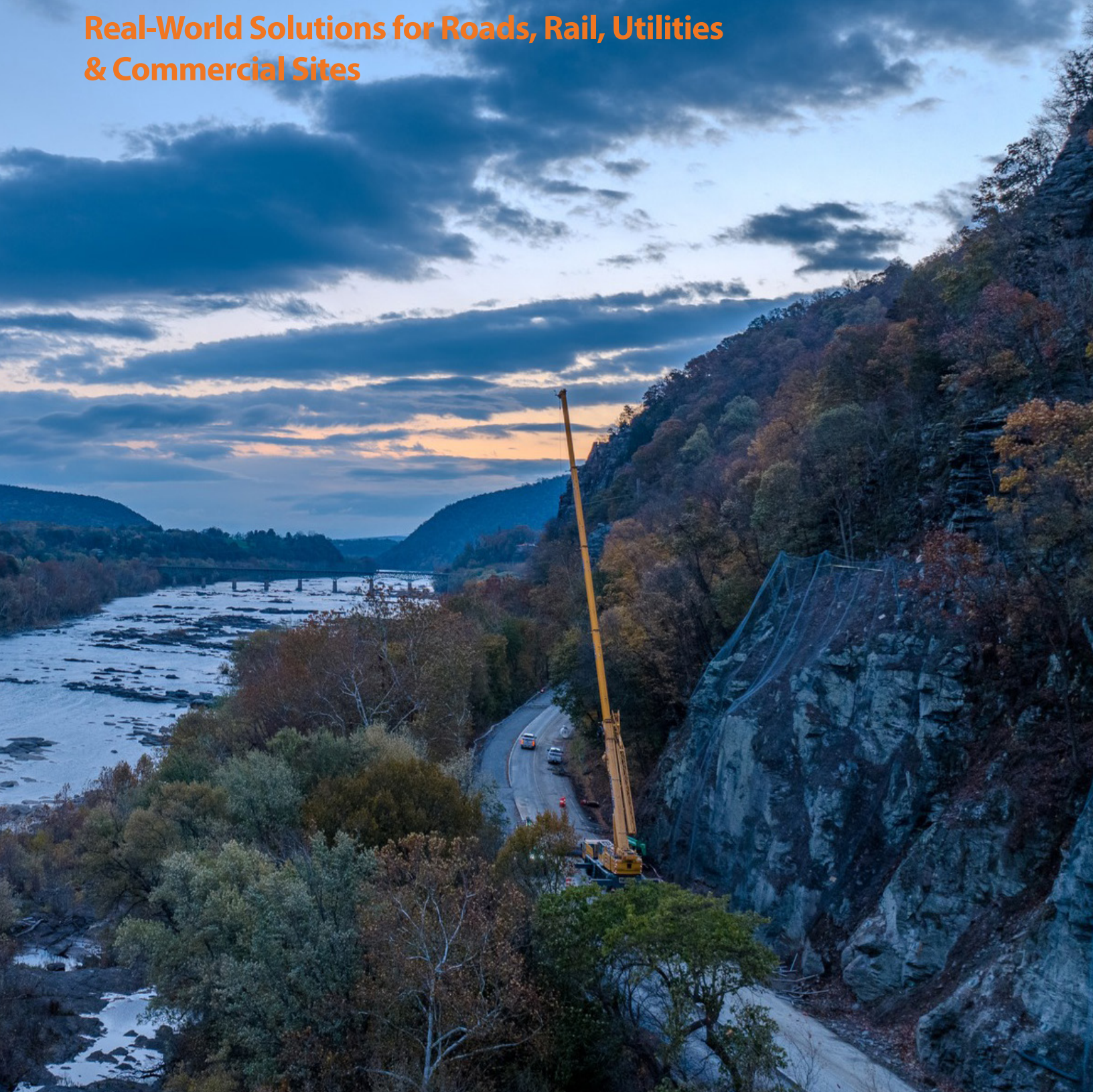




# Building Resilience in Challenging Environments

**Real-World Solutions for Roads, Rail, Utilities  
& Commercial Sites**





## Unyielding Protection for Critical Infrastructure: GSI and Access Limited's Expertise in Geohazard Mitigation

GeoStabilization International (GSI) and Access Limited bring together unmatched expertise in geohazard mitigation and infrastructure stabilization. With a shared dedication to safety, efficiency, environmental sensitivity, and collaboration, these affiliated brands provide comprehensive solutions to some of North America's most challenging geotechnical projects. Together, they focus on stabilizing landscapes affected by steep slopes, rockfalls, landslides, retaining wall repair and other natural hazards, delivering resilient protection measures across rugged terrains and critical infrastructure.

