

# The Virginia 811 Dirt

WORKING AS ONE TO GET THE JOB DONE



VIRGINIA 811'S QUARTERLY NEWSLETTER | MARCH 2024

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## LETTER FROM THE CEO

### B. Scott Crawford

2024 is off to a bang! As of this writing, Virginia is witnessing a 10% increase in locate request volume over 2023, year to date. A concern is that No Shows (999) are up over 55%. Fiber expansion continues to place pressures all stakeholders are sensitive to and trying to accommodate.

Virginia 811 is committed to supporting all stakeholders as we, together, confront these challenges. Electronic white lining is a strong strategy to help locators confront the demands placed on the overall system. Electronic white lining can provide locators with more specific details about excavator need, decreasing the the amount of time locators spend at each locate request. This can have a positive impact, overall, in regard to helping to manage demand related to fiber installation.

Currently, Virginia 811 is working on trying to identify a means to facilitate electronic white lining. Two primary challenges exist with this effort. First is ensuring that current State Corporation Commission rules governing locator responsibilities are amended to allow locators to default to image depictions of an excavation area when text-based descriptions conflict with that image-based depiction.

Second, Virginia 811 needs to work with software providers to allow for a notification polygon to morph into an excavation polygon that both allows for adequate notification and provides a visual representation of the excavation area to better help locators identify potentially affected facilities. This is, ultimately, a top priority of Virginia 811.

However, there is another exciting avenue Virginia 811 is exploring to potentially help relieve pressure on locators. While at an early stage, Virginia 811 is in conversation with a software company to create an AI driven management system that can focus on daily locate request volume related to independent municipalities, allowing excavators to know that the municipality is witnessing a level of locate requests that may be placing undue strain. The excavator would receive notification that the locate request may have a higher probability of having one or more No Shows. The excavator could then have the option to, seamlessly, cancel the previous locate request and schedule a locate request for a time that, based on AI analysis, would result in a higher probability of being located on time.

Again, there are hurdles that must be cleared, but the potential for such functionality is real and Virginia 811 is committed to exploring such areas of continuous improvement. In the end all stakeholders must work together to face this increase in locate request volume to ensure Virginia’s underground infrastructure, excavators, and property are protected. Virginia 811 is committed to ensuring this is achieved.

I hope you enjoy the articles found within this newsletter, showcasing the many achievements Virginia 811 and the stakeholders have achieved. Damage prevention is truly a team effort. We must all work together to ensure our underground utility infrastructure is secure and protected.

- B. Scott Crawford  
President & CEO  
Virginia 811





# DRIVING CONTINUOUS IMPROVEMENT FROM WITHIN

## The Power of Team Member Suggestions

- B. Scott Crawford

On June 6, 1944, the largest amphibious assault in history, which included three airborne divisions dropping over Normandy in the hours before the invasion began, occurred. The Normandy landing, known as “D-Day,” resulted in the Allied forces successfully establishing a Western Front against Nazi Germany, thus taking pressure off of the Soviet forces fighting Germany on the Eastern Front. The June 6th invasion quickly procured and maintained a beachhead, but the campaign bogged down and dragged on through the summer as the needed breakthrough, penetrating German defenses reinforced by the infamous hedgerows (incredibly dense hedges that created difficult, natural, defensive barriers) was not quickly realized. Allied forces established, and hung on to, the beach but increasingly witnessed a difficult time penetrating German defenses, preventing Allied forces from driving toward Paris and, ultimately, Berlin.

The American Sherman tanks were not powerful enough, at times, to break through the hedges, and when they did find some success, their soft underbellies were exposed as the hedges lifted them up, making them prime targets for German panzerfausts! A breakthrough was needed, and in the end, while it was achieved, it took a collective effort involving decisions at the strategic level and the tactical level. Generals alone, with their strategic planning, did not produce the breakthrough.

In order to confront the challenges the hedgerows presented, a host of experiments unfolded. Lieutenant Charles Green, 29th Division, designed a bumper for the Sherman tanks that was constructed out of the salvaged railroad ties that the Germans had placed on the beaches to serve as obstacles to slow down landing craft and advancing tanks. This addition to the front of Sherman tanks allowed them to plow through some of the thickest hedgerows. However, this was not the only innovation brought to bear on this challenge. Sergeant Curtis Culin, 2nd Armored Division, designed a device made out of scrap iron retrieved from a German roadblock. The device, making the tank look like a rhino, allowed Sherman tanks to cut through the hedgerows. The device was adopted and added to Sherman tanks. Those tanks fitted with the device became referred to as “Rhino Tanks.” The United States Army encouraged the contributions of men such as Green and Culin to offer ideas as to how to best confront the hedgerows. Only through the allowance of insight from those with the most specific focus on the challenges the soldiers were facing to flow upward could the solutions needed to achieve strategic goals be achieved.

For those of us in business, this anecdote from the Normandy campaign suggests some powerful lessons. Most important is the need for business leaders to provide opportunities for team members “in the trenches” to provide feedback, insight, and ideas to those higher on the sacred corporate hierarchy who often create, through their decisions, the challenges the team has to confront! Through this process, team members can find an ability to lead as they create solutions and efficiencies that others not as engaged in operations may be entirely unaware of or might miss. In this manner, managers, supervisors, and execs can find solutions to the many “hedgerows” businesses face whether they be tied to equity growth, service, efficiencies, or cost savings.

