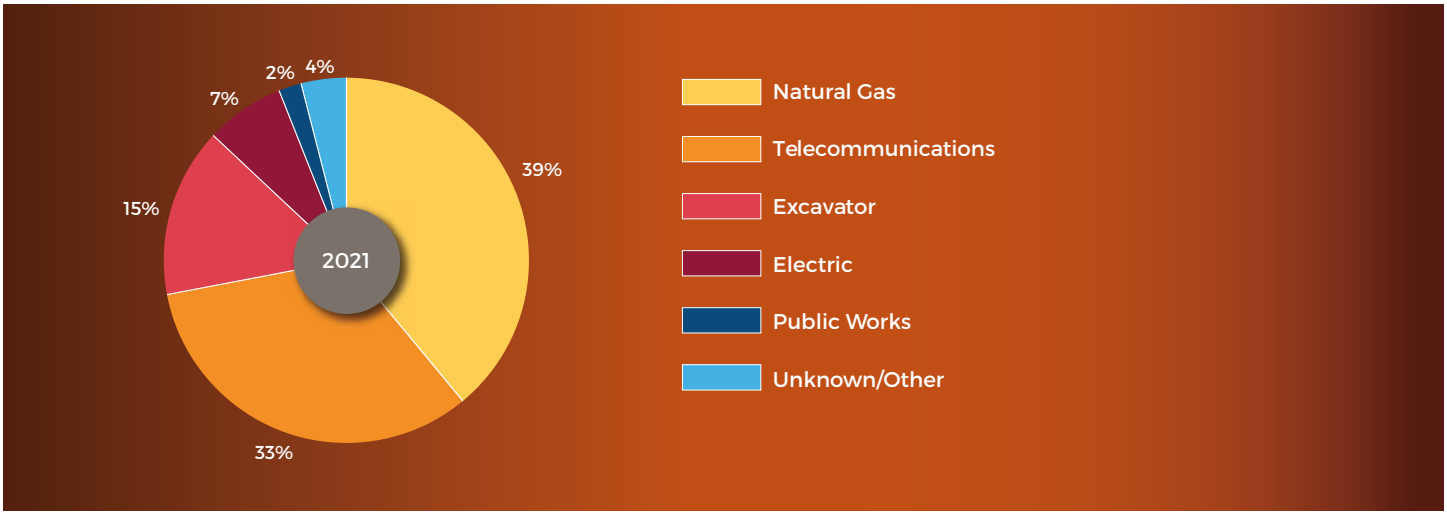
Figure 2 - Damages by Stakeholder Group 2017-2021



As shown in Figure 3, **72%** of total damages were reported by stakeholders in the natural gas and telecommunication sectors in 2021, which is very close to the **73%** reported in 2020.

This has been reducing incrementally for the last couple years however, though this year notes a reduction in reported events impacting Natural Gas lines, and an uptick in Public Works and Electrical events. This could be due in part to a notable reduction in reported Unknown/Other events.

Figure 3 - Percentage of Damage Events by Stakeholder 2021

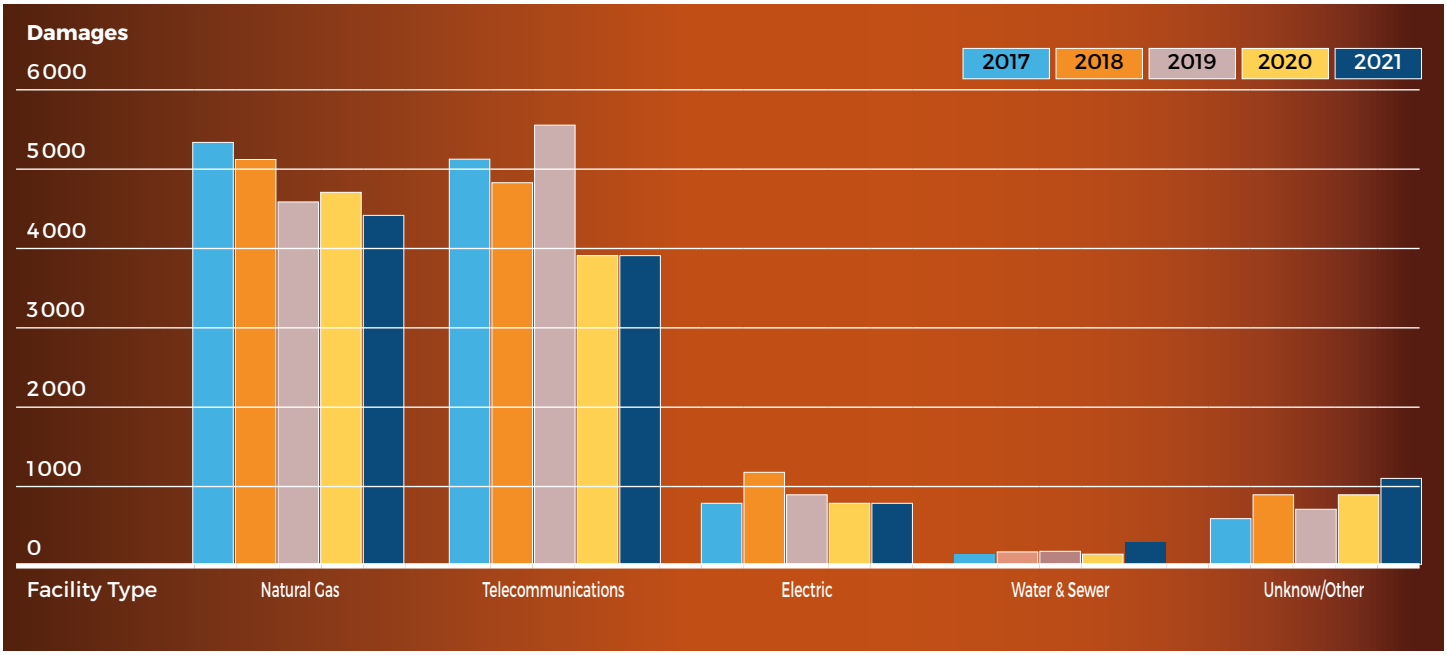


Facilities Affected

This section describes the facility owner whose operations were affected by damages. All in all, there are incremental changes year over year, but fundamentally the amount of reporting is mostly consistent. Overall there was a drop in Natural Gas strikes from 2020 (**-5.2%**), continuing a visible 5-year trend.

Telecommunications and Electric remained relatively stable (**+.3%** and **+3%** respectively), while Water & Sewer saw a whopping **+133%** jump. Typically, a large leap in a single year indicates simply that a new submitter (or couple of submitters) specific to that Facility began contributing to DIRT in the past year (Figure 4).

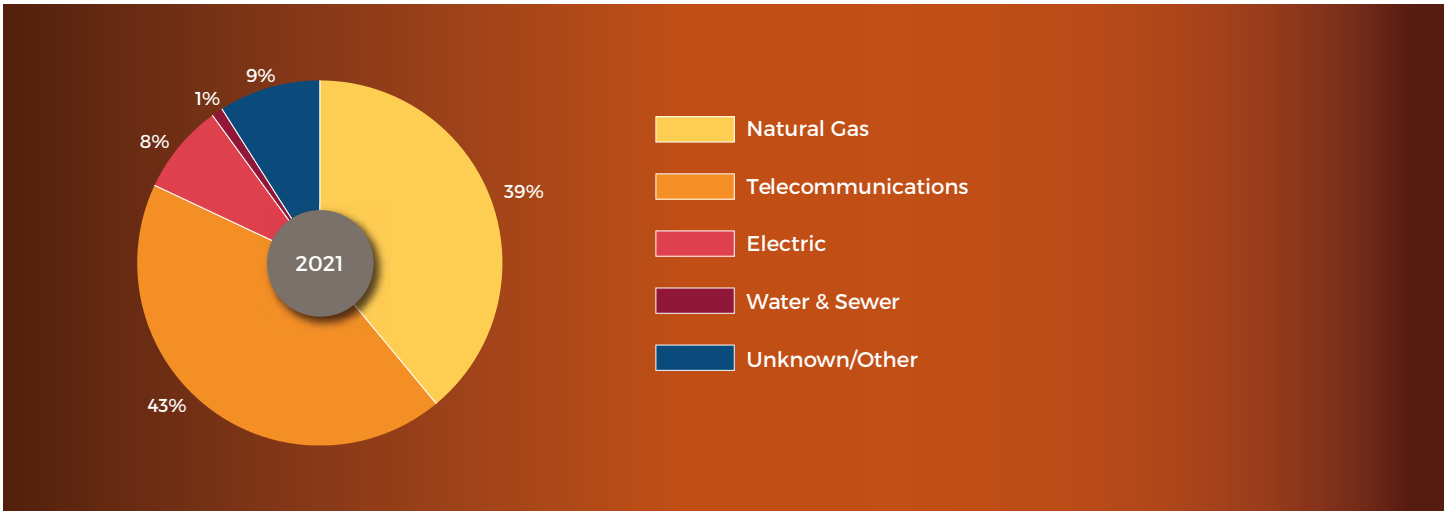
Figure 4 - Damages by Affected Facility



Of the **11,402** damages that occurred in **2021,** Natural Gas and Telecommunication facilities were affected in **82%** of the incidents (Figure 5).

