

Mitigating Third-Party Damage Risk Through the Use of AI

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October 14th, 2025

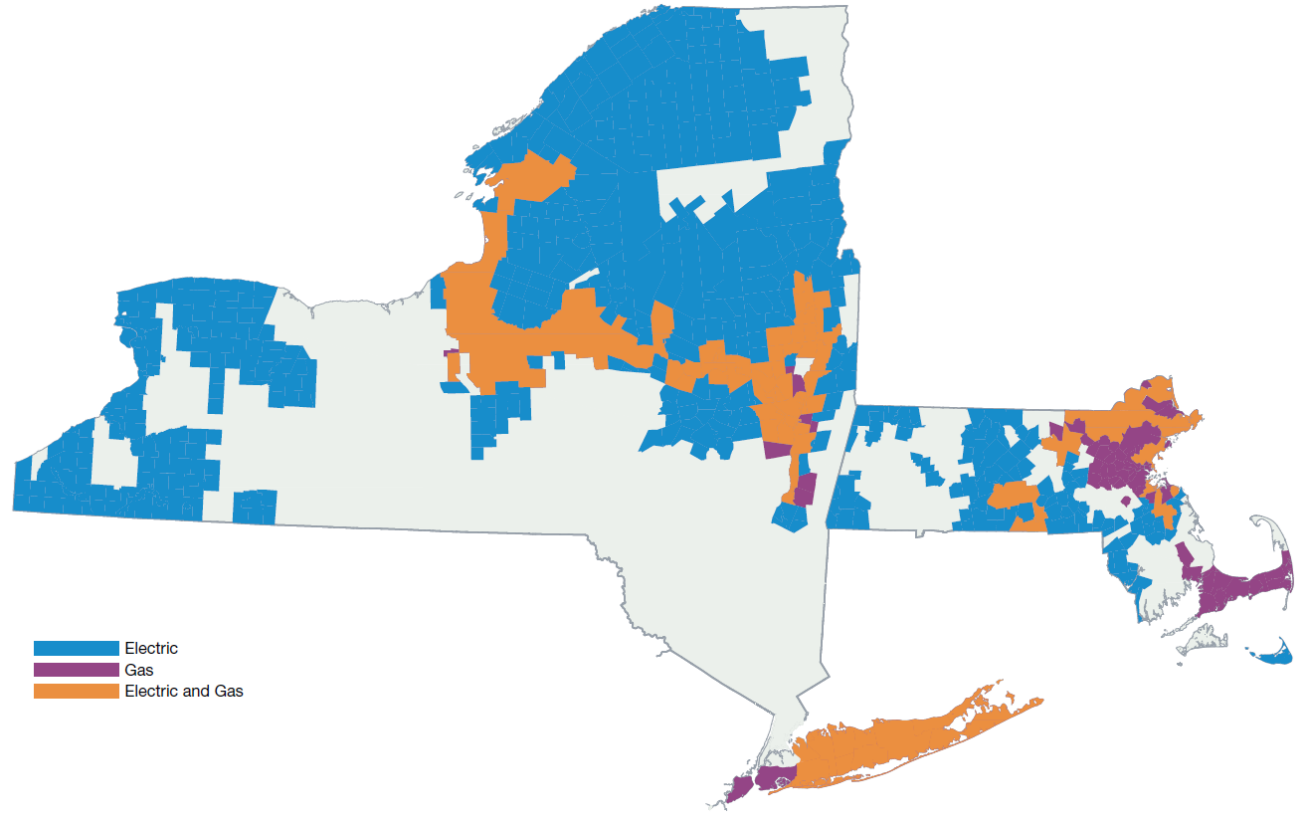
nationalgrid



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National Grid - US is an electricity and natural gas provider in northeastern United States with over 3.5 million gas customers across New York State and Massachusetts.

The gas system encompasses 33,000 miles of main and almost 2.5 million services for a total of over 61,000 miles of pipe.



Utility challenges

Increased excavation activity: Higher ticket volumes and construction activity means greater pressure to gain visibility to drive better performance