At Virginia 811, we use a digital suggestion box, accessible to all team members to facilitate this communication. Kari Harris, Head of Safety and Organizational Improvement, had noticed that the number of suggestions coming from team members was incredibly low when, before the Pandemic, an actual physical suggestion box had been in our break room. She recommended that we make the suggestion box digital, created a Smartsheet to allow team members to advance suggestions, and oversaw the digital suggestion box’s launch. Almost immediately the number of suggestions far surpassed the number from the previous method, and the number of suggestions has only grown!

Over the course of 2023, team members submitted over 100 suggestions through the digital suggestion box. The Executive Team reviews all suggestions thoroughly and provides feedback to the individuals who submit the suggestions, with the exception being, of course, those submitted anonymously. For anonymous suggestions, an all-company email may, based on the nature of the suggestion, be sent out to ensure the person who submitted it knows it was examined and whether it can, or cannot, be implemented.

Impressively, over the course of 2023, roughly 33% of suggestions submitted were able to be implemented! Not only has this digital suggestion box allowed the number of suggestions to increase, but with a 33% adoption rate, there is an indication that the suggestions are strong and directly contributing to continuous improvement efforts at Virginia 811.

Ultimately, even the suggestion on Kari’s part was an effort to address a unique hedgerow Virginia 811 was facing: lack of participation in the

suggestion box process. Her design for a metaphorical bumper on our Sherman Tanks helped clear a path for stronger communication. This has created an environment at Virginia 811 where all team members can freely share ideas. To enhance this effort, at the start of 2024, all team members who submit ideas receive “Recognize Points” that can be used for Virginia 811 swag, gift cards, or even PTO. We will also have a drawing each year where all team members who submit suggestions that are implemented over the previous year have a chance to win a special gift card.

Through positive reinforcement, it is hoped that the number of suggestions will continue to grow. Only through the recognition that all team members’ perspectives and ideas matter, that communicative channels need to be easy and fluid, and that ideas are valued can a company begin to reinforce continuous improvement efforts. The D-Day campaign, including not just the establishment of a beachhead but the eventual breakthrough needed at St. Lo, provides important lessons for business leaders to reflect upon. I hope we can all find our Lieutenant Greens and Sargent Culins to address the numerous hedgerows that continuously stand in the way of our continuous improvement efforts.





# VIRGINIA 811 WELCOMES NEW TEAM MEMBERS

## Embarks on Extensive Training for a Successful 2024

Virginia 811 started the new year with the commencement of an extensive New Select Training on January 8th. We welcomed our newest team members, **Susan Williamson, Anita Scott, Allison Eakin, Tina Kane, Ashli Mullins, and Annie Dahmen**, and welcomed back a former teammate, **Hollie Payne** to this group. Together their unique skills and perspectives will contribute significantly to the success of Virginia 811.

The training schedule kicked off with a comprehensive 2-day orientation where new hires immersed themselves in Virginia 811 culture, as well as learning our mission, values, and the essential tools for success. Following the orientation, the team transitioned into focused classroom training sessions covering industry-specific knowledge and customer service best practices.

To cater to the diverse learning styles within our team, hands-on training was combined with mock loate requests, practice calls, listening and watching calls, and reading through Policy Tech. This was followed by live monitoring with Mentors, as well as additional training and practice activities. Several new hires have already ventured into working solo, while others are still benefiting from real-time guidance. This personalized approach ensures that each team member can progress at their own pace.

Virginia 811 also geared up for Texas 811 to begin assisting us with our Spanish language calls. **Kayla DeHart** provided specialized training to the organization the first week of February, ensuring they are well-prepared to meet this new challenge.

Additionally, to enhance their team’s expertise, **Nikki Turpin** will be traveling to Texas 811 in February to provide essential law training. This comprehensive training will not only deepen their understanding of Virginia State law, but also strengthen their commitment to providing accurate and reliable services.



**Kayla DeHart**  
Professional Development  
and Education Specialist

### VIRGINIA 811'S NEWEST TEAM MEMBERS



**Susan Williamson**



**Anita Scott**



**Allison Eakin**



**Nikki Turpin**  
Professional Development  
and Education Specialist



**Tina Kane**



**Ashli Mullins**



**Annie Dahmen**



**Hollie Payne**

# FAST FACTS

## 4<sup>th</sup> QUARTER 2023

CHANNEL	COUNT	PERCENTAGE
PHONE	100,884	23.37%
WTE	154,595	41.94%
SAT	58,833	15.96%
TRE	54,309	14.73%
Total	368,621	

Total Internet Originated Tickets YTD 2023

**267,737**  
(72.6% of all tickets)

## 2023 ANNUAL

CHANNEL	COUNT	PERCENTAGE
PHONE	453,619	29.24%
WTE	621,395	40.06%
SAT	268,178	17.29%
TRE	208,148	13.42%
Total	1,551,340	

Total Internet Originated Tickets YTD 2023

**1,097,721**  
(70.8% of all tickets)



# GOLDEN SHOVEL AWARD WINNER

Golden Shovel Award 4<sup>th</sup> Quarter  
& Overall Golden Shovel Award Winner For 2023

MATTHEW FERGUSON

We are proud to announce **Matthew Ferguson** as the recipient of the Golden Shovel Award for both the fourth quarter, as well as Virginia 811's overall Golden Shovel winner for 2023.

Matthew has been with Virginia 811 since March 28, 2022, and started in the position as a Damage Prevention Specialist. He has been in his current role as a Senior Damage Prevention Specialist/ Internal Quality Assurance since August 1, 2022.