This is a **-2%** decrease over **2020**, for reasons already noted previously.

Figure 5 - 2021 Damages by Affected Facility



Facilities Affected

Shown in Table 4 is the percent of damages by Facility Type affected at a provincial level. Typically, the highest facilities affected do not necessarily reflect those damaged the most; rather they often point to which utilities in each region contribute to DIRT the most:

- In British Columbia, for example, **85%** of damages affected Natural Gas facilities
- In Quebec, **49%** of damages affected Telecommunications facilities
- Manitoba has a notable balance between strikes on both Natural Gas and Electric facilities

Table 4 - Percentage of Damages by Affected Facility by Province/Region 2021

Province/Region	Telecommunications	Natural Gas	Electric	Water	Unknow/Other
British Columbia	10%	85%	0%	0%	5%
Alberta	60%	18%	6%	2%	14%
Saskatchewan	23%	38%	39%	0%	0%
Manitoba	0%	49%	51%	0%	0%
Ontario	43%	48%	5%	3%	1%
Quebec	49%	22%	2%	0%	27%
Atlantic	0%	80%	20%	0%	0%
Canada	**43%**	**41%**	**7%**	**2%**	**9%**

Excavator Information

This section describes the type of excavator and excavator equipment involved in damages

Excavator Type

Figures 6 and 7 report the number and percentage of damages by type of excavator, respectively. Contractor damages increased overall from **2017 to 2018** but have been in decline since.

Municipality, Utility and Unknown/Other have been mostly flat from **2017 to 2021**. Occupant/Farmer experienced a decline in damages from **2017 to 2019**, but then experienced a notable bump in **2020,** and a slight reduction in **2021.**

Figure 6 - Percentage of Damage Reports by Type of Excavator, 2021

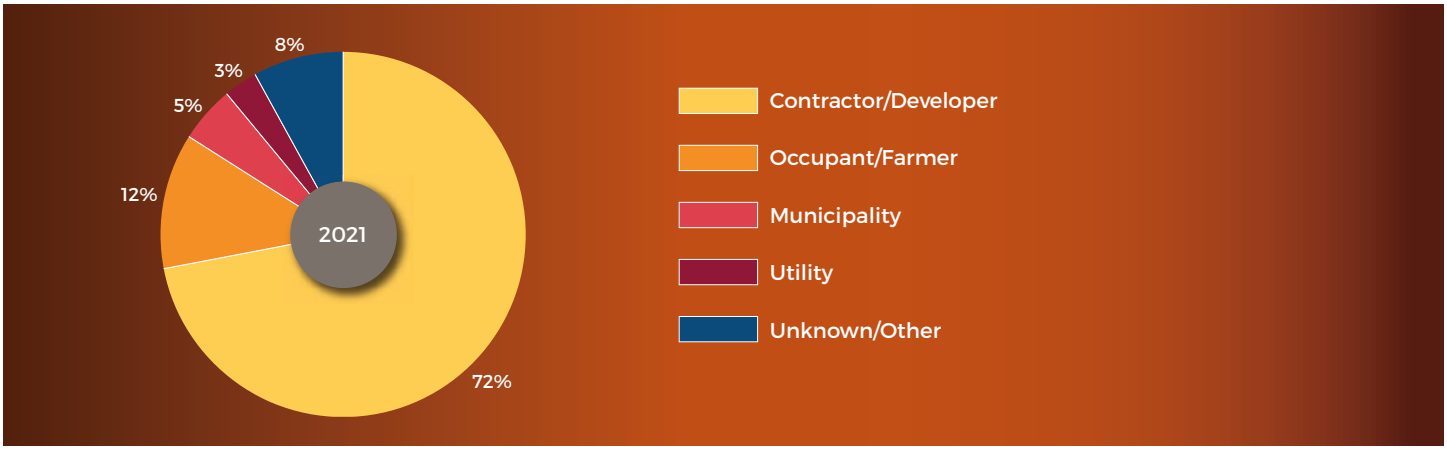
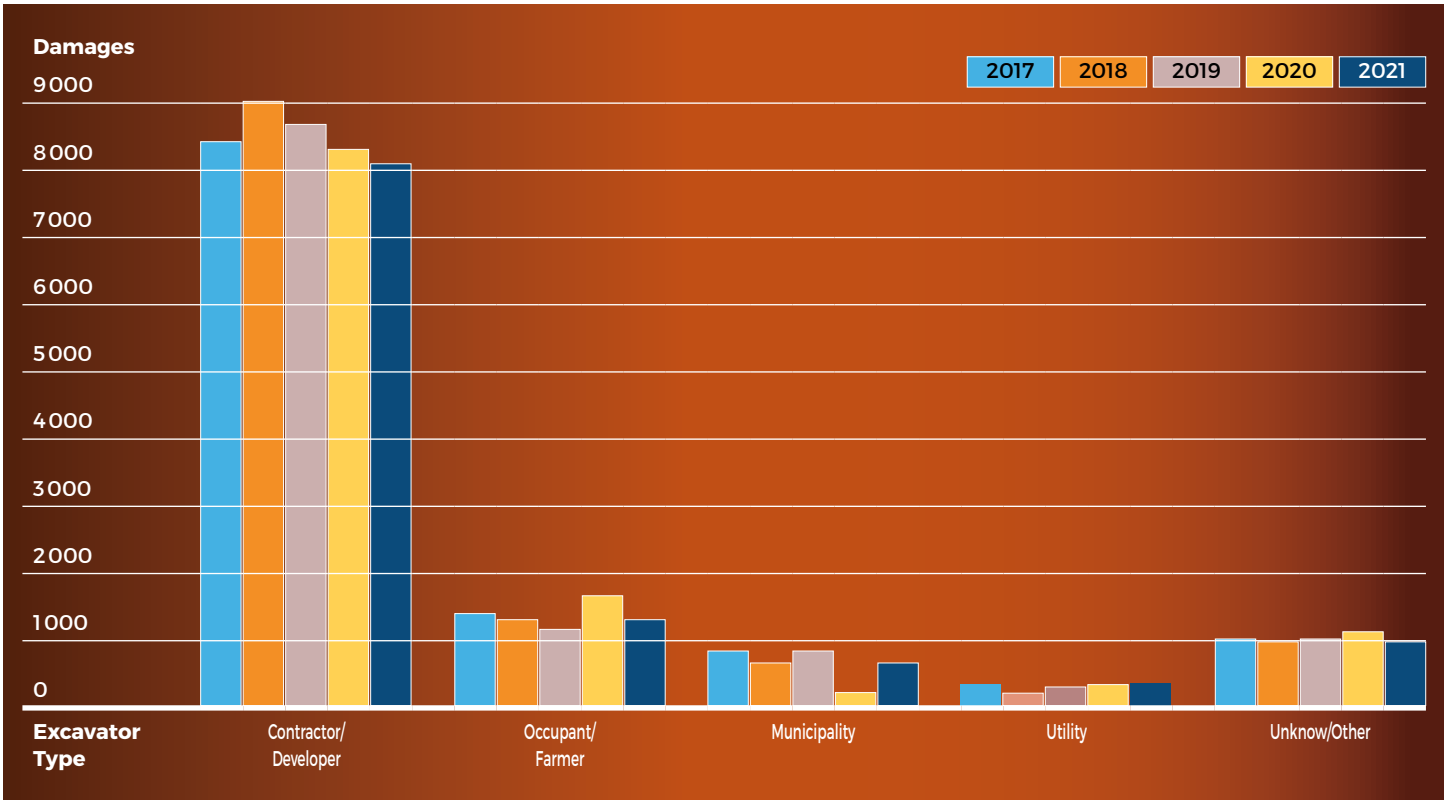