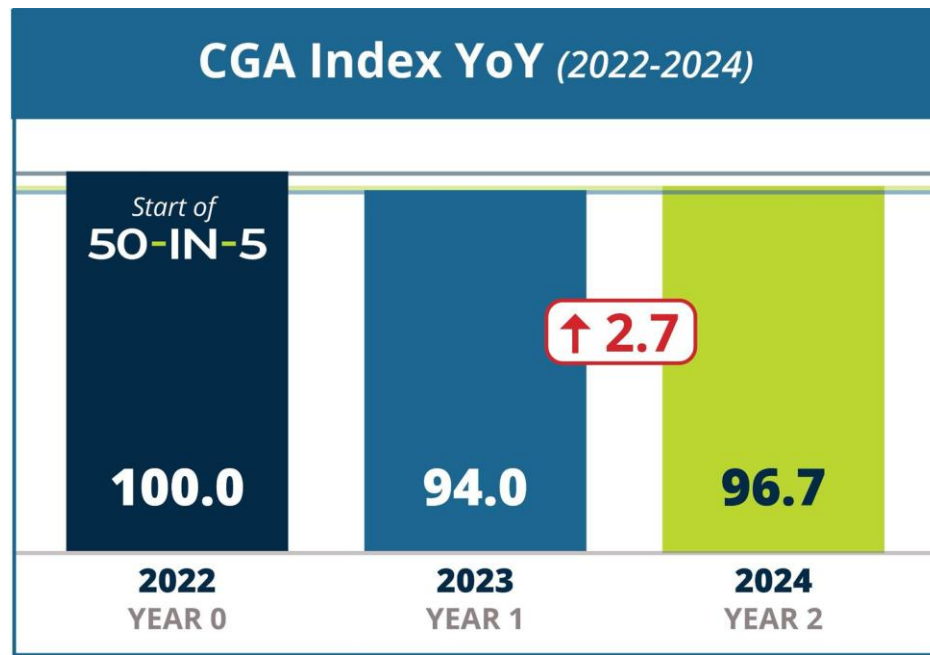
High program cost: Locating contractor fees continue to increase on par of faster than ticket growth, causing costs to quickly skyrocket.

Antiquated technology: Current systems are difficult to use, costly to maintain and lack the modern capabilities drive true data driven actions

Inability to track performance: In most systems, it is difficult to track key performance indicators. Utilities not currently using a TMS rely on locating contractors to provide the metrics required to manage their operations.

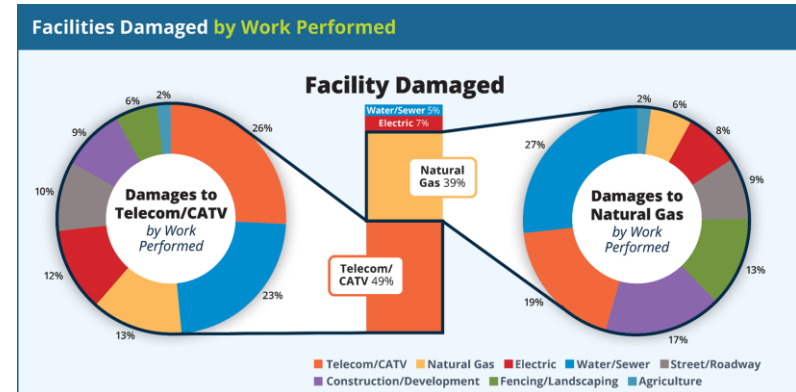
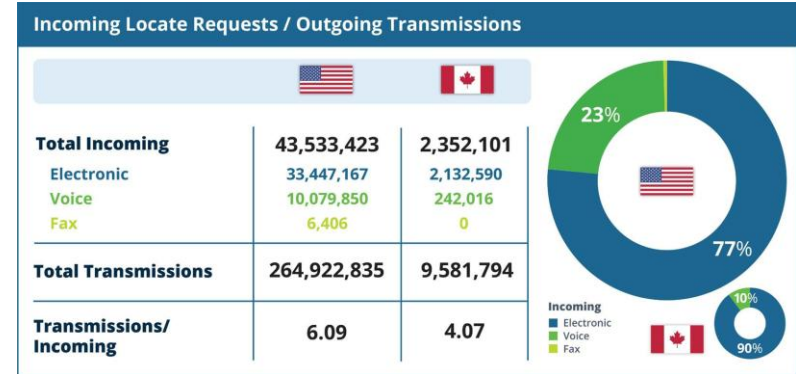
How is the Industry Performing?

- **CGA '50 in 5' Initiative:** Aim to reduce damages by 50% in 5 years
- Damage rates have **decreased only slightly**, remaining relatively flat compared to the ambitious 50% reduction goal
- Broadband fiber & federally funded infrastructure projects have fueled an increase in damages



How do we Solve the Problem?

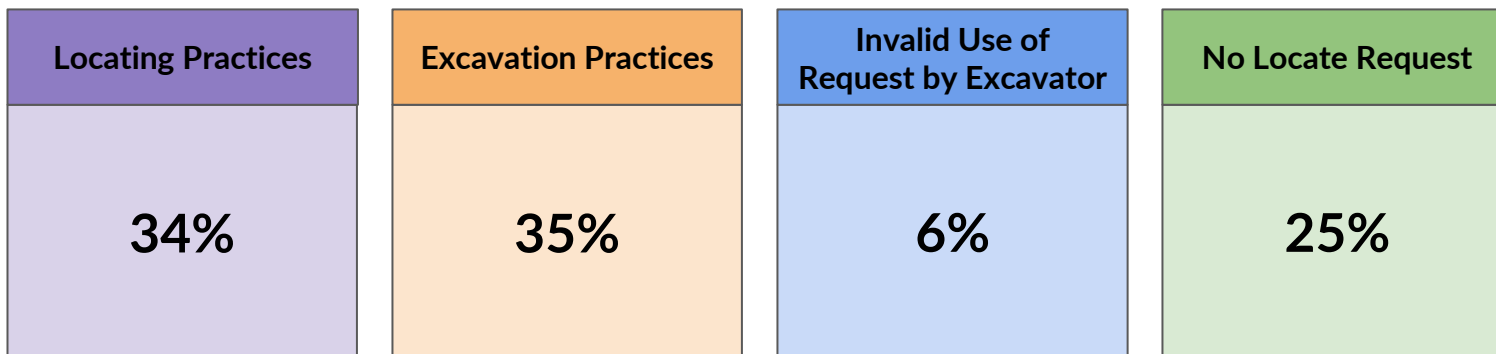
- Ticket volumes and large projects are increasing in many areas
- Damages have increasing impact from regulatory bodies
- There's a finite number of resources, so how do we make them more effective?
- The use of Artificial Intelligence (AI) and Machine Learning (ML) models can help



What are the Root Causes of Damages?