### Who We Work With

We collaborate closely with asset owners across various sectors, including Departments of Transportation, rail companies, power utilities, and mining operations, ensuring the security and stability of essential infrastructure. In addition to working with these asset owners, we partner with general contractors to deliver comprehensive, reliable solutions that reinforce the resilience of critical networks supporting communities and economies.

### GeoStabilization International (GSI)

GSI has established a reputation for excellence in landslide repair and emergency geohazard mitigation. GSI combines a design-build approach with rapid mobilization capabilities, utilizing proprietary technologies like the Soil Nail Launcher™ and Geosynthetically Confined Soil® (GCS®) walls. Their extensive suite of equipment—including custom-built drill rigs, enables them to address complex slope stability challenges quickly and effectively. With a skilled team of over 50 registered Professional Engineers and multiple crews, GSI has executed more than 6,000 projects globally, often under emergency declarations, and prides itself on tailored, efficient solutions for every unique situation.

### Access Limited

Access Limited specialization in rockfall mitigation and steep slope stabilization. Known for its adeptness on difficult-to-access terrains, Access Limited uses a fleet of spider excavators and advanced rockfall protection systems to safeguard against natural hazards. The company excels in installing rock anchors, rock bolts, and various mesh types—including Tecco mesh, cable nets, and attenuators—on steep slopes and cliffs. With over a century of combined experience, Access Limited's team is known for embracing challenges and delivering innovative solutions to stabilize and protect infrastructure in remote, rugged landscapes.

### Delivering Comprehensive, Resilient Solutions

By leveraging their combined experience, unique tools, and in-house engineering, GeoStabilization International and Access Limited deliver effective, sustainable, and custom-designed solutions to protect roadways, support vital transportation networks, and ensure community resilience. This synergy allows them to respond to geohazard events within 24 hours, ensuring that each project benefits from both expertise and efficiency, embodying a commitment to safety, environmental stewardship, and technical excellence.







## Steps to Safe and Cost-Effective Geohazard Solutions

### Site Assessment and Surveys

Choose a provider who offers free site visits and conducts thorough surveys, ensuring a detailed understanding of the site.

### Data Analysis

Confirm they use the data from surveys to create cost-effective and practical solutions.

### Collaborative Design

Select a team with in-house engineers who work closely with stakeholders to tailor the design.

### Efficient Installation

Look for a provider who offers a full-service installation and can quickly mobilize for emergencies.

### Performance Warranty

Opt for a long-term warranty to ensure support and reliability.







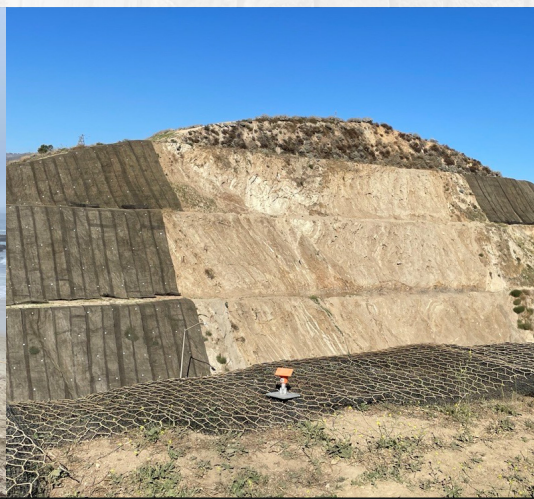
## Solutions

### Soil Stabilization

- Earth Retention
- Ground Improvement
- Micropiles & Foundation Support
- Soft Subgrade Improvement
- Retaining Walls & Caps

### Steep Slope and Rockfall Mitigation

- Steep Slope Drilling
- Slope Stabilization
- Spider Excavation Services
- Debris Flow Installation & Maintenance