Matthew made significant contributions to the development and execution of the O3M Project. He played a key role in brainstorming ideas for identifying and tracking locate requests exceeding 1/3 mile, both before and after the July 1, 2023, law change. Matthew has demonstrated expertise in efficiently handling reports, emails, and follow-ups, providing education to both external and internal stakeholders. He has supported supervisors and teammates in assessing accuracy, offering clarity on acceptable practices, and identifying areas for improvement in new and existing requests. Matthew consistently shares his knowledge and ensures the preservation of the self-esteem of individuals he collaborates with.

He actively contributes to spin-off projects and participates in data collection for Scott Crawford and Diana Stokes. Matthew maintains clear communication with his supervisor, readily adjusts his focus when needed in a different direction, and consistently contributes to projects in Operations and other departments when called upon.



“ Matthew’s commitment to excellence and collaborative spirit truly set him apart, making him the well-deserved recipient of this year’s Golden Shovel Award. ”

Your sincere accolades are well-deserved, Matthew.  
Thank you for your dedicated contributions and hard work.



# HAPPY ANNIVERSARY

Team Members Celebrating  
Their Service to Virginia 811 This Quarter

THANK YOU FOR YOUR YEARS OF SERVICE

**Jackie Stern**  
2/11/2002 | 22 Years

**Rob Hogan**  
2/18/2002 | 22 Years

**Mike Hosey**  
3/17/2003 | 21 Years

**Amy Wright**  
3/17/2003 | 21 Years

**Kai Marxen**  
2/16/2004 | 20 Years

**Stacey Clark**  
1/18/2005 | 19 Years

**Julie Rector**  
1/30/2006 | 18 Years

**Stephanie Ferguson**  
2/21/2006 | 18 Years

**Melissa Ray**  
2/21/2006 | 18 Years

**Janie Wilhelm**  
1/29/2007 | 17 Years

**Lauren Berrios**  
2/12/2007 | 17 Years

**Kim Hermanson**  
2/4/2008 | 16 Years

**Kenny Spade**  
2/4/2008 | 16 Years

**Kerry Bradley**  
1/31/2011 | 13 Years

**Robyn Divers**  
2/14/2011 | 13 Years

**Connesha Waterfield**  
2/25/2013 | 11 Years

**Anna Holtz**  
2/25/2013 | 11 Years

**Caitlyn Goodchild**  
1/22/2018 | 6 Years

**Deena Jordan**  
1/22/2018 | 6 Years

**Gail Biggs**  
2/4/2019 | 5 Years

**Tracy Kingery**  
2/4/2019 | 5 Years

**Julia Adkins**  
3/4/2019 | 5 Years

**Tiffany Uhl**  
3/22/2018 | 6 Years

**Pat Allen**  
3/30/2021 | 3 Years

**Matthew Ferguson**  
3/28/2022 | 2 Years

**Joseph Sparrow**  
3/28/2022 | 2 Years

**Randy Corvin**  
1/3/2023 | 1 Year

**Jessica Lassiter**  
1/3/2023 | 1 Year

**Dylan Mullins**  
1/3/2023 | 1 Year

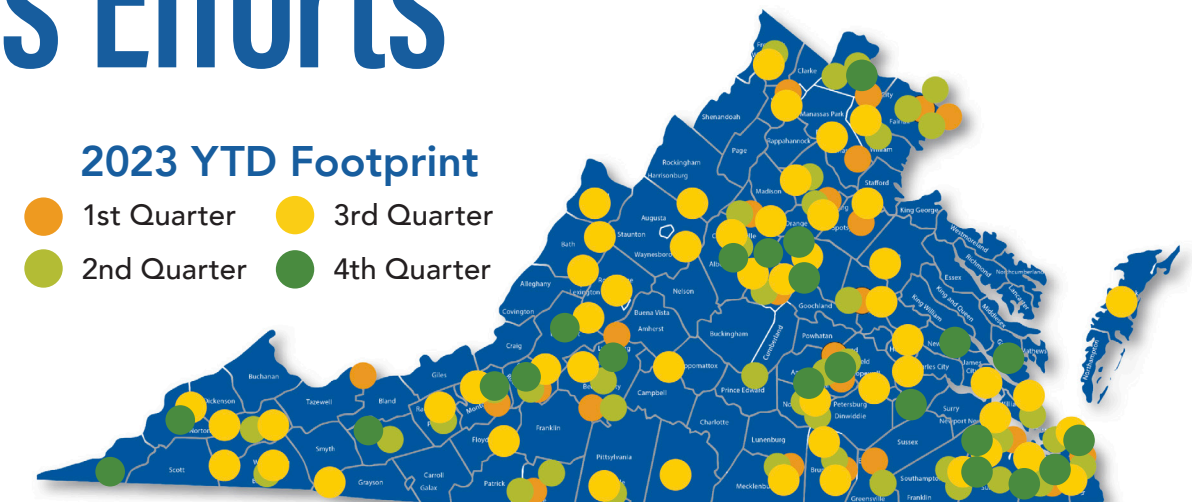
Together they bring a combined  
**318** years of experience to the Virginia 811 team!