Figure 7 - Damages by Excavator Type 2017-2021

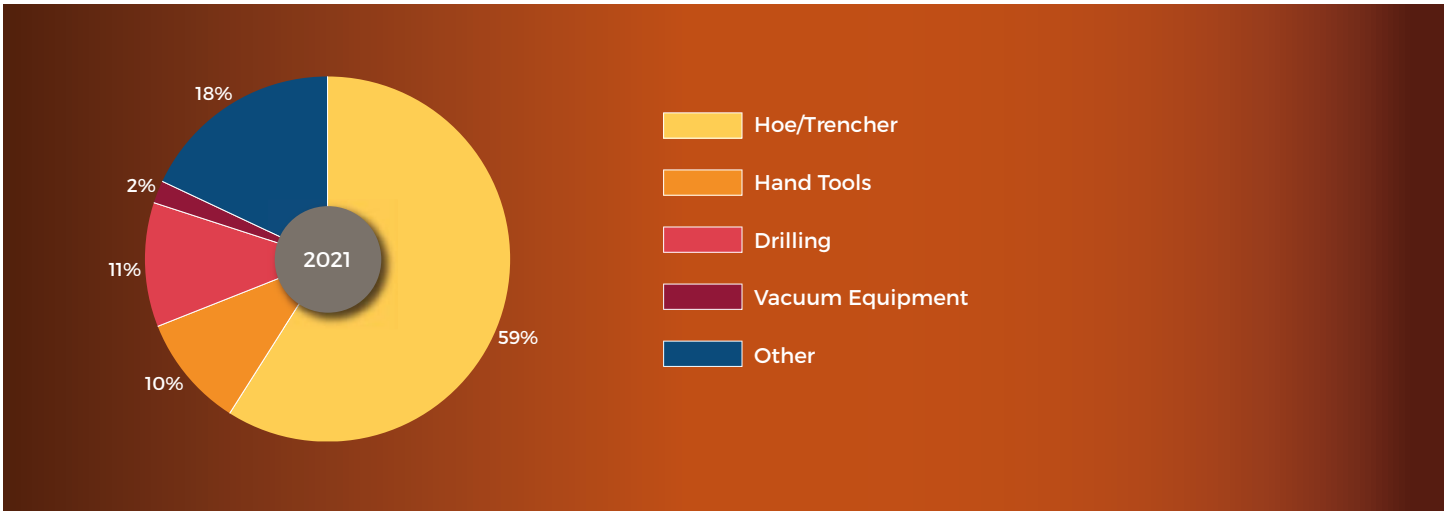


Excavator Information

Excavator Equipment Type

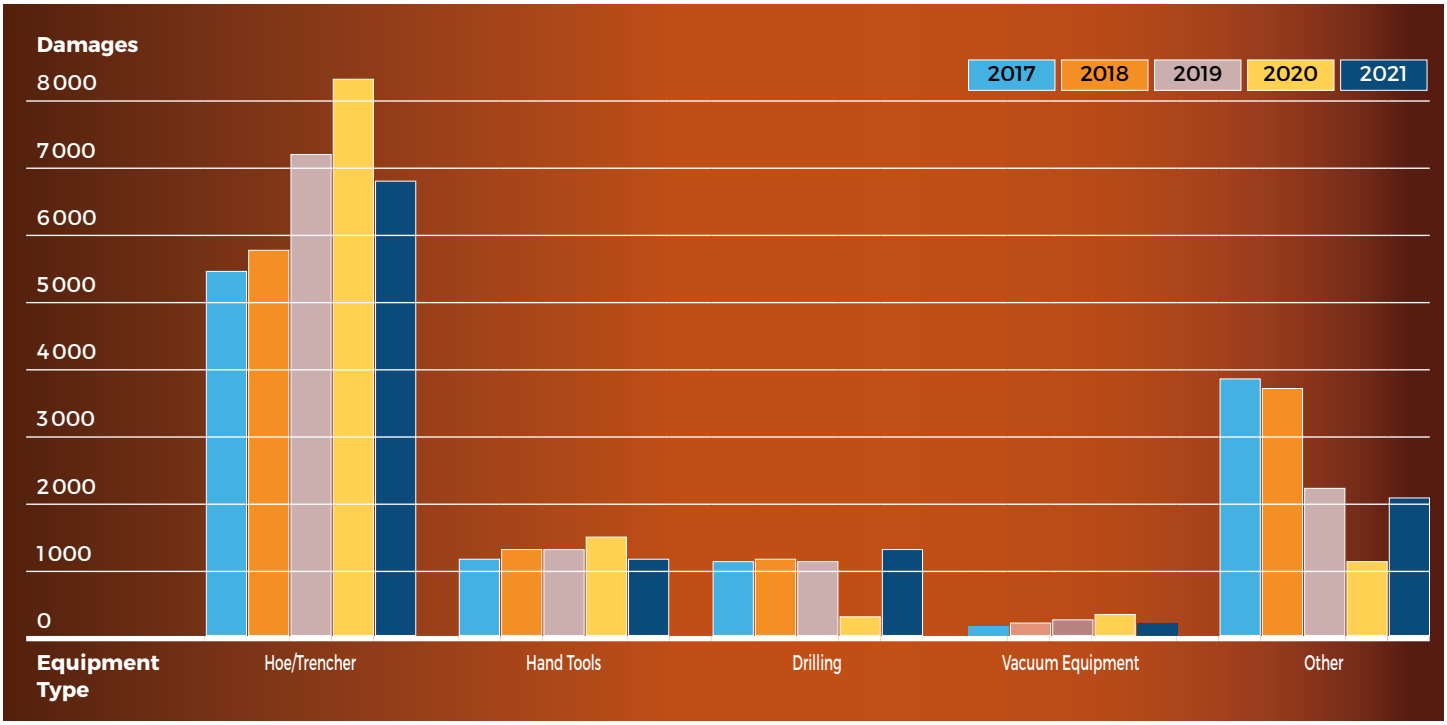
As shown in the graphic below, the hoe/trencher category remains, once again, the most common equipment type cited in damage reports (**59%**) in **2021** (Figure 8), though it fell by nearly **-13%** from **2020**.

Figure 8 - Percentage of Damage Reports by Excavator Equipment Type, 2021



Unfortunately, the previously consistent trend of the Other type shrinking year over year has stalled out, with a notable jump (over **+82%**) from **2020 to 2021**.

Figure 9 - Damages by Excavation Equipment Type, 2017-2021



Work Details

Work Details should always be taken into context relative to the percentage of requests placed in each Region by Contractors, rather than Members or Homeowners. Contractors often maintain the highest percentage of locate requests and in turn, are proportionally the largest contributors to utility strike incidents. To demonstrate this, Table 5 illustrates the proportion of each Region's locate requests placed by Contractors in 2021.

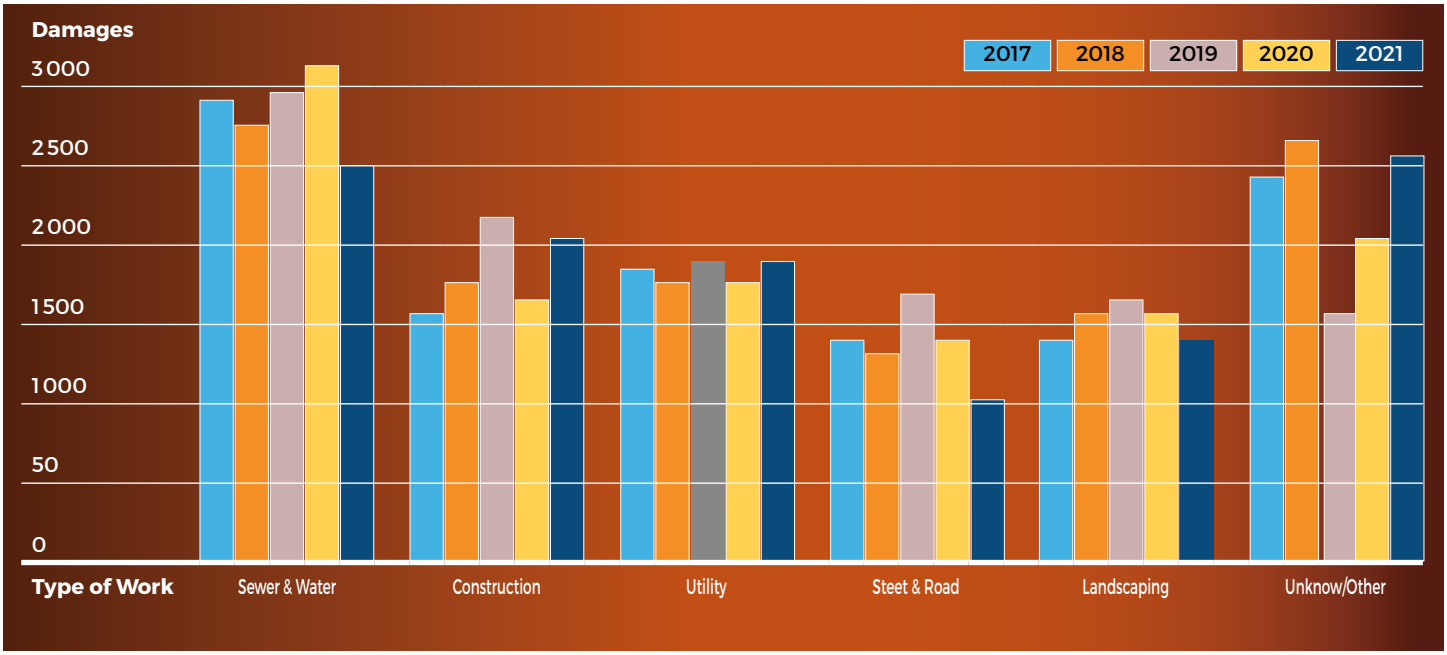
Table 5 - Proportion of Contractor Requests by Region, 2021

Province/Region	Total Requests	Contractor Requests	% of Contractor Requests
British Columbia	241,374	155,178	64%
Alberta	468,907	338,299	72%
Saskatchewan	166,496	109,346	66%
Manitoba	82,244	55,143	67%
Ontario	1,101,026	850,619	77%
Quebec	334,728	200,560	60%
Atlantic	62,298	44,332	71%
Canada	**2,457,073**	**1,753,477**	**71%**

Work Details

Figure 10 displays the number of damages by the Type of Work performed for the years **2017 to 2021**. **2021** marks the first year in this interval where Sewer & Water saw a steep decline (nearly **-20%** over **2020**), after climbing for most of the 4 years previous. Also notable, Street & Road incidences took an even larger drop (nearly **-31%**), while Unknown/Other has been moving higher year over year since **2019** (**+64%** from **2019 to 2021**).