According to the 2024 DIRT Report, the Top 10 causes of damage can be broken down into 4 predominant categories

Categories of Damage Causes



Locating Practices - Risk-Based Approach

Locating Practices

34



- Share risk info with locators - contracted/in-house
 - More experienced locators on high risk tickets
 - Assign highest risk exposure tickets to in-house locators
- Prescriptive approach to QA/QC - 2nd set of eyes on highest risk tickets
- Automate the process for Locator Quality data

Excavation Practices - Risk-Based Approach

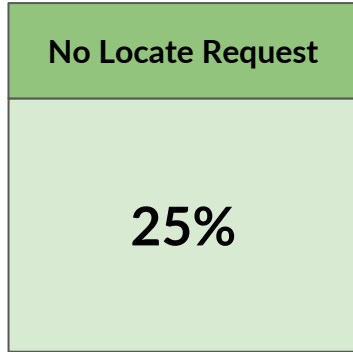
Excavation Practices

35%



- Focus limited resources for onsite interventions for **Very High** risk tickets
- Build relationship between excavators & utility resources
- Set up notification rules to warn excavators of high exposure assets
- Focus additional attention on “worst offenders”

No Call-In Damages - Risk-Based Approach



- Document unticketed excavations
- Use Public Awareness team to reach out to “Worst Offenders”
- Pinpoint areas more likely to have NCIs
 - More effective Public Awareness spend
- Leverage Locators/utility resources for excavator awareness

Urbint + nationalgrid

Damage Prevention

Reduce Third Party
Damages



Reduced asset
damages by

37%

Worker Safety

Prevent Serious Injuries
and Fatalities



Increased hazard
recognition by

56%

Storm Response

Restore Power Faster
Post-Weather Events



Secured all crews for a
major storm within

19 Minutes

Public Safety

Improve Response to
Public Hazards



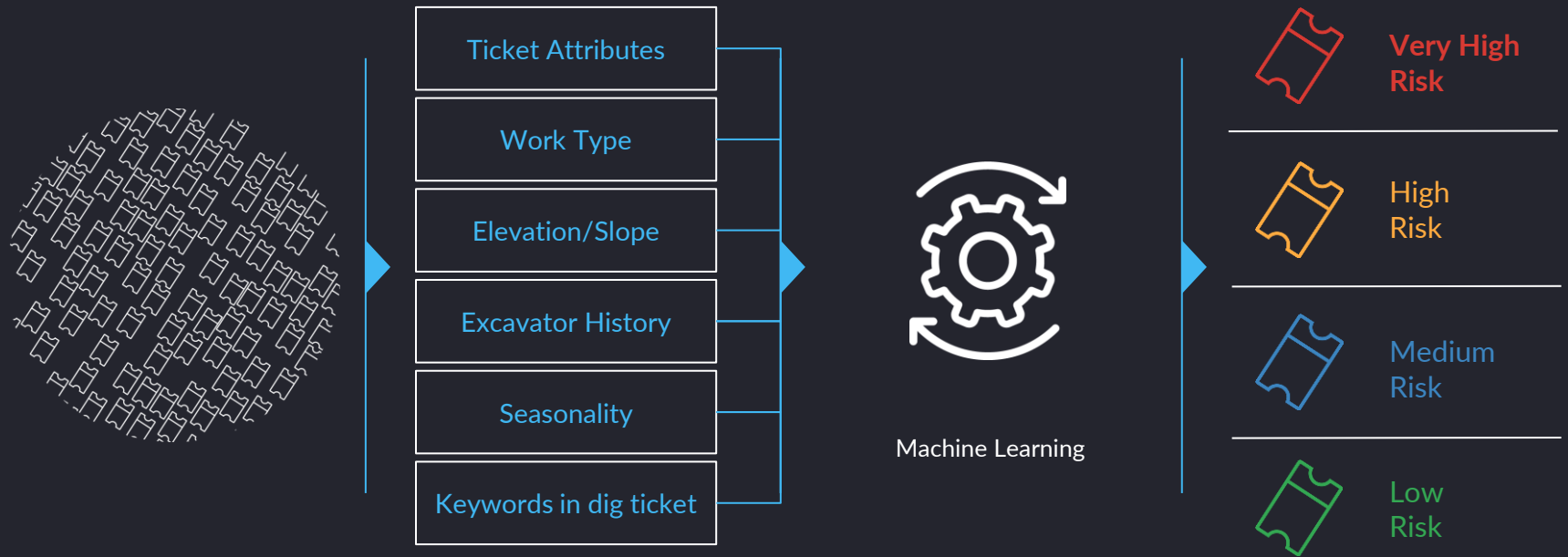
Enhanced Situational
awareness from

5,000

first responders

How AI / ML Can “Weed Out the Noise”