# Virginia 811 Public Awareness Efforts

Education, Training, Community, and Display Truck Events

## 9,385 Individuals Trained in 2023



- VMDAEC Training Center - Palmyra
- City of Chesapeake
- Stone force Underground LLC
- Botetourt Chamber of Commerce
- Kiwanis Club of Salem
- City of Salem Christmas Parade
- Gloucester Christmas Parade
- Eastcom Locator Training
- MasTec
- City of Colonial Heights Christmas Parade
- Rural Fiber Town Hall
- Jones Utility
- Eastcom Fundamentals of Underground Utility Locating Seminar
- Liberty University Utilities
- Lumos UG
- Roanoke Christmas Parade
- Town of Smithfield Christmas Parade
- HRSD - Norfolk
- Gateway Engineers, Inc.
- RW Stump Grinding
- Koontz Bryant Johnson Williams, Inc.
- Precision Piping Solutions
- LDPC Meeting - Chester
- LDPC Meeting - Manassas
- Town of Troutville
- Brightspeed
- Stake Center - Hampton
- Perkinson Construction
- Burton Solutions
- Lynchburg Redevelopment and Housing Authority
- Town of Wise
- Carroll County Public Service Authority
- VDOT - Wise
- All Points Broadband
- Loudoun County Office of Emergency Management
- N&S Locating
- Virginia 811 New Hires
- JES Construction
- Gaston Brothers Utilities
- Town of Jonesville
- Blakemore Construction
- Team Fishel Peninsula
- Archer-Williams Contracting
- Dominion Energy Training Center
- Matthews Power LLC
- Asplundh Tree Service Southwestern Region
- Roanoke Gas Company
- Excavator Resolution Partnership Committee
- Complete Underground LLC
- GAC Construction
- Locate Resolution Partnership Committee
- Riscos Fiber World
- Kaslo Enterprises, LLC
- Aldridge
- OSP Engineering & Construction
- Curtis Contracting, Inc.
- Michels Construction, Inc.
- Timmons Group
- ACM Underground
- NB+C
- UtiliQuest - New Hire Class







Virginia's Local Damage Prevention Committee (LDPC) meetings have started strong in 2024, with significant attendance numbers and the introduction of a new regional map and new six month meeting schedules for each region. We encourage everyone to explore the new LDPC landing page on the updated VA811.com website to view these changes.

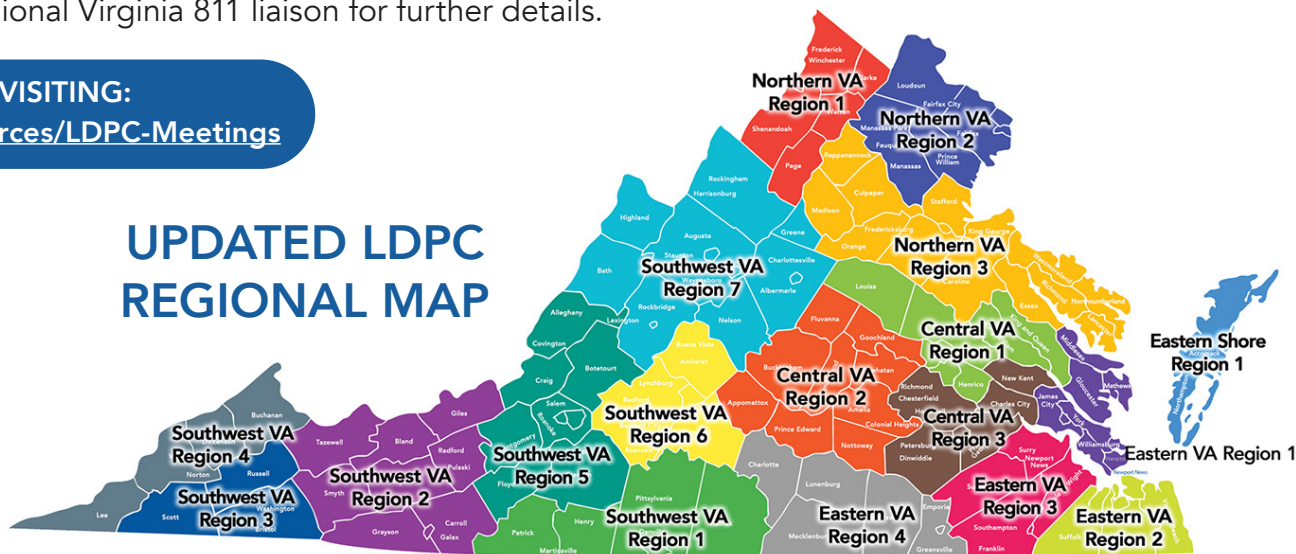
The redesigned regional map, spanning 19 meetings across the state, strategically covers multiple counties within a single region to effectively reach larger audiences. Virginia 811 collaborated closely with LDPC chairpersons to develop this new map design while assessing the efficacy of transitioning from quarterly to semi-annual meetings. The updated meeting schedule enables organizers to cover material throughout a six-month period, thereby enhancing their capacity to share valuable information during these meetings.

In addition to the topical agendas prepared by regional chairpersons, Virginia 811 liaisons attend meetings to share Virginia 811 information and updates. State Corporation Committee representatives are also present at many meetings to discuss educational credits, damage prevention plans, and incidents from around the United States, addressing questions and concerns. It's important to note that Virginia 811 does not host meetings but rather facilitates the coordination of meetings by sending out notifications and reminders. LDPC meetings are public meetings organized by regional attendees along with their chairpersons.

We invite you and your organization to participate in an LDPC meeting coming to your region in 2024. These meetings provide a platform for members, excavators, and locators to voice their concerns, share information about projects, and discuss challenges. Regular attendees see LDPC meetings as valuable planning sessions, where they can learn about upcoming developments in their areas. And the new LDPC format is designed to provide increased value for all participants.

If you or your organization are interested in serving as a guest speaker for a particular LDPC within your region or if you have any inquiries about these meetings, please reach out to your designated meeting chairperson or contact the regional Virginia 811 liaison for further details.