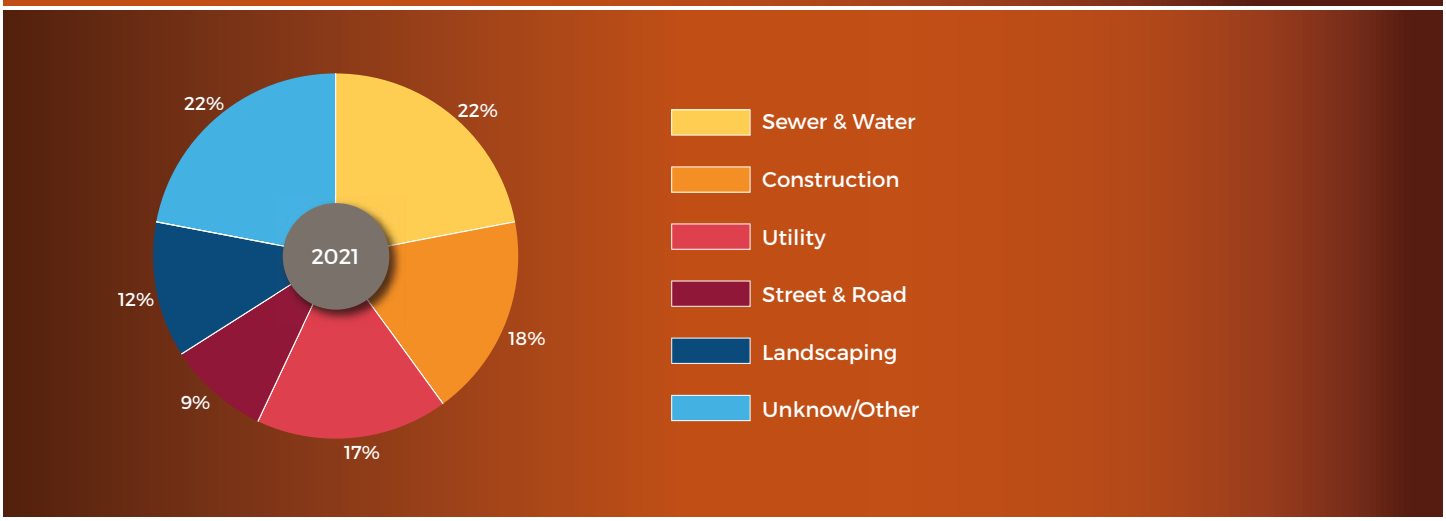
Figure 10 - Damages by Type of Work Performed, 2017-2021



As shown in Figure 11, both Unknown/Other and work on Sewer & Water systems accounted for **22%** of damages in **2021**.

Construction jumped **+4%** from **2020,** Utility went up by **+3%**, and both Landscaping (**-2%**) and Street & Road (**-3%**) fell.

Figure 11 - Percentage of Damages by Type of Work Performed, 2021



Work Details

Table 6 presents Damages by Type of Work Performed and Type of Excavator for the year **2021**.

- The leading Excavator type was, once again, Contractors with **72.5%** of total damages. This of course is because Contractors overwhelmingly perform the most excavations in any given year (see Table 5)
- As in **2020**, the second highest rate of damages (**12.2%** of total damages), was work performed by Occupants & Farmers, with Landscaping being their most common type of work

Table 6 - Damages by Type of Work Performed and Type of Excavator, 2021

Type of Work	Contractor/ Developer	Municipality	Occupant/ Farmer	Utility	Unknown/ Other	Total
Sewer & Water	1,830	252	148	108	58	2,396
Construction	1,347	19	175	7	56	1,604
Utilities	1,464	19	108	173	59	1,823
Unknown / Other	1,585	121	339	33	588	2,666
Street & Road	1,066	81	42	17	42	1,248
Landscaping	983	21	582	8	71	1,665
Total	**8,250**	**513**	**1,571**	**346**	**874**	**11,402**

The primary Work Type varied by province. The leading Work Performed causing damages in Saskatchewan (SK) was Utility (**n=181**). Damages attributed to work performed on Water & Sewer systems were the most frequent in British Columbia (BC) (**n=324**), and Atlantic (ATL) (**n=10**).

In a curious change from previous years, Unknown/Other was heavily seen in Alberta (AB) (**n=980**), Ontario (ON) (**n=925**), and Quebec (**n=371**). Table 7 reports Damages by Type of Work Performed by Province.

Table 7 - Damages by Type of Work Performed by Province, 2021

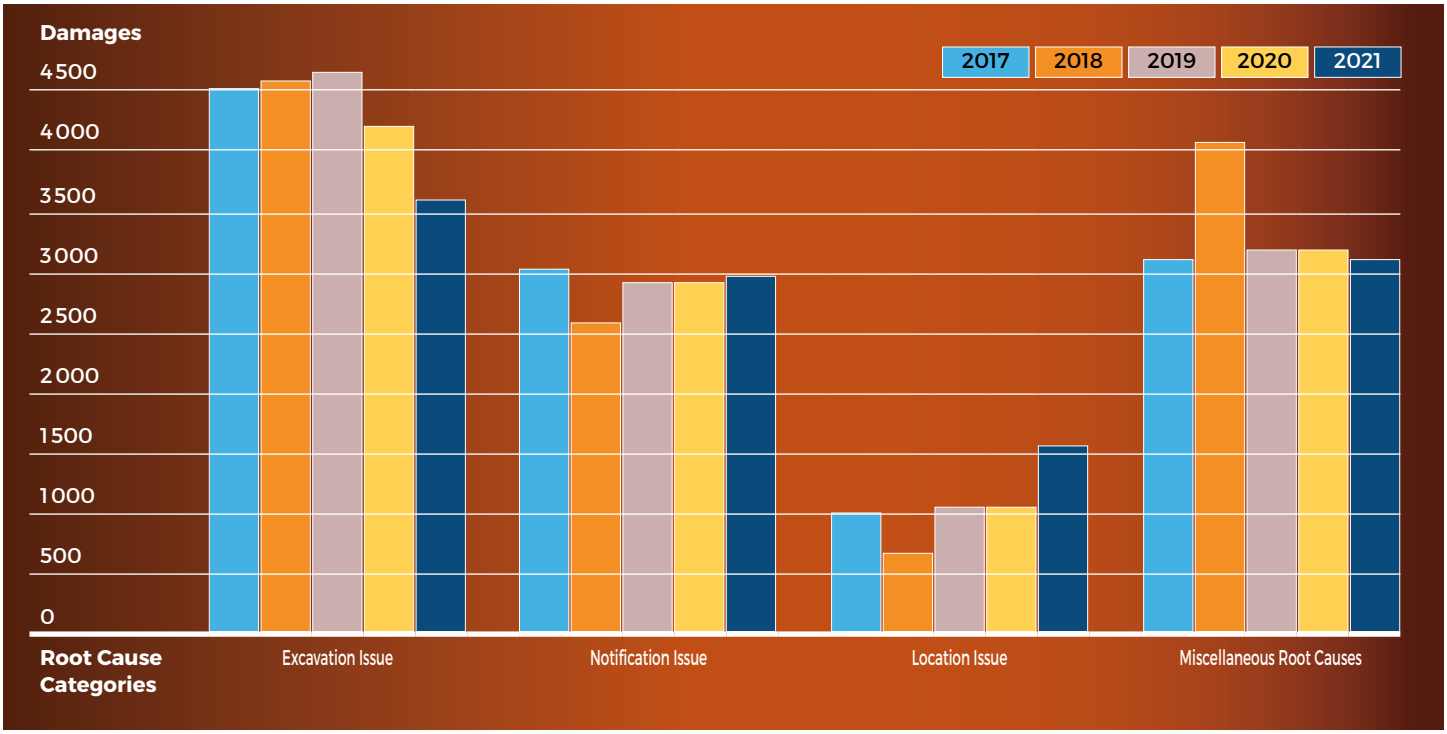
Type of Work	British Columbia	Alberta	Saskatchewan	Manitoba	Ontario	Quebec	Atlantic	Total
Sewer & Water	324	765	173	49	872	203	10	2,396
Construction	228	362	72	40	806	94	2	1,604
Utility	166	676	181	26	710	63	1	1,823
Unknown / Other	189	980	177	24	925	371	0	2,666
Street & Road	75	617	54	52	335	113	2	1,248
Landscaping	300	392	132	4	754	83	0	1,665
Grand Total	**1,282**	**3,792**	**789**	**195**	**4,402**	**927**	**15**	**11,402**

Root Cause

Root cause describes the reason for reported damages, or more specifically, what was the fundamental cause of the damage occurrence. Figure 12a provides a breakdown of Known Root Causes from **2017** to **2021**. Excavation Issues continue their decline from **2020**, which points to Contractor education efforts being more successful over time.

In both Notification Issues and Miscellaneous Root Causes, we are seeing an overall flat trend continue between **2017** to **2021**. Meanwhile, Locating Issues see a notable rise, at least partially due to a higher incidence of reported Locator Error and increased strikes on Abandoned Facilities.