- 1 Thousands of One-Call tickets received every day
- 2 Data is collected around each ticket and fed to model
- 3 Algorithms process ticket data and determine risk characteristics
- 4 Categorizes & scores tickets for prioritization

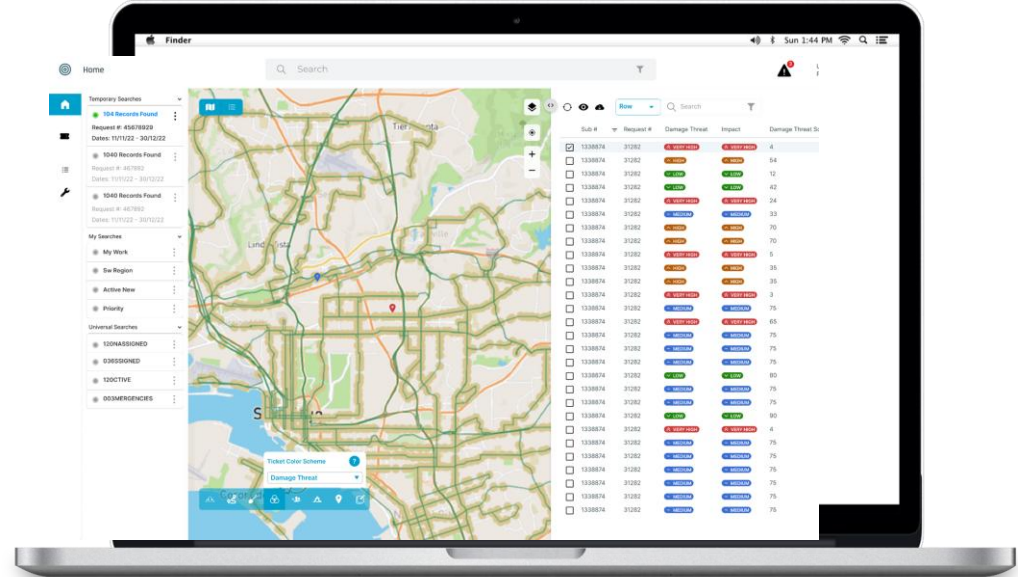


**Not a comprehensive list*

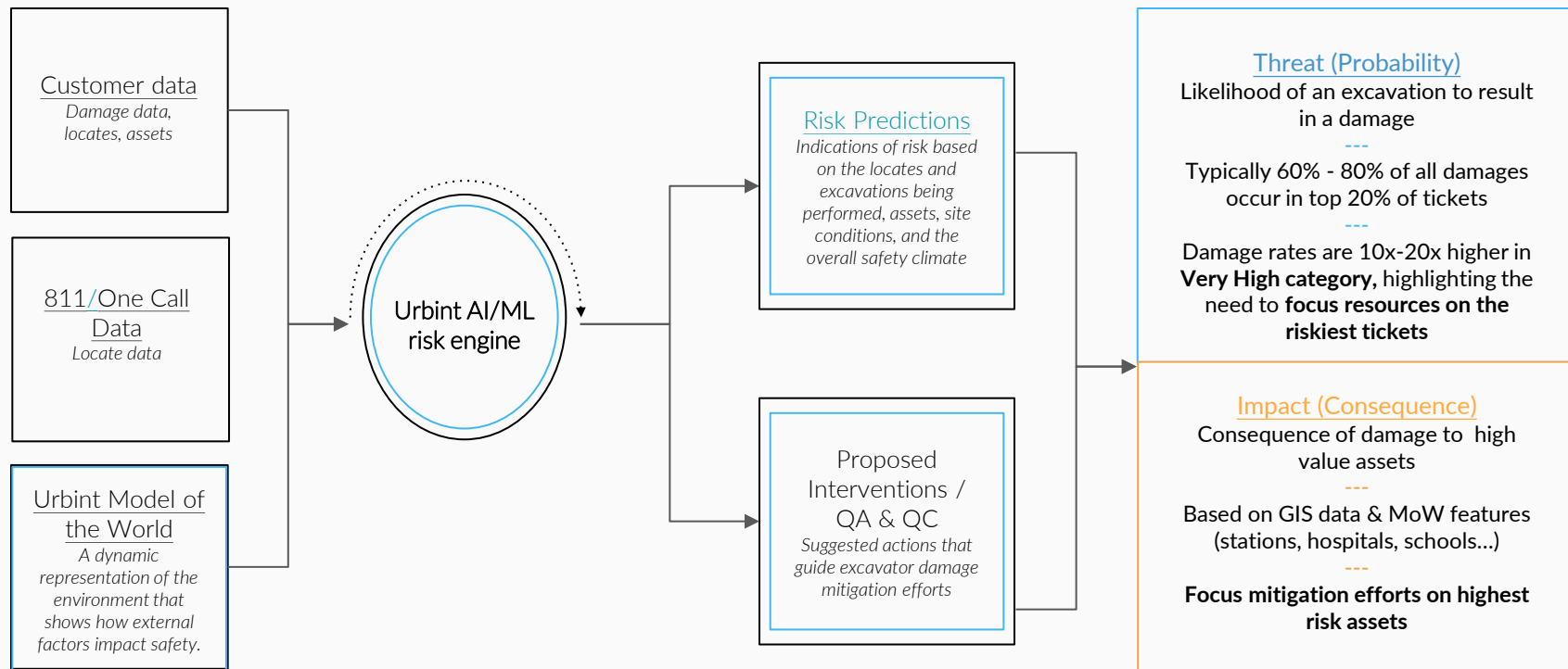


AI / ML Results for the Highest Risk Tickets

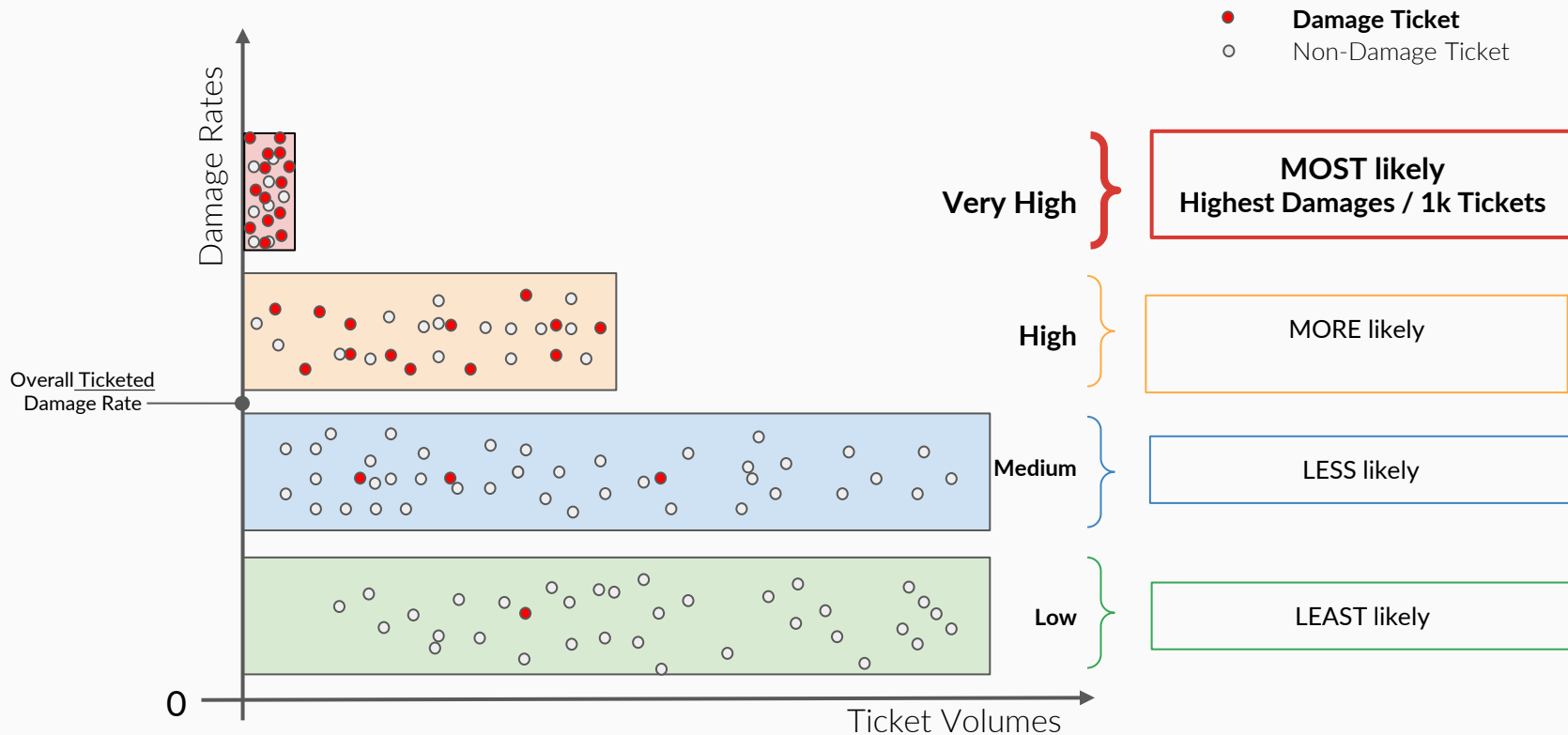
- Typically **2%-5% of tickets** result in **15%-25% of damages**
- Tickets in the highest category of risk are **10X-20X more likely** to result in a damage
- Most utilities **don't have enough resources** to mitigate risk on all tickets, but can support 2%-5% which is why **prioritization is essential**
- Combining the “**Predicted**” damage risk and the “**Impact**” can help reduce the highest exposure for utilities