LEARN MORE BY VISITING:  
[VA811.com/Resources/LDPC-Meetings](https://va811.com/Resources/LDPC-Meetings)



# DAMAGE PREVENTION AMBASSADOR AWARD

Celebrating Individuals Who Embody The Mission Of Safety And Education

Virginia 811 is launching a new award this year, the **Virginia 811 Damage Prevention Ambassador Award**. This award is intended to recognize and celebrate individuals who actively engage in initiatives that reduce the risk of utility damage during excavation projects, go above and beyond in promoting safe excavation practices, and foster a culture of safety and education within their community. By honoring these ambassadors, Virginia 811 not only highlights their outstanding efforts but also sets a standard for others to follow. Honoring these individuals will be a testament to the belief that individual actions can have a profound impact on overall safety and well-being of the community.



## KEY DETAILS:

- Award nomination information and the dedicated submittal form can be found on the VA811.com website on the Local Damage Prevention Committee (LDPC) landing page here: [VA811.com/Resources/LDPC-Meetings](https://va811.com/Resources/LDPC-Meetings)
- To qualify, nominees should fulfill a minimum of 5 out of the 10 specified criteria

## CRITERIA:

- Attends at least one LDPC meeting within their region
- Has made a presentation or spoken at an LDPC meeting
- Has contributed to reducing damages within their area
- Has contributed to reducing Update/3 HR locate requests within their area
- Encourages/participates in pre-construction conferences on large projects within their area
- Participates in or sponsors a Damage Prevention Event, such as organizing Virginia 811 presentations or forming and leading a Local Damage Prevention Committee (LDPC).
- Has a company program for safety and damage prevention
- Invites Virginia 811 to participate in their organization's safety training events
- Actively promotes the 811 message: "Contact Virginia 811 Before You Dig. Every dig. Every time."
- Attends at least one Damage Prevention Conference or Virginia 811 General Membership Meeting throughout the year

## NOMINATION PROCESS:

- Verification by Virginia 811 Public Awareness and Executive teams
- Nominees notified via email/phone

## RECOGNITION:

- Recipient receives a distinctive plaque





# THE VIRGINIA 811 MOBILE EDUCATION TRAILER

Driving Damage Prevention Awareness on the Open Road!

Virginia 811 is proud to announce it will be working on a mobile education trailer. The project is scheduled for completion in 2024. This new 16' x 7' x 7' pull-behind trailer is a dynamic educational classroom designed to raise awareness of the Dig with C.A.R.E. message, and its crucial role in preventing damage to underground utilities. Equipped with interactive displays, educational materials, and hands-on activities, the trailer aims to engage students, community members, and industry professionals in learning about underground utility safety.

Brian Morehouse, Virginia 811's Manager of Public Awareness, expressed the significance of the trailer, stating, "This trailer represents a significant milestone in our ongoing efforts to promote safe excavation practices and protect Virginia's underground infrastructure. By bringing education directly to communities across the state, we hope to empower Virginians with the knowledge and awareness needed to prevent accidents and ensure the safety of our utilities."

The trailer will offer a range of educational experiences, including interactive simulations that demonstrate the process of locating underground utilities and the potential consequences of excavation without proper precautions. Participants can learn about the different types of underground utilities, the importance of accurate utility marking, and the steps to take before digging.

One of the key features will be its versatility and mobility. With the ability to travel to schools, community events, and industry conferences, the trailer can reach audiences of all ages and backgrounds. This accessibility ensures that vital safety information is readily available to Virginians across the state.

The launch of the trailer in 2024 comes at a crucial time as Virginia continues to experience growth and development in its infrastructure projects. With increased construction activities, the need for heightened awareness of underground utility safety has never been more critical.

As Virginia embraces this new initiative, stakeholders are encouraged to participate in educational events and activities hosted by the Virginia 811 trailer and to become a sponsor of our efforts. By working together, we can ensure that Virginia remains a leader in promoting underground utility safety and protecting our state's valuable infrastructure.

We look forward to introducing this innovative educational tool to Virginia in 2024 and creating a lasting impact on our industry and in communities across the Commonwealth for years to come. Keep up-to-date with the Virginia 811 trailer and the progress of this project throughout the year by visiting the dedicated trailer landing page: [VA811.com/The-Virginia-811-Educational-Mobile-Trailer/](https://va811.com/The-Virginia-811-Educational-Mobile-Trailer/)

## HOW YOU CAN JOIN US:

Projects of this magnitude thrive on collective efforts and we invite you to partner with us to make this initiative successful. There are three sponsorship tiers:

- **Gold** 18"x 24" Logo Branding Trailer Exterior + VA811 Truck | 4 Years | \$10,000
- **Silver** 10"x14" Logo Branding Trailer Exterior + VA811 Truck | 4 Years | \$5,000
- **Bronze** 6" X 10" Logo Branding Trailer Exterior + VA811 Truck | 4 Years | \$3,500

## WHY PARTNER WITH US:

Beyond being an educational trailer, it is a mobile billboard for your organization and brand as we traverse the Commonwealth at various locations. Your association with this project not only brings it to life but also reflects your organization's dedication to shaping a safer, more informed Virginia.