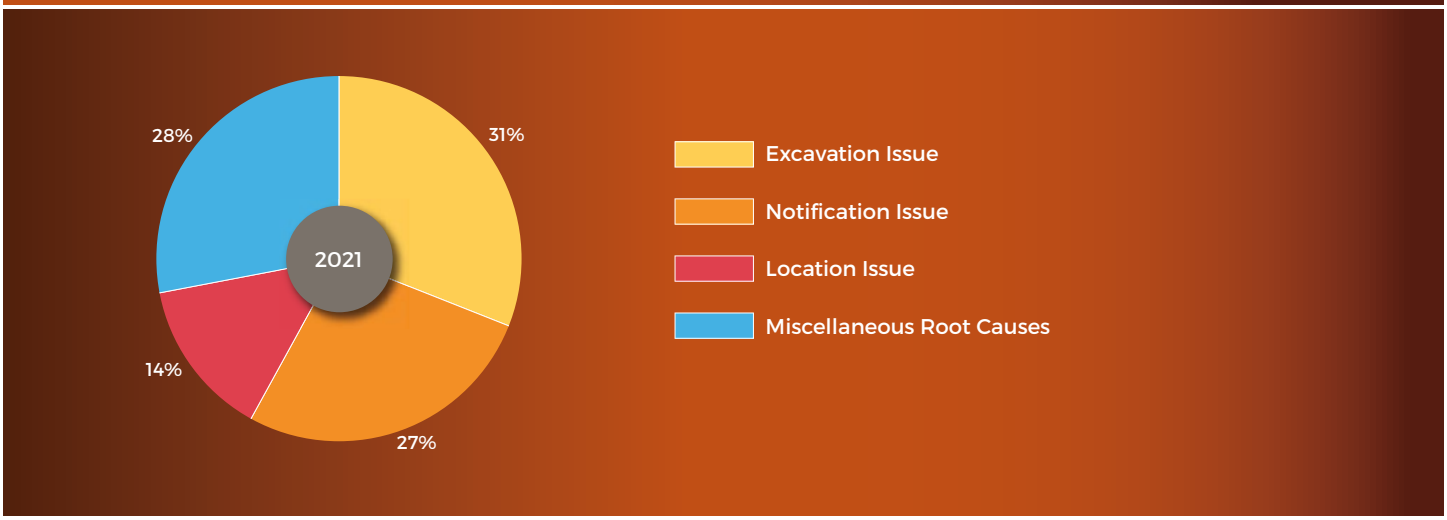
Figure 12a - Known Root Causes, 2017-2021



Due to changes to the 2018 Field Form, year-to-year sub-category comparisons are less appropriate. In this year's report, this is no longer a problem.

As of 2021 (published in 2022) the legacy root causes sub-categories are no longer part of the sample group (2019-2021).

Figure 12b - Known Root Causes, 2021

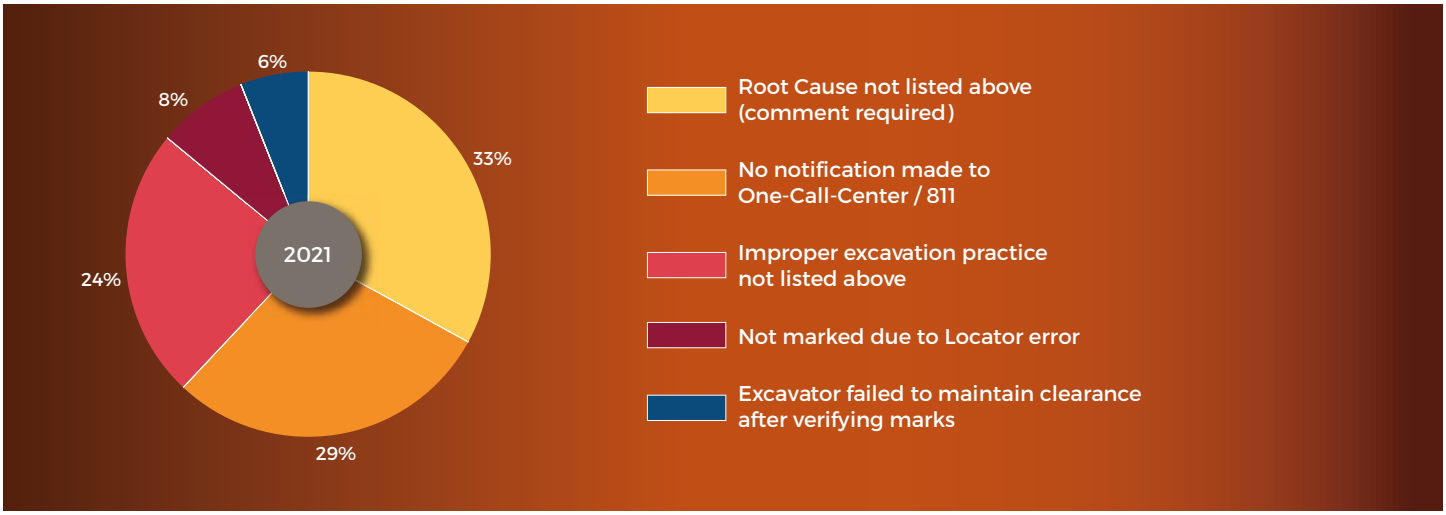


Root Cause

In Figure 13, we see a breakout of the top **90%** of root cause sub-categories. In **2021** the variance is mostly dominated by a three-way split of Root Cause Not Listed Above (**33%**, up **+5%** over 2020), No Notification Made to One-Call Centre (**29%**, also up +**5%**), and Improper Excavation Practice Not Listed Above (**24%**, up **+2%**). Following up, Not Marked Due to Locator Error (**8%**, up **+3%**) and Excavator Failed to Maintain Clearance After Verifying Marks (**6%**, down **-2%**) have flipped positions from **2020**.

While difficult to focus down on myriad root causes outside the main list, No Notification Made to One-Call Centre is an easy target; education initiatives, public outreach, and safety campaigns centered around promoting the ease of placing online requests can help mitigate (or possibly eliminate) this Cause. Unfortunately, growth from **2020 to 2021** in this Root Cause means we may need to focus down on certain regions more so than others. Issues with Excavation Practices and Excavators Maintaining Clearance can also be concentrated upon via engagement through boots-on-the-ground Ambassadorship programs that seek to walk through the processes of safe excavation with Excavators on-site.

Figure 13 - Top 90% of Root Cause Sub-Categories, 2021



Root Cause

Of the **29%** of damages attributed to No Notification Made to One-Call Centers, **86%** contacted an Electric or Natural Gas facility posing a much higher safety risk to the public, worker and community safety (Table 8).

This demonstrates that notifying One-Call Centres is a critical measure in preventing workplace injury.

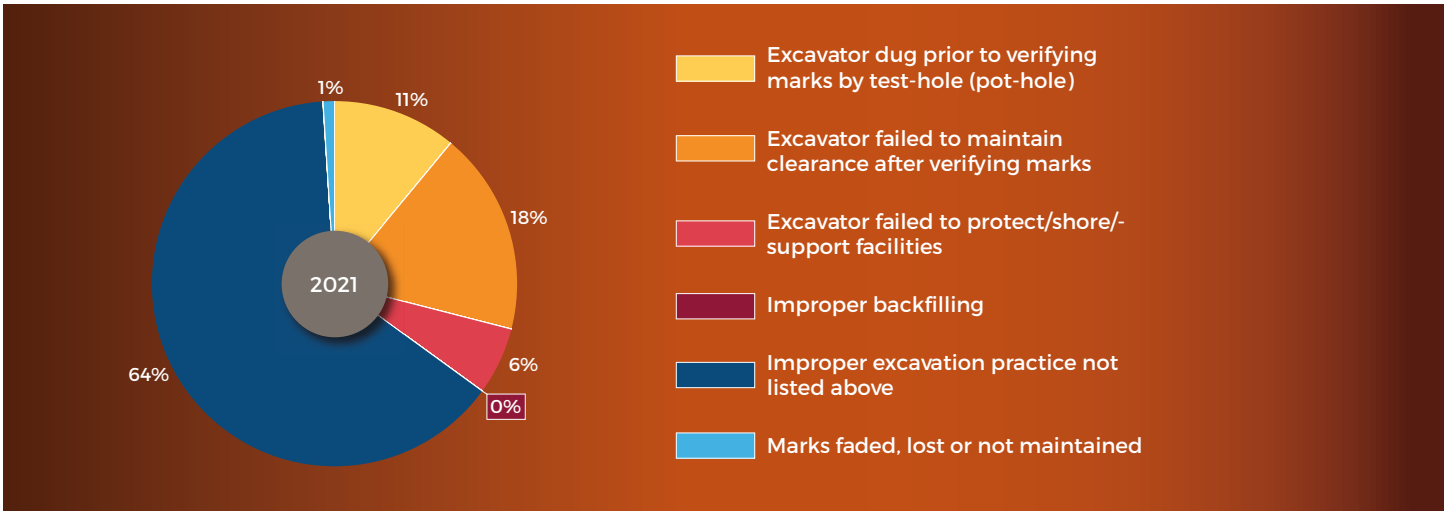
Table 8 - No Locate Damages and Percentage of Damages with Hazardous Utilities, 2021

Province/Region	2020 No Locate Damages	No Locate Request, Electric	No Locate Request, Natural Gas	Percent of Total – No Locate, Electric, Natural Gas
British Columbia	598	0	590	99%
Alberta	417	24	237	63%
Saskatchewan	244	79	120	82%
Manitoba	33	17	16	100%
Ontario	1,230	146	1,013	94%
Quebec	191	0	79	41%
Atlantic	2	0	1	50%
National Total	**2,715**	**266**	**2,056**	**86%**

Of the **3,573** known Root Causes attributed to Excavation Issues, Improper Excavation Practice Not Listed Above is once again on top, back to **64%** (**+5%** from **2020**) as it was in 2019. Unfortunately, this points to requiring more specific descriptors of damages for this Category within the DIRT system.