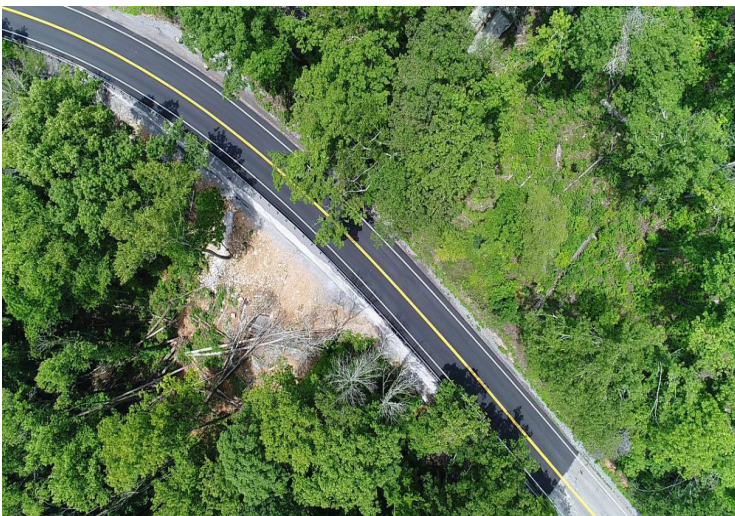
## Case Studies

GSI and Access Limited offer a comprehensive range of soil stabilization and steep slope services designed to protect infrastructure and communities from geohazard risks.

GeoStabilization International specializes in soil stabilization, offering expert solutions for landslide repair, ground improvement, micropile/foundation support, and retaining wall repair. Their services provide reliable support for landscapes facing erosion, instability, and complex structural challenges.

Access Limited brings industry-leading capabilities in steep slope drilling, slope stabilization, and spider excavator services, ensuring safe, effective access to rugged and difficult terrains. Additionally, they provide debris flow installation and maintenance to mitigate the impact of stormwater and debris on vulnerable areas.

The following case studies highlight key projects where GSI and Access Limited's innovative approaches and specialized equipment have ensured the safety and resilience of critical infrastructure, even in the most challenging geologic and environmental conditions.