Urbint Leverages AI for Risk Mitigation

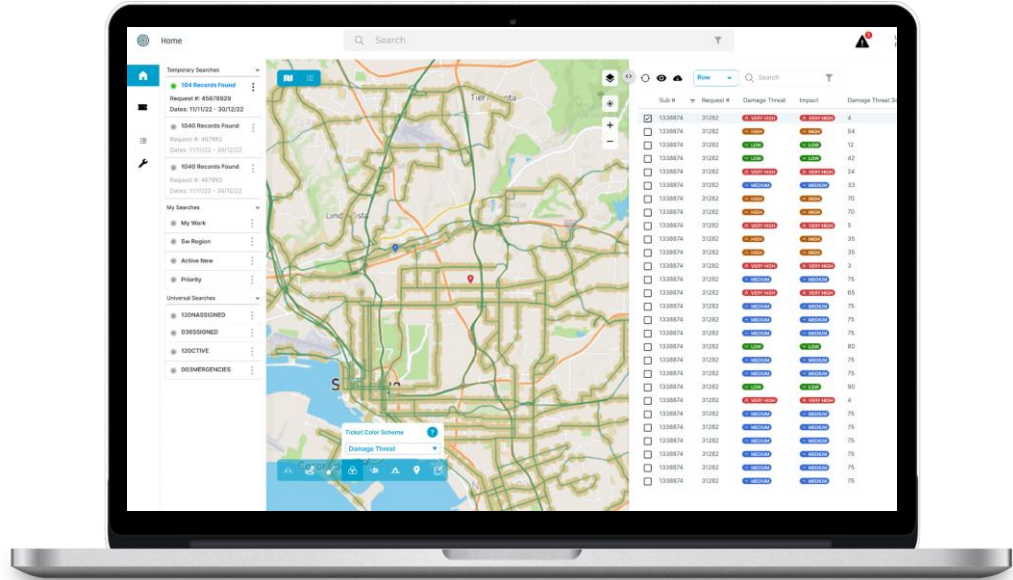


Threat Model (Probability) Categories



Damage Threat Scores

- Empowers utilities with a **holistic view of risk** on each ticket and the ability to target true high risk excavations ($\text{risk} = \text{likelihood} \times \text{consequence}$)
- Urbint leverages **ML** to generate Damage Threat scores
- These scores reflect the **likelihood** that your assets will be damaged during excavation
- Supports a proactive approach to reduce damages



Damage Prevention Risk Engine

Currently, The solution displays the **Damage Threat** and the potential **Impact** of each ticket separately

#1-67892-972-7
847 N Broad St
Philadelphia, PA

Risk summary

Damage threat **VERY HIGH**

Impact **VERY HIGH**

Ticket details

Ticket number	#1-67892-972-7	Work starts	May 20, 2025, 11:18 PM
Ticket version	0	Reported on	May 16, 2025, 11:18 PM
Ticket stage	Pre-Dig	Response due	May 18, 2025, 11:18 PM
Ticket type	Standard	Last updated	May 9, 2025, 8:01 AM
Work done for	Weiss-huerta	Expiration date	—
Work type	Utility Work & New Utility Pole		
Equipment	Backhoe		

[View One Call Center ticket text and version history...](#)

DAMAGE THREAT

Likelihood of an excavation damage to occur

Calculated through a Machine Learning algorithm trained on damages that can be traced back to an 811 ticket

IMPACT

Consequence associated with the occurrence of a damage

Relative Risk Model Designed by SMEs and validated by the National Grid, Weighted sum of safety, outage, and repair outcomes

Damage Threat Model Features and Categories

Trained on damages that can be traced back to an 811 ticket

The Damage Threat model focuses on ensuring that the Very High Category is optimized so that National Grid is mitigating more damages on fewer tickets. This is done by training the model on key features that will help identify these Very High threat tickets

Top Feature Groups	Top Features that drive damage threat predictions up or down
Work Type Keywords	Type of ongoing work, based on words/ phrases like "fios", "gas", "excavation", "sewer", "sign install", "replace utility"
Ticket Type	Is the ticket a "Rush", "Emergency" ticket type or not
Work Type	Historical damage rates for the work type
Contractor Reputation	Historical damage rates for the contractor
Excavator Reputation	Historical damage rates for the excavator
Regional Reputation	Regional hot spots & historical damage rates for the region
Spatial	Site conditions such as elevation, slope etc.
Gas Asset	Measure of the gas asset density in the area



* Metrics (relative likelihood of damage) quoted in this table are 'Target' model performance levels and are dependent on data quality (accuracy, completeness) and availability (timely refresh of damage data)

Damage Threat Model Features and Categories

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Damage Threat Category	What does it mean (targets)? ¹	Intervention Recommendation
Very High (~1% tickets)	6.7 X MORE likely (than average) to experience a damage	Prioritize in-person interventions in this bucket
High (~33% tickets)	2.5X MORE Likely to experience a damage	Prioritize in-person interventions on tickets in this bucket that are characterized by a Very-High Impact label
Medium (~33% tickets)	Slightly LESS likely to experience a damage	No intervention recommended
Low (~33% tickets)	4X LESS likely to experience a damage	No intervention recommended