## IF THIS RESONATES WITH YOUR ORGANIZATION'S MISSION AND VALUES:

We invite you to embark on this journey with us. Please reach out to:

**Brian Morehouse | Manager of Public Awareness | [bmorehouse@va811.com](mailto:bmorehouse@va811.com) | (336) 482-6890**

### EXTERIOR FRONT MOUNTED ACCESSORIES

- Generator
- Air Compressor

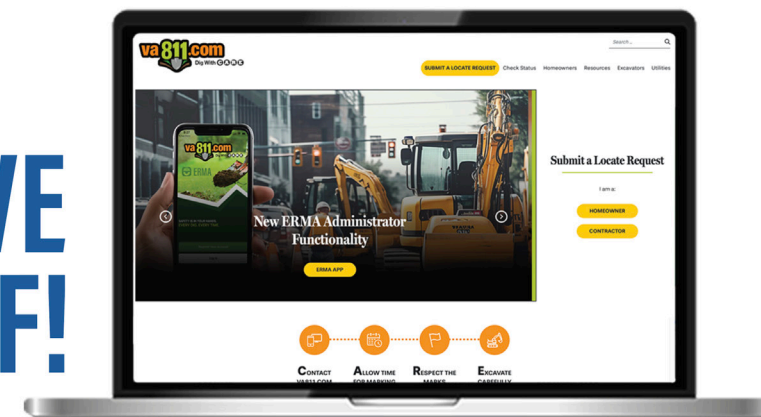


### INTERIOR FEATURES

- Virginia 811 Learning Wall featuring:
  - Public vs. Private Lines
  - Underground Utility Lines
  - Common Digging Projects
- 55" TV
- Exterior Home Meter Display + Explainer
- 3D Know What's Below Floor Graphics
- APWA Color Flag Visual
- Bench Seat
- Game Board
- Storage Rack for Literature



  
**WE HAVE  
LIFT OFF!**



## Virginia 811 Launches A New Look

Virginia 811 unveiled our revamped [VA811.com](https://va811.com) website on January 11, 2024, marking a significant milestone in enhancing user experience and accessibility. The redesigned site incorporates streamlined menus and improved responsiveness for mobile devices. These enhancements contribute to a more intuitive and user-centric online platform, aligning with Virginia 811's commitment to providing optimal support for visitors to our website.

Explore the new design and user-friendly features that simplify your browsing experience.

### WHAT'S NEW:

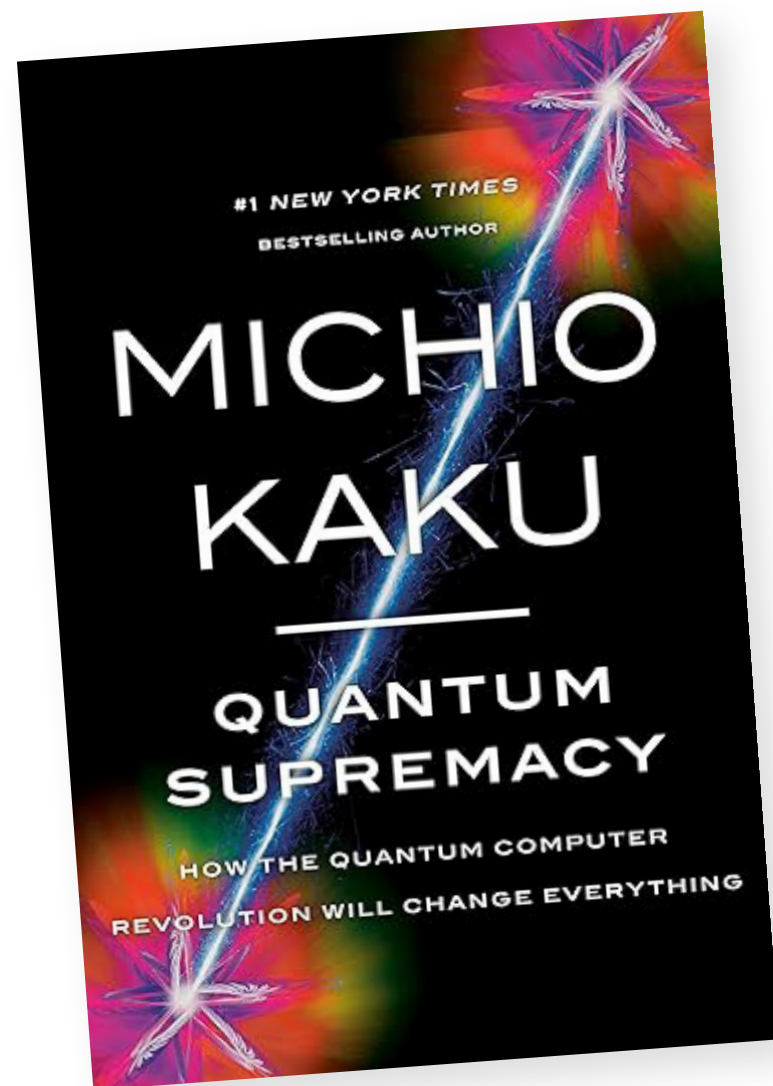
- **Sticky Header Navigation**
- **Updated Events Calendar**
- **Dedicated Homeowner and Professional Sections**
- **Streamlined Menus and Simplified Navigation**
- **Updated Site Responsiveness for Mobile**

If you are a Utility Member or an Excavator, be sure to explore the customized drop-down navigation tailored to meet your specific needs, providing a seamless and efficient browsing experience.