# US 340 Rockfall Mitigation

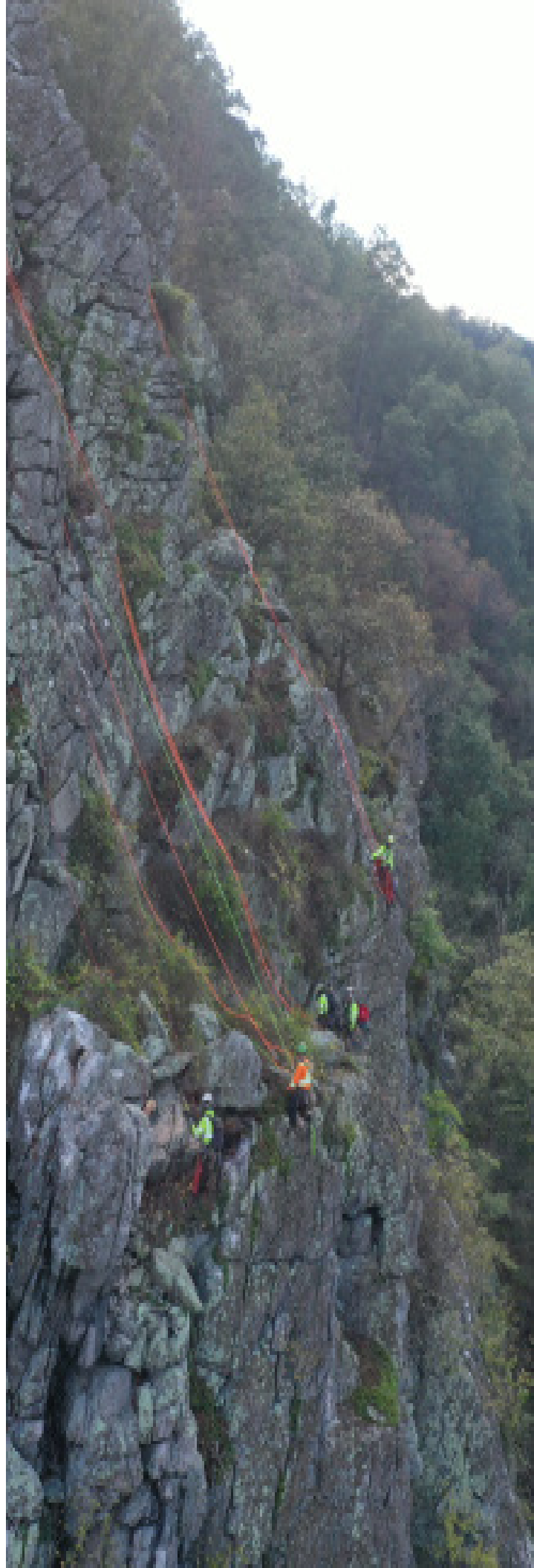
## PRESERVING SAFETY AND ACCESSIBILITY

The US 340 Rockfall Mitigation project, situated in Jefferson County, WV, addresses critical rockfall challenges within the Loudoun Heights region of Harper's Ferry National Historical Park. This crucial 2-lane corridor, accommodating over 24,000 vehicles per day, serves as a lifeline for local commuters, truck traffic, and travelers from West Virginia, Virginia, and Maryland. However, the area's rugged terrain, characterized by cut slopes dating back to 1950s construction and natural erosion along the Shenandoah River, poses significant hazards to public safety. Continuous maintenance efforts by the West Virginia Division of Transportation (WVDOT) underscore the urgent need for comprehensive mitigation measures.

### Project Overview:

#### Safety Enhancements Amidst Maintenance Demands

The existing conditions along the US 340 corridor pose threats to public safety, impacting emergency response times and requiring continuous maintenance by the WVDOH. Additionally, the Loudon Heights region includes a trail network and overlook at the top of the slope, accessible from the Appalachian Trail. Collaboration among WVDOT, VDOT, MDOT, FHWA, and NPS was vital in the planning and execution of the project, which necessitated a 22-mile detour impacting routes in both West Virginia and Virginia, as well as traffic flows into Maryland.







## Advanced Solutions Implemented for Stabilization and Protection

ROCKFALL DEBRIS CLEANUP

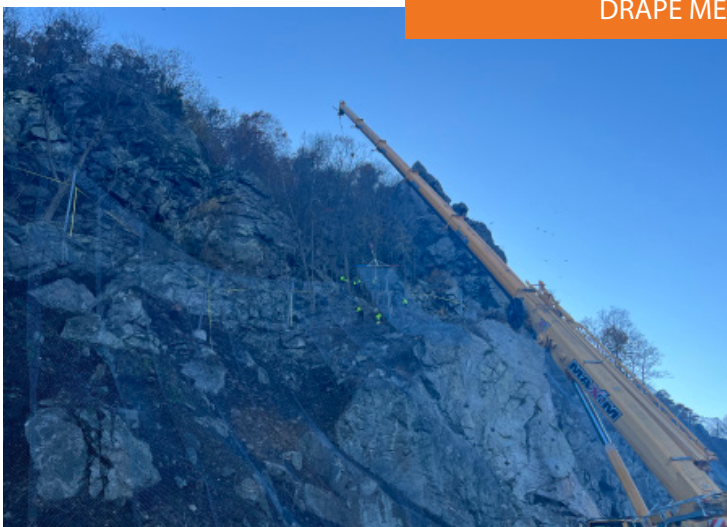


EXTENDED RIG

Access Limited, in collaboration with Triton Construction, WVDOT, HDR Engineering (WVDOT's engineer of record), Ice Engineering (WVDOT's inspection Team), and Infinite Consulting and Engineering, implemented comprehensive rockfall protection and stabilization measures. Access Limited incorporated safety and maintenance scaling techniques and constructed advanced rockfall protection systems provided by GeoBrugg North America LLC.

Teaming up with Infinite Engineering, Access Limited finalized the design of rockfall systems, strategically deploying solutions such as rockfall slope drape, rockfall attenuator barriers, rockfall barriers, rock overhang removal, and localized rock bolting to stabilize slopes and mitigate potential rockfalls. Technological integration, including horizontal drain installation, added an additional layer of protection to safeguard the corridor against rockfall hazards.

DRAPE MESH INSTALLATION







## Rockfall Attenuators Lead Advanced Protection

Central to the project's success were the rockfall attenuators, strategically deployed to fortify the resilience of the corridor. Access Limited's meticulous implementation of rockfall attenuator barriers, along with other advanced protection systems, ensured robust defense mechanisms against potential rockfalls.