* Metrics (relative likelihood of damage) quoted in this table are 'Target' model performance levels and are dependent on data quality (accuracy, completeness) and availability (timely refresh of damage data)

Example of elements that can contribute to risk



Excavator Reputation
✓ POOR [Learn More](#)

Excavator Reputation:

- Number of jobs that excavator has done in short/medium and long-term history
- How this excavator's historical damage rate ranks compared to other excavators in short/medium and long-term history
- Number of total damages the excavator caused in recent history



Work Type Risk
✓ LOW [Learn More](#)

Work Type:

- How common/rare this work type/work type category is
- How this work type/work type category ranks compared to other types in damage rate
- Number of damages caused by this work type in short/medium and long-term history



Equipment Risk
~ MEDIUM [Learn More](#)

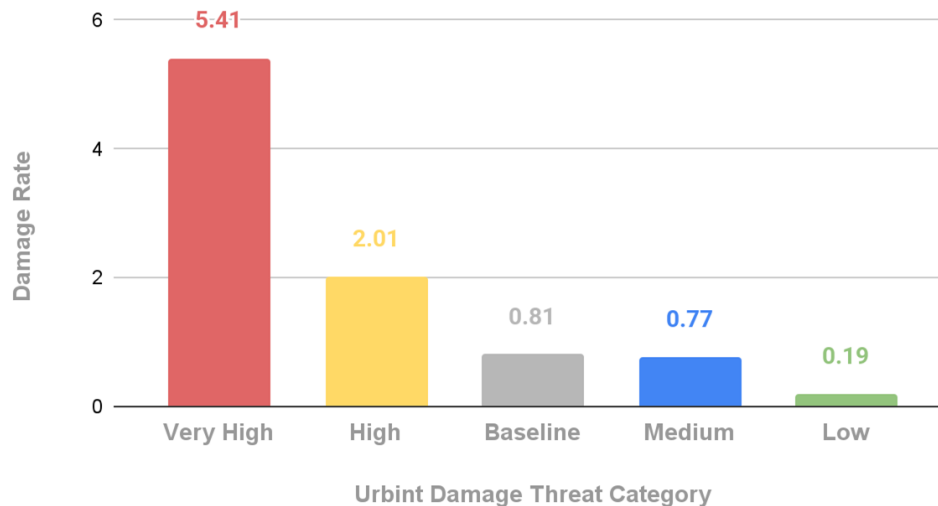
Equipment Type:

- How common this equipment type is
- How this equipment type damage rate ranks compared to other equipment types.

2025 Year-to-Date Model Performance (DNY)

- Tickets ranked **Very High** are 28.5x more likely to result in a damage than **Low** tickets
- Tickets ranked **Very High** are 6.7x more likely to result in a damage than picking a ticket at random

2025 National Grid (DNY) Urbint Model Performance



Residual Risk: Original vs. Updated Predictions

URBINT LENS						
All active tickets (unsaved) 315 tickets						
Ticket ID	Service center	Address	Current Damage Threat	Original Damage Threat	Damage Threat Change	Impact
#492-08-5179	North, East, West	8502 Preston Rd. Ingl	HIGH	VERY HIGH	Decrease	VER
#492-09-6225	North	2118 Thornridge Cir. S	MEDIUM			ME
#492-09-7991	North, East, West	1901 Thornridge Cir. S	MEDIUM			ME
#492-08-9569	Polygon 1, Polygon 2, More	8502 Preston Rd. Ingl	HIGH			HIG
#492-09-6695	North, East, West	4140 Parker Rd. Allen	MEDIUM	LOW	Increase	LOW
#492-09-6827	North, East, West	8502 Joshua Rd. Ingl	VERY HIGH			VER
#492-08-5823	North, East, West	1901 Thornridge Cir. S	HIGH			HIG
#492-08-2450	North, East, West	2118 Thornridge Cir. S	LOW			VER
#492-09-6827	North, East, West	1901 Thornridge Cir. S	VERY HIGH	MEDIUM	Increase	ME
#492-09-6695	North, East, West	6391 Elgin St. Celina,	MEDIUM			ME
#492-08-9569	North, East, West	4140 Parker Rd. Allen	HIGH			LOW
#492-09-6423	North, East, West	3517 W. Gray St. Utici	VERY HIGH			HIG
#492-09-2139	North, East, West	6391 Elgin St. Celina,	MEDIUM			ME
#492-08-5547	North, East, West	1901 Thornridge Cir. S	MEDIUM			ME
#492-09-7991	North, East, West	8502 Preston Rd. Ingl	MEDIUM			ME



Damage Threat - Risk Insights

412-A E 28th St Ave | Lower East Side, NY

Residual risk changes ⬆️ INCREASE

The risk score on the ticket has changed from **High** to **Very High** based on the <PR code type> positive response.