Of the known causes, Excavator Failed to Maintain Clearance to the Marking leads again with **18%** (**-6%** from **2020**) of utility strikes occurring in this instance within this cause group. Figure 14 presents known Root Causes attributed to Excavation Issues.

Figure 14 - Known Root Cause by Excavation Issue

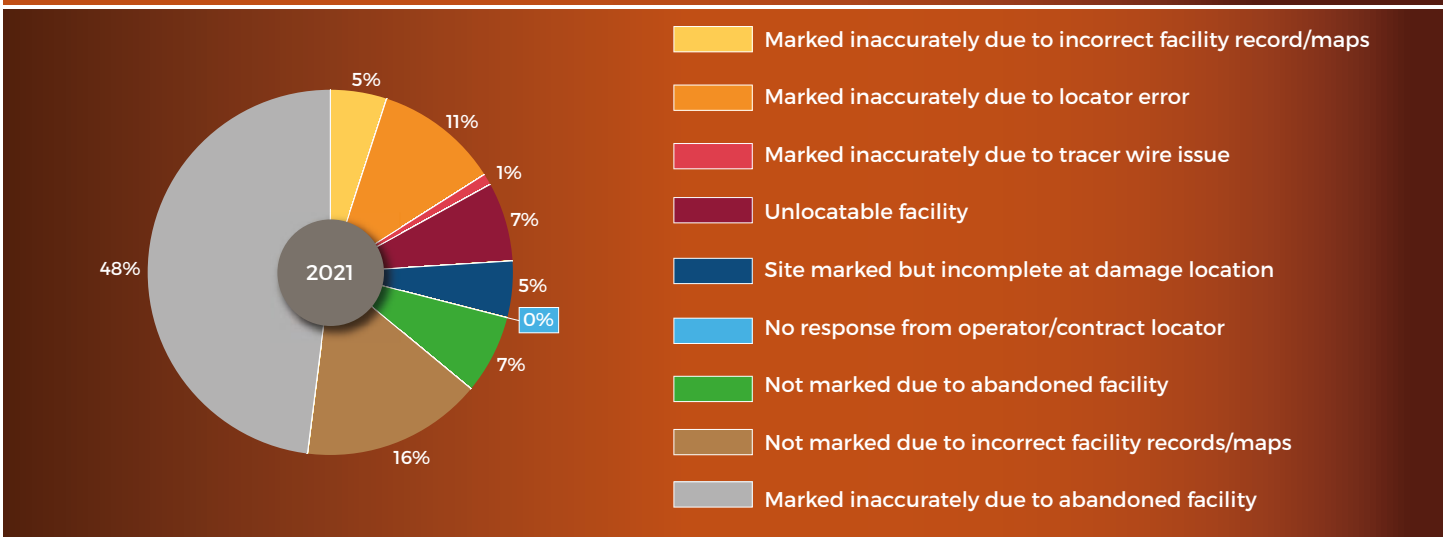


Root Cause

Figure 15 presents known Root Causes attributed to Location Issues. Of the **1580** known root causes attributed to Location Issues, the top three make up over **75%** of the damages.

They are: Not Marked Due to Locator Error (**48%**, down **-10%** from **2020**), Not Marked Due to Incorrect Facility Records/Maps (**16%**, down **-2%** from **2020**), and Marked Inaccurately Due to Locator Error (**11%**, down **-4%** from **2020**).

Figure 15 - Known Root Cause by Location Issue, 2021



While **2021** still possesses a large proportion of Locate-attributed strikes, it's notable that within this Root Cause, all three of the largest causes dropped significantly from **2020** in proportion to other Causes.

This is a hollow success however, as the amount of Locate-attributed strikes went up by nearly **50%** over **2020** overall.

Societal Costs

Each year, the CCGA releases the DIRT report to outline damage events throughout Canada, many which have both an obvious and less obvious price to be paid by both those affected and society at large.

The utility strikes recorded have their costs reflected as both direct costs (e.g., cost to repair damaged underground infrastructures) and indirect costs (e.g., loss of productivity due to downtime resulting from damages) including but not limited to:

- Service disruption
- Deployment of emergency services
- Evacuation
- Loss of product
- Environmental impact and mitigation
- Economic impact
- Work delays
- Administrative and legal costs

Damage Prevention messaging should always emphasize the less direct societal costs that affect everyone, even those not involved in the event. It is a powerful and simple message to impart that utility safety affects us all, so diligence and care should be taken at all times.

Additional Information per Province

Over and above the data collected in the DIRT system, One-Call Centers provide important information related to data found in locate requests made in every province. Members such as the owners of underground infrastructure, including utilities and municipalities, provide One-Call Centers with the mapping data of their buried facilities.

Table 9 shows the breakdown of locate requests placed via telephone versus the Web, as well as the number of registered members of One-Call Centres by province/ region. Table 10 is a summary of the provincial and regional information.

Table 9 - Registered Members at One-Call Centers and Percentage of Phone Versus Web Locate Requests

One Call Centres	Registered Members	Phone Locate Requests (%)	Web Locate Requests (%)
British Columbia	351	15%	85%
Alberta	841	15%	85%
Saskatchewan	115	32%	68%
Manitoba	67	23%	77%
Ontario	841	16%	84%
Quebec	266	7%	93%
Atlantic	34	8%	92%
Canada	**2,515**	**16%**	**84%**

Additional Information per Province

Table 10 - Summary by Province/Region, 2021

Province / Region	% of Population ‡	Damages	% of Damages	Damages per Work Day	Locate Requests	Damages per 1,000 Requests*	Locate Notifications	Damages per 1,000 Notifications**
British Columbia	14%	1,282	11%	5.1	241,374	5.31	687,075	1.87
Alberta	12%	3,792	33%	15.2	468,907	8.09	1,597,579	2.37
Saskatchewan	3%	789	7%	3.2	166,496	4.74	468,320	1.68
Manitoba	4%	195	2%	0.8	82,244	2.37	206,244	0.94
Ontario	39%	4,402	39%	17.6	1,101,026	4.00	6,141,712	0.72
Quebec	22%	927	8%	3.7	334,728	2.77	614,091	1.51
Atlantic	6%	15	<1%	0.06	62,298	0.24	72,205	0.21
Canada	**100%**	**11,402**	**100%**	**45.9**	**2,457,073**	**4.64**	**9,787,426**	**1.16**

‡ StatsCan (2021)
* Locate request is defined as 'communication between an excavator and a staff member of a One-Call Centre in which a request for locating underground facilities is processed.
** Notifications: Ticket data transmitted to underground infrastructure owners.
Ontario is the only province with legislation mandating registration with a One-Call Centre.

Lastly, for 2021 we will be tracking the total number of companies that are registered with each Regional DIRT system, and cataloguing these year over year going forward. As of now, Ontario (79) and Alberta (71) have the largest pool of submissions (and subsequently, also have the largest total incidences recorded in 2021). Table 11 tracks these year over year (starting in 2021). It is notable that there is some corollary between the number of registered submitters and the total number of incidents recorded.

Table 11 - Registered DIRT Submitters by Province

Province/Region	2021
British Columbia	20
Alberta	71
Saskatchewan	6
Manitoba	1
Ontario	79
Quebec	7
Atlantic	5

Conclusions and Actions

DIRT is an extremely powerful, but limited tool. The data represented in this report is voluntarily submitted by users within each Regional CGA, and not fully representative of all damages or utility strikes that can occur within each Region. Each analysis comes with notable caveats relative to the nature of DIRT: not all damages are submitted, the submissions are restricted to which users have chosen to submit (which can lead to overrepresentation by certain industries/facility owners), and the methodology can variate region to region (though steps have been taken to normalize this over time). The conclusions drawn here are meant to help drive both public policymaking and shape best practices in the interest of reducing risk and injury for excavators. Maintaining a functional and safe infrastructure underground is a goal all parties share, and the suggestions from this DIRT analysis should be taken to heart when considering any policy change.