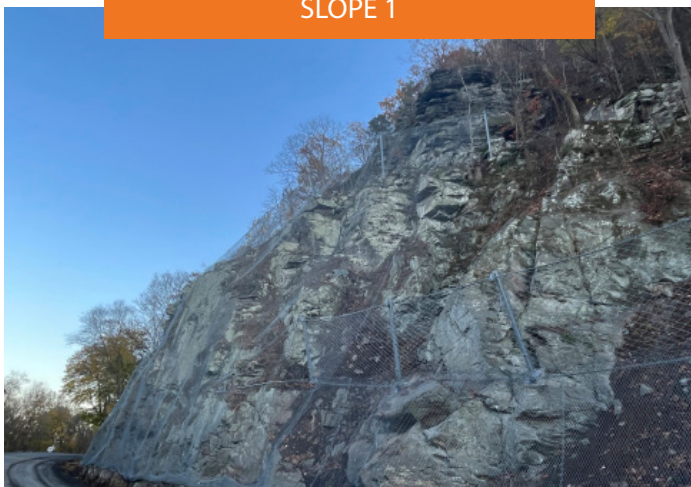
Rockfall attenuators are specialized structures designed to mitigate the impact of falling rocks and debris in areas prone to rockfall hazards. These systems typically consist of barriers or nets strategically positioned along slopes to intercept and absorb the energy of falling rocks, thereby reducing the velocity and potential damage they may cause.

By effectively dissipating the kinetic energy of falling rocks, these attenuators help to protect infrastructure, roadways, and nearby structures, enhancing safety for motorists and pedestrians alike.

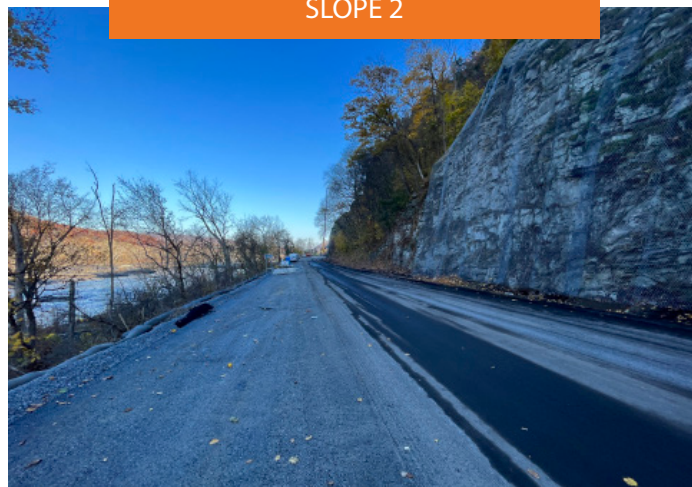
Access Limited's completion of approximately half a mile of rockfall mitigation measures, reaching up to 300 feet above the roadway, complemented Triton's efforts in resurfacing the project limits, replacing signs, and marking pavements, all accomplished within a remarkable 90-day timeframe.

This concerted effort successfully mitigated rockfall risks along the vital US 340 corridor, underscoring the commitment to enhancing public safety.

SLOPE 1



SLOPE 2





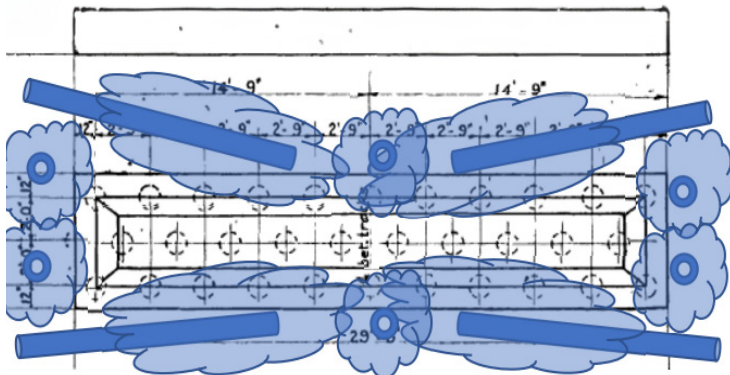
# Rehabilitating Bridge Piers with Compaction Grouting

In light of settlement issues with the existing foundations of a Class 1 Railroad's intermediate bridge piers, GeoStabilization International (GSI) spearheaded a critical project to stabilize the structure. Confronted with the complexity of preserving the existing foundations, along with challenges like limited access and the need to work around active waterways, our team engineered innovative solutions to ensure the project's success.

This case study thoroughly outlines the project's objectives, the obstacles overcome, the advanced technologies utilized, environmental considerations, following railroad safety standards, and the significant benefits gained by our client throughout this endeavor.

## Project Overview:

GSI's solution aimed to stabilize the unstable intermediate foundations through compaction grouting. This involved the installation of a subgrade stabilization array around and below the pier structures, reaching a depth of 35 feet.



# STRUCTURAL STABILITY RESTORED