**We can't wait for you to experience  
the new and improved features.**

**VIEW IT HERE: [VA811.com](https://va811.com)**





# MOVING BEYOND THE DIGITAL AGE

## Book Review of *Quantum Supremacy*:

How the Quantum Computer Revolution Will Change Everything by Michio Kaku

- B. Scott Crawford

Boomers, Gen Xers, and even the Millennials have the distinction of having lived through two important “ages.” These three generations experienced the “Analog Age,” where measurements of space and even time were “analogies” of items and time itself – analogy is the root of analog, and this mechanical, magnetic, and electrically driven system shaped much of the lives for those living through any part of most of the 20th century. But these three generations experienced a revolution of sorts beginning in earnest in the 1990s as personal computers began to become ubiquitous in both the home and office and as public access to the World Wide Web had its impact on society. Rather than mechanical, magnetic, and electrically driven technology, data became converted into digits (1s and 0s), allowing for calculative speed, crystal clear recordings and communication, and

access to information that was unprecedented in all of human history. While Boomers, Gen Xers, and yes, even Millennials, who came of age in the midst of the Digital Revolution, evolved and adapted to this new social, political, communicative, and economic reality, Gen Z and now Generation Alpha emerged and grew up with the Digital World being the only world they have ever known.

Interestingly, we may very well be on the cusp of entering another new age: the Quantum Age. This age will be defined by quantum computing, which Michio Kaku examines in his work *Quantum Supremacy*. Quantum computing, once certain key barriers are broken, will significantly impact all areas of our lives. Kaku does an excellent job not only explaining how quantum computing works, within the context of quantum physics, but also helps to bring understanding as to the challenges we face to fully implement quantum computing and the potential quantum computing has in regard to a wide range of issues, ranging from climate concerns, to health, and to supplying near unlimited energy! While Boomers and Gen Xers may not see this next stage in our evolution of technology, Millennials have a chance, and it is likely Gen Zers and Generation Alpha will witness these incredible developments.

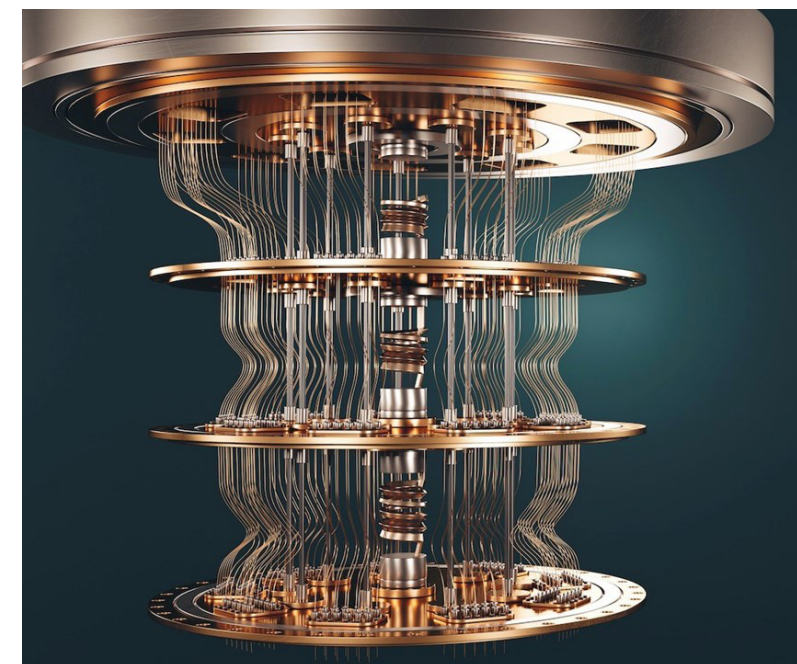
As Kaku explains, quantum computing will allow for calculations involving “superposition.” While digital bits can only carry one bit of information at any given time, quantum computing’s use of qubits, also known as quantum bits, will allow computing power to have unlimited power. Basically, predictive models currently run within a digital environment, while vastly faster than analog technology, this still forces variables to be basically run and “examined” one at a time. Depending on the complexity of the issue, this can either put too much of a strain on digital computers or at the very least require a large amount of time to run calculations. With quantum computers, an infinite number of variables can be run and analyzed simultaneously, creating an exponentially higher level of calculative and predictive power.

To help illustrate this concept, Kaku provides an approachable understanding of quantum physics. Quantum physics posits that at the micro world level, electrons simultaneously move toward their objective in an infinite number of paths, ultimately following the quickest – yet as they move, the simultaneously infinite number of paths occur. In this manner, if expanded to the larger world, infinite possibilities play out at any given time, with any decision any of us make, whether it is simply getting up from a chair and walking to the refrigerator or choosing to change careers. Somewhere, in an infinite number of parallel universes, every possible action is actually being carried out, as real to those who inhabit those universes as our reality is real to us!

Tapping into this power within a computing context allows simulations to run that can analyze an infinite number of variables and outcomes, providing levels of data analysis that will be unprecedented and solution to challenges that will greatly impact society. After exploring the complexities around understanding quantum computing, and the challenges we face fully implementing this level of computing power, Kaku focuses on a host of areas where quantum computing can impact our lives. Through a host of chapters focusing on health, gene editing, artificial intelligence, and even immortality, as well as global warming, harnessing energy, and simulating the universe in order to better understand from where we literally came, Kaku is able to demonstrate plausible ways in which quantum computing can impact our lives.

Most intriguing is Kaku’s exploration of how quantum computing can allow for immortality, both biological and digital immortality. The computing power may allow for scientists to actually identify how to enhance DNA repair mechanisms and prevent aging. Similarly, and something that is actually somewhat theoretically possible even with digital technology, quantum computing can create the infrastructure needed to fully actualize the recreation of our personalities and even “presence” through an artificial and digital environment. Quantum computing will allow a higher level of analysis of our digital footprint, allowing, through possibly holograms, our immortality to be realized.

*Quantum Supremacy* is definitely a work worth reading. While many of us reading the work won’t witness what promises to be a fascinating future, some readers may be able to witness the evolution from Digital to Quantum Age. Those who do, well, they are surely in for an exciting experience!