1) **Root Causes Shifting** – While 2021 saw both **Notification** and **Miscellaneous Root Causes** staying relatively stagnant against one another, there was a drastic reduction in **Excavation Issues**, which may in fact point to success in educating Excavators, and more due care being applied towards groundwork in Canada. This may be in part attributed to the increased proliferation of Ambassador programs. Conversely, **Locating Issues** as noted previous saw a jump by a full **55%** in total over **2020**. Locator Errors in particular were up **30%**, which demonstrates a vital need to ensure standardized Locator Training is implemented across the country.

2) **No Notification to the One-Call Centre** – For the third year running, No Notification to the One-Call Centre again tops the identifiable Known Root Causes. Ultimately, there is a multi-pronged approach that should be taken to increase usage of the various One-Call services. Simplifying the process, increasing accessibility via software and online services, promotion of ease of use and reliable locator turnarounds ensure consistent usage and notification.

3) **Promote Online Ticket Processes and Develop Best Practice** – As noted in CGA presentations and elsewhere[2], a noteworthy avenue for reducing utility strikes is to promote the usage of the Online Ticket Submission Processes at various One-Call centers. Excavators placing their own requests rather than having a phone Agent interpreting the request can reduce potential utility strikes by nearly one half, particularly in regions that have virtual white-lining.

4) **Increasing Data Quality in DIRT** – Each region tends to take a different approach to DIRT; some are relatively hands-off, while others work closely with submitters. Each region is quite focused on increasing the userbase, but the tradeoff has started seeing a trending slide toward an decrease in Known data. Specifically, the **+64%** increase in Unknown/Other reports under Type of Work Performed is quite significant, and surprising. Regions should be following up with submitters, and ensuring that the submitters themselves are following up with their previous entries to ensure they have the most up-to-date data possible.

1 https://www.cer-rec.gc.ca/en/about/acts-regulations/cer-act-regulations-guidance-notes-related-documents/canada-energy-regulator-event-reporting-guidelines/index.html#s8_2

2 https://dp-pro.com/canadian-perspective-call-or-click-a-question-of-safety/

Register with DIRT and Be Part of the Damage Prevention Solution

The Canadian Common Ground Alliance (CCGA) invites you to register with Regional Partner Virtual DIRT and report damages to Canada's buried infrastructure. Doing so will allow more thorough analysis and enable damage prevention and safety solutions that will benefit all Canadians.

Alberta: utilitysafety.ca

Atlantic: atlanticdigsafe.ca

British Colombia: commongroundbc.ca

Manitoba: manitobacga.com

Ontario: orcga.com

Quebec: info-ex.com

Saskatchewan : scga.ca

Regional Profiles

The series of tables below provide summaries of damage data, along with some contextual economic data, for each of the regions currently reporting via the DIRT system in Canada. Time series data is provided for relevant provinces. For each province/region, a summary of whether damage prevention/One-Call legislation exists is also provided.

In addition, at the end of each profile, you will find the web address of the Common Ground Alliance and the One-Call centre for that region.

2021 Note: The previous StatsCan publication used to determine this metric was discontinued following 2020, and the new Construction Employment metrics are quantifiably lower than in past years

Population
Table 17-10-0009-01 Population estimates, quarterly

Housing Starts Table
34-10-0135-01 Canada Mortgage and Housing Corporation, housing starts, under construction and completions, all areas, quarterly

Construction Employment
Table 14-10-0092-01 Employment by industry, annual

Construction GDP
Table 36-10-0402-01 Gross domestic product (GDP) at basic prices, by industry, provinces and territories (x 1,000,000)

info@canadiancga.com

www.CanadianCGA.com
www.ClickBeforeYouDig.com
www.digsafecanada.com

www.facebook.com/Canadian/CGA

twitter.com/CanadianCGA

Regional Profiles
British Columbia

British Columbia CGA
Common Ground Alliance

	2017	2018	2019	2020	2021
PROFILE					
Population	4,817,160	5,016,322	5,071,336	5,145,785	5,249,635
Land area	922,503	922,503	922,503	922,503	922,503
Population density	5.2	5.4	5.5	5.6	5.7
Housing starts*	43,664	40,857	44,932	37,734	47,609
Employment in construction	228,600	238,400	236,600	213,200	173,121
Construction GDP ($ millions)	19,825	20,562	22,650	23,033	25,371
SUMMARY					
Locate requests	190,312	203,758	202,052	212,056	241,374
Notifications	880,229	821,445	679,203	609,367	687,075
Locate requests to notifications ratio	1:4.6	1:4.0	1:3.4	1:2.87	1:2.85
Damages	1,449	1,408	1,304	1,241	1,282
Damages per work day	5.8	5.6	5	4.9	5.1
Damage ratio per 1,000 notifications	1.7	1.7	1.92	2.04	1.87
Damage ratio per 1,000 locate requests	7.76	6.9	6.45	5.85	5.31
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	142	143	135	88	216
Construction	180	184	435	425	284
Water/Sewer	454	397	415	365	327
Road/Street	109	130	117	78	64
Utilities	147	168	109	153	166
Unknown/other	417	386	93	132	225
DAMAGES BY FACILITY TYPE					
Electric	0	0	0	0	0
Natural Gas	1,301	1,228	1,139	1,039	1,086
Liquid Pipeline	52	36	22	31	6
Telecommunications	70	106	111	116	129
Unknown/Other	26	38	32	55	61
ROOT CAUSE					
Excavation Issue	516	660	447	423	493
Notification Issue	830	616	720	626	603
Locating Issue	12	4	4	1	3
Miscellaneous Root Causes	91	128	133	191	183
Damage Prevention/One Call Legislation					
British Columbia CGA: commongroundbc.ca BC One-Call: bc1c.ca	**Partial legislation:** BC Oil and Gas Commission and the National Energy Board governed pipelines are required to register with BC One-Calls. *Note that not all housing starts will be associated with an excavation; in the case of condo developments, for example, one excavation will be associated with numerous housing starts.				

Regional Profiles
Alberta

	2017	2018	2019	2020	2021
PROFILE					
Population	4,286,134	4,330,206	4,371,316	4,428,082	4,464,170
Land area	640,330	640,330	640,330	640,330	640,330
Population density	6.7	6.8	6.8	6.9	7.0
Housing starts	29,457	26,085	27,325	24,023	31,945
Employment in construction	241,000	245,400	236,800	217,600	165,724
Construction GDP ($ millions)	27,552	26,212	24,329	21,404	23,551
SUMMARY					
Locate requests	378,360	351,934	403,434	426,324	468,907
Notifications	1,649,307	1,477,711	1,463,751	1,470,207	1,597,579
Locate requests to notifications ratio	1:4.4	1:4.4	1:3.6	1:3.5	1:3.4
Damages	2,750	3,139	3,613	3,879	3,792
Damages per work day	10.9	12.5	14.4	14.8	15.2
Damage ratio per 1,000 notifications	1.7	2.2	2.47	2.64	2.37
Damage ratio per 1,000 locate requests	7.31	9.1	8.96	9.1	8.09
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	252	317	477	382	313
Construction	245	298	301	424	528
Water/Sewer	467	546	921	1,192	865
Road/Street	322	421	735	553	412
Utilities	484	408	673	702	683
Unknown/other	980	1,149	506	626	991
DAMAGES BY FACILITY TYPE					
Electric	152	179	205	219	227
Natural Gas	714	672	526	562	668
Liquid Pipeline	1*	381	0	3	8
Telecommunications	1,507	1,458	2,277	2,211	2,294
Water/Sewer	15	61	80	73	62
Unknown/Other	361	388	525	811	533
ROOT CAUSE					
Excavation Issue	576	550	1,163	1,080	721
Notification Issue	307	237	406	469	437
Locating Issue	505	306	631	748	1,130
Miscellaneous Root Causes	1362	2,046	1413	1,582	1,504
Damage Prevention/One-Call Legislation					
Utility Safety Partners: utilitysafety.ca	**Partial legislation:** Alberta Energy Regulator and the National Energy Board governed pipelines are required to register with Utility Safety Partners				

Regional Profiles
Saskatchewan

Saskatchewan Common Ground Alliance

Saskatchewan	2017	2018	2019	2020	2021
PROFILE					
Population	1,163,925	1,165,903	1,174,462	1,177,782	1,180,867
Land area	588,244	588,244	588,244	588,244	588,244
Population density	2.0	2.0	2.0	2.0	2.0
Housing starts	4,904	3,610	2,427	3,087	4,174
Employment in construction	50,700	49,500	47,100	41,000	28,556
Construction GDP ($ millions)	6,094	5,776	5,519	4,919	4,434
SUMMARY					
Locate requests	144,855	148,166	141,518	151,282	166,496
Notifications	448,874	466,764	450,209	437,685	468,320
Locate requests to notifications ratio	1:3.1	1:3.1	1:3.2	1:2.89	1:2.81
Damages	716	673	669	753	789
Damages per work day	2.9	2.7	2.7	3.0	3.2
Damage ratio per 1,000 notifications	1.60	1.44	1.49	1.72	1.68
Damage ratio per 1,000 locate requests	4.94	4.54	4.73	4.98	4.74
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	99	124	127	113	84
Construction	172	55	49	101	94
Water/Sewer	127	78	94	96	174
Road/Street	52	70	63	31	46
Utilities	147	162	200	177	182
Unknown/other	119	184	136	235	209
DAMAGES BY FACILITY TYPE					
Electric	226	271	258	271	304
Natural Gas	136	224	232	264	299
Liquid Pipeline	7	3	1	6	4
Telecommunications	347	172	170	210	182
Unknown/Other	0	3	8	2	0
ROOT CAUSE					
Excavation Issue	268	277	317	335	298
Notification Issue	171	159	186	240	269
Locating Issue	199	78	123	115	159
Miscellaneous Root Causes	78	159	43	63	63
Damage Prevention/One-Call Legislation					
Saskatchewan CGA: scga.ca Sask 1st Call: sask1stcall.com	**Partial legislation:** National Energy Board governed pipelines are required to register with Sask 1st Call.				