Excavator Rank
⬆️ **VERY HIGH** [Learn More](#)

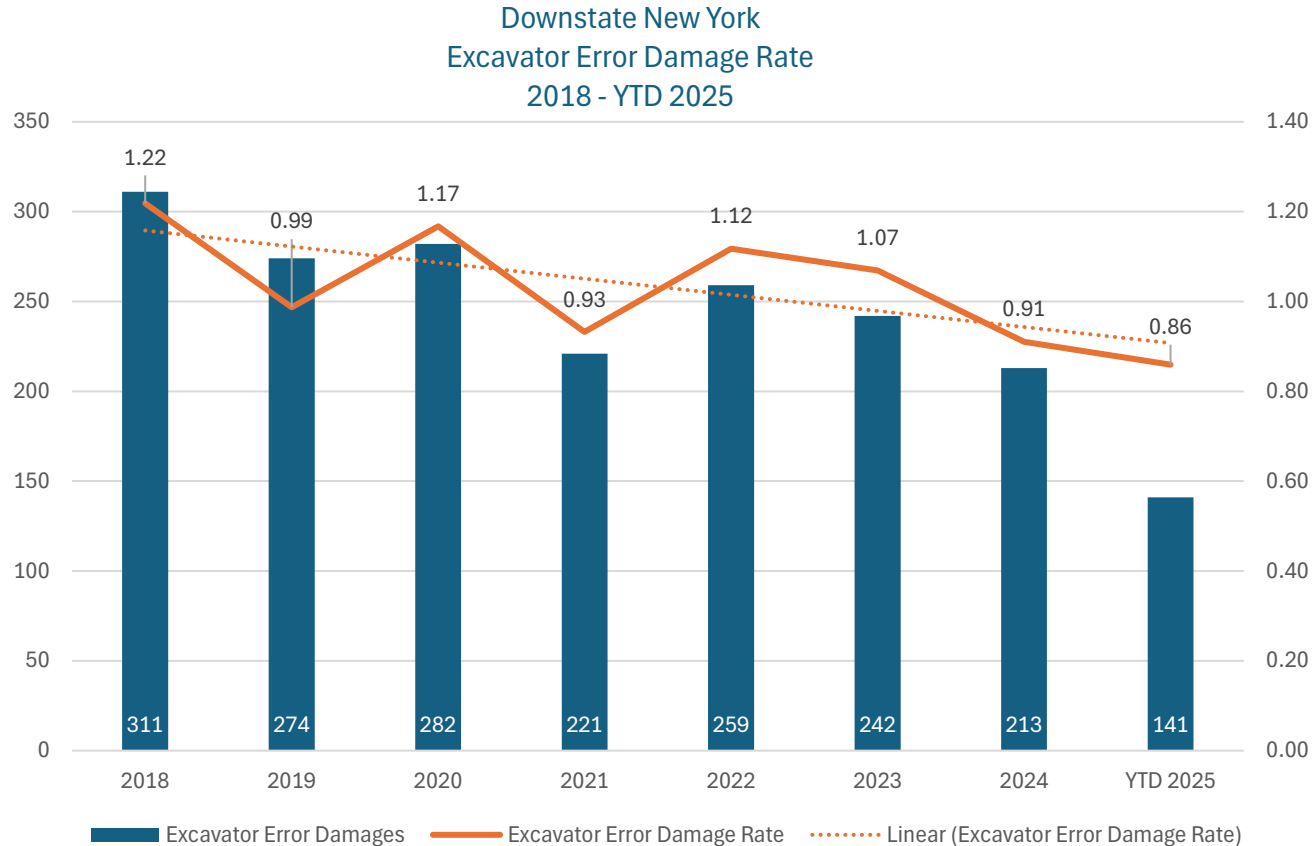
Ticket Type
~ **MEDIUM** [Learn More](#)

Location Complexity
⬆️ **HIGH** [Learn More](#)

Type of Work
✓ **LOW** [Learn More](#)

*Our Risk Model considers over 300+ risk factors across these categories and this is a summarization of the drivers of risk.

Consistent Improvement



Consistent Improvement

Downstate New York	2018	2019	2020	2021	2022	2023	2024 YTD	2025
One Call Tickets	255,231	277,529	241,513	237,096	231,770	226,319	233,987	164,084
Excavator Error Damages	311	274	282	221	259	242	213	141
Excavator Error Damage Rate	1.22	0.99	1.17	0.93	1.12	1.07	0.91	0.86

Key Observations

- Sustained improvement: **Damage rate down ~30% since 2018.**
- **2025 projection:** Lowest damage count and rate to date (0.86).
- Rate reduction sustained over seven years, demonstrating **program maturity** rather than workload decline indicating **behavioral change** rather than cyclical variation.
- Nearly 40 % fewer damages, showing **strong improvement in compliance and pre-dig verification.**

Path Forward for National Grid

By continuing this **AI refinement** and scaling, **National Grid's** goal is to **lead the industry in damage prevention**, ensuring **greater public safety** and a **more reliable network**.

We plan to do that by partnering and **learning from our peers**, embracing **Best Practices**, collaborating with **regulators**, **municipalities**, and **contractors** to achieve **CGA's 50-in-5 goals**.



national**grid**