# How Quantum Computing Can Protect the Underground Infrastructure

**The following essay was written by ChatGPT+, a Natural Language Generator developed by Open AI. The prompt to which ChatGPT+ responded was: "Write a 500 word essay on how quantum computing could positively impact the protection of underground utilities."**

Quantum computing, a revolutionary technology that leverages the principles of quantum mechanics, holds the potential to transform a myriad of industries, including the field of underground utility protection. The intricate network of pipelines, cables, and wiring that resides beneath our feet is crucial for the delivery of essential services such as electricity, water, and telecommunications. Ensuring the safety and integrity of these underground utilities is paramount to prevent service disruptions, environmental disasters, and ensure public safety. This essay explores how quantum computing could significantly enhance the protection and management of underground utilities.

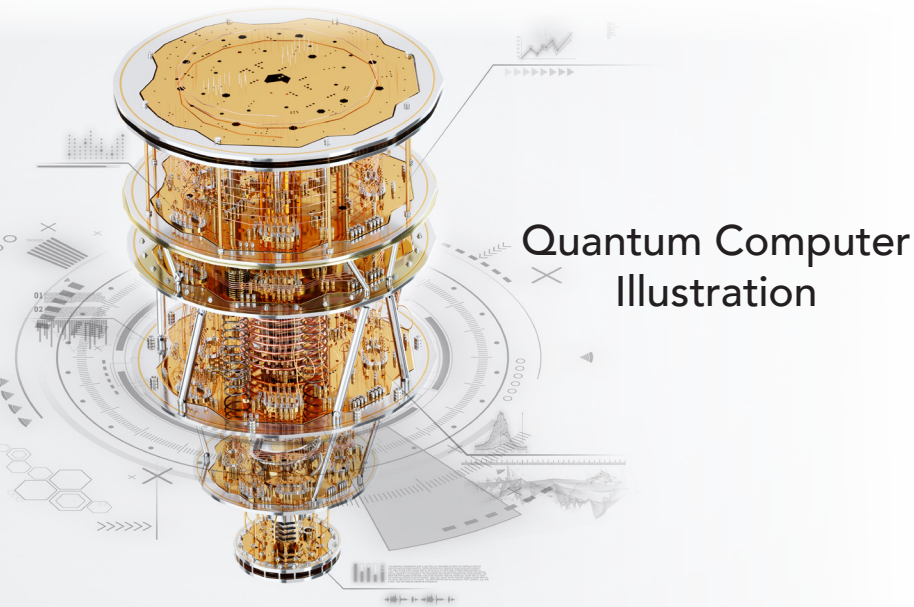
Quantum computing operates on the principles of superposition and entanglement, enabling quantum computers to process a vast number of possibilities simultaneously. This capability is starkly different from classical computing, which processes data in a linear, sequential manner. The application of quantum computing in the field of underground utility protection could be revolutionary, offering solutions to complex problems that are currently beyond the reach of classical computers.

One of the primary challenges in protecting underground utilities is accurately locating and mapping the existing infrastructure. Traditional methods often rely on outdated records or invasive techniques that can be time-consuming and potentially damaging to the utilities themselves. Quantum computing could enhance geospatial analysis, allowing for the development of more sophisticated and non-invasive methods for detecting and mapping underground utilities. Quantum algorithms could analyze vast datasets from various sources, including ground-penetrating radar, seismic waves, and electromagnetic fields, to create highly accurate, three-dimensional maps of underground infrastructure. This would not only reduce the risk of accidental damage during excavation works but also facilitate more efficient maintenance and monitoring.

Moreover, quantum computing could significantly improve the predictive maintenance of underground utilities. By harnessing quantum algorithms, utility companies could analyze complex patterns and predict potential failures before they occur. For example, quantum computers could simulate the environmental stresses on pipelines, such as corrosion, soil movement, and water infiltration, at a quantum level. This would enable utility providers to preemptively address vulnerabilities, thereby preventing leaks, breaks, and service disruptions.



Illustration Provided by ChatGPT+  
Quantum Computing Protecting Underground Utilities,  
Digital Art, ChatGPT+ and B. Scott Crawford, 2024



Quantum Computer  
Illustration

In addition, the protection of underground utilities is not just about physical integrity but also cybersecurity. As utilities become increasingly digitized and connected, the risk of cyber-attacks on critical infrastructure grows. Quantum computing could bolster the cybersecurity of underground utilities by developing quantum-resistant encryption methods. Traditional encryption could potentially be broken by quantum computers, but quantum encryption, such as quantum key distribution, offers a level of security that is theoretically unbreakable according to the laws of quantum physics. This would ensure the secure transmission of data related to underground utilities, protecting them from cyber threats.

Furthermore, quantum computing could facilitate the integration of underground utility data with other smart city technologies, enhancing overall urban planning and management. By processing complex datasets from various sources, including IoT devices and sensors, quantum computers could optimize the layout and maintenance schedules of underground utilities in harmony with urban development plans, traffic patterns, and environmental considerations.

In conclusion, the advent of quantum computing promises to bring about a paradigm shift in the protection and management of underground utilities. From improving the accuracy of utility mapping and predictive maintenance to enhancing cybersecurity and facilitating smart city integration, the potential applications of quantum computing in this field are vast and transformative. As research and development in quantum technology continue to advance, it is imperative for stakeholders in the utility sector to stay abreast of these developments and explore how quantum computing can be harnessed to safeguard the critical infrastructure that lies beneath our feet.





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