Regional Profiles
Manitoba

MCGA
Manitoba Common Ground Alliance

	2017	2018	2019	2020	2021
PROFILE					
Population	1,338,109	1,356,836	1,369,465	1,379,469	1,386,333
Land area	552,371	552,371	552,371	552,371	552,371
Population density	2.4	2.5	2.5	2.5	2.5
Housing starts	7,501	7,376	6,946	7,314	8,006
Employment in construction	48,300	47,200	50,400	46,700	34,914
Construction GDP ($ millions)	4,490	4,628	4,683	4,182	4,102
SUMMARY					
Locate requests	61,885	64,090	74,861	76,276	82,244
Notifications	136,024	173,292	191,226	183,366	206,444
Locate requests to notifications ratio	1:2.2	1:2.2	1:2.6	1:2.4	1:2.5
Damages	187	219	196	208	195
Damages per work day	0.7	0.9	0.8	0.8	0.8
Damage ratio per 1,000 notifications	1.3	1.26	1.02	1.13	0.94
Damage ratio per 1,000 locate requests	2.86	3.42	2.62	2.73	2.37
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	24	33	27	24	6
Construction	20	20	13	22	15
Water/Sewer	61	58	60	50	51
Road/Street	20	28	24	20	19
Utilities	20	22	19	46	98
Unknown/other	42	58	53	46	6
DAMAGES BY FACILITY TYPE					
Electric	85	132	110	109	99
Natural Gas	102	87	86	99	96
Liquid Pipeline	0	0	0	0	0
Telecommunications	0	0	0	0	0
Unknown/Other	0	0	0	0	0
ROOT CAUSE					
Excavation Issue	130	153	137	118	126
Notification Issue	41	41	36	71	13
Locating Issue	14	21	22	18	6
Miscellaneous Root Causes	2	4	1	1	50
Damage Prevention/One-Call Legislation					
Manitoba CGA: manitobacga.com One-Call: clickbeforeyoudigmb.com	**Partial legislation:** National Energy Board governed pipelines are required to register with ClickBeforeYouDigMB				

Regional Profiles
Ontario

Ontario Regional ORCGA Common Ground Alliance

	2017	2018	2019	2020	2021
PROFILE					
Population	14,193,384	14,411,424	14,566,547	14,733,506	14,915,270
Land area	908,699	908,699	908,699	908,699	908,699
Population density	15.6	15.9	16.0	16.2	16.4
Housing starts	79,123	78,742	68,985	81,305	100,089
Employment in construction	512,500	525,100	542,800	520,800	370,686
Construction GDP ($ millions)	49,443	51,506	50,741	50,881	57,318
SUMMARY					
Locate requests	1,041,610	1,077,815	1,071,928	1,025,432	1,101,026
Notifications	7,498,270	6,698,205	6,227,227	5,746,332	6,141,712
Locate requests to notifications ratio	1:7.2	1:6.2	1:5.8	1:5.6	1:5.6
Damages	5,367	5,313	5,005	4,566	4,402
Damages per work day	21.1	21.2	19.9	18.1	17.6
Damage ratio per 1,000 notifications	0.7	0.87	0.80	0.79	0.72
Damage ratio per 1,000 locate requests	5.2	5.16	4.67	4.45	4.00
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	799	831	750	906	754
Construction	799	1072	1,182	547	806
Water/Sewer	1,437	1,281	1,166	1,157	872
Road/Street	640	496	523	543	335
Utilities	992	950	815	621	710
Unknown/other	700	683	569	792	924
DAMAGES BY FACILITY TYPE					
Electric	343	341	270	222	239
Natural Gas	2,404	2,408	2,332	2,422	2,120
Liquid Pipeline	17	17	13	15	17
Telecommunications	2,549	2,484	2,343	1,884	1,885
Water/Sewer	52	62	42	8	127
Unknown/Other	2	1	5	15	13
ROOT CAUSE					
Excavation Issue	2,499	2,356	2,085	1,955	1,791
Notification Issue	1,318	1,321	1,381	1,314	1,233
Locating Issue	271	302	249	144	1,131
Miscellaneous Root Causes	1,279	1,334	1,290	1,153	247
Damage Prevention/One-Call Legislation					
OntarioCGA: orcga.com One-Call: ontarioonecall.ca	**Partial legislation:** National Energy Board governed pipelines and all buried infrastructure within public rights of way are required to register with Ontario One-Call				

Regional Profiles
Quebec

	2017	2018	2019	2020	2021
PROFILE					
Population	8,394,034	8,390,499	8,484,965	8,575,812	8,631,147
Land area	1,667,712	1,667,712	1,667,712	1,667,712	1,667,712
Population density	5.0	5.0	5.1	5.1	5.2
Housing starts	46,495	46,874	47,967	54,066	67,962
Employment in construction	245,800	249,600	264,600	257,200	221,203
Construction GDP ($ millions)	23,048	23,884	24,602	23,913	26,508
SUMMARY					
Locate requests	259,670	274,938	288,149	293,462	334,728
Notifications	572,049	597,324	627,518	595,823	614,091
Locate requests to notifications ratio	1:2.2	1:2.2	1:2.2	1:2	1:1.8
Damages	1,302	1,235	1,102	911	927
Damages per work day	4.9	4.9	4	3.6	3.7
Damage ratio per 1,000 notifications	2.2	2.07	1.8	1.61	1.51
Damage ratio per 1,000 locate requests	4.74	4.49	3.82	3.27	2.77
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	144	112	93	48	29
Construction	160	164	168	130	287
Water/Sewer	407	416	298	247	204
Road/Street	296	261	252	214	121
Utilities	73	84	94	79	63
Unknown/other	222	198	197	193	223
DAMAGES BY FACILITY TYPE					
Electric	99	127	120	41	16
Natural Gas	480	443	369	328	205
Liquid Pipeline	2	0	2	0	8
Telecommunications	614	570	540	506	452
Water/Sewer	0	1	0	0	0
Unknown/Other	107	94	71	36	246
ROOT CAUSE					
Excavation Issue	527	558	463	324	340
Notification Issue	339	231	205	243	212
Locating Issue	48	45	32	29	28
Miscellaneous Root Causes	388	401	402	315	347
Damage Prevention/One-Call Legislation					
QCGA et One-Call: info-ex.com	**Partial legislation:** Pipelines governed by the National Energy Board are required to register with Info-Excavation.				

Regional Profiles
Atlantic Region

ATLCGA
Atlantic Canada Common Ground Alliance

	2017	2018	2019	2020	2021
PROFILE					
Population	2,394,362	2,416,754	2,426,711	2,531,079	2,480,826
Land area	500,531	500,531	500,531	500,531	500,531
Population density	4.8	4.8	4.8	5.1	5.0
Housing starts	8,619	9,299	10,103	10,351	12,097
Employment in construction	82,400	82,300	84,700	78,600	69,529
Construction GDP ($ millions)	8,299	7,500	7,652	6,979	7,162
SUMMARY					
Locate requests	35,451	44,481	52,361	55,837	62,298
Notifications	53,338	53,771	68,686	67,725	72,205
Locate requests to notifications ratio	1:1.5	1:1.2	1:1.3	1:1.2	1:1.2
Damages	17	54	60	15	15
Damages per work day	0.3	0.2	0.2	0.06	0.06
Damage ratio per 1,000 notifications	1.2	1.00	0.87	0.22	0.21
Damage ratio per 1,000 locate requests	0.48	1.21	1.15	0.27	0.24
DAMAGES BY TYPE OF WORK					
Green (Landscaping)	3	4	5	2	0
Construction	6	5	9	2	1
Water/Sewer	4	21	11	7	10
Road/Street	2	10	15	4	3
Utilities	0	4	6	0	1
Unknown/other	2	10	14	0	0
DAMAGES BY FACILITY TYPE					
Electric	0	0	0	0	3
Natural Gas	14	17	15	15	12
Liquid Pipeline	0	0	0	0	0
Telecommunications	52	29	45	0	0
Water/Sewer	0	0	0	0	0
Unknown/Other	0	0	0	0	0
ROOT CAUSE					
Excavation Issue	13	18	12	11	11
No notification made to the One-Call Centre	3	31	35	4	2
Locating Issue	0	1	4	0	0
Miscellaneous Root Causes	1	4	9	0	2
Damage Prevention/One-Call Legislation					
Altantic Canada CGA: atlanticdigsafe.ca One-Call: info-ex.com	**Partial legislation:** Pipelines governed by the National Energy Board are required to register with Info-Excavation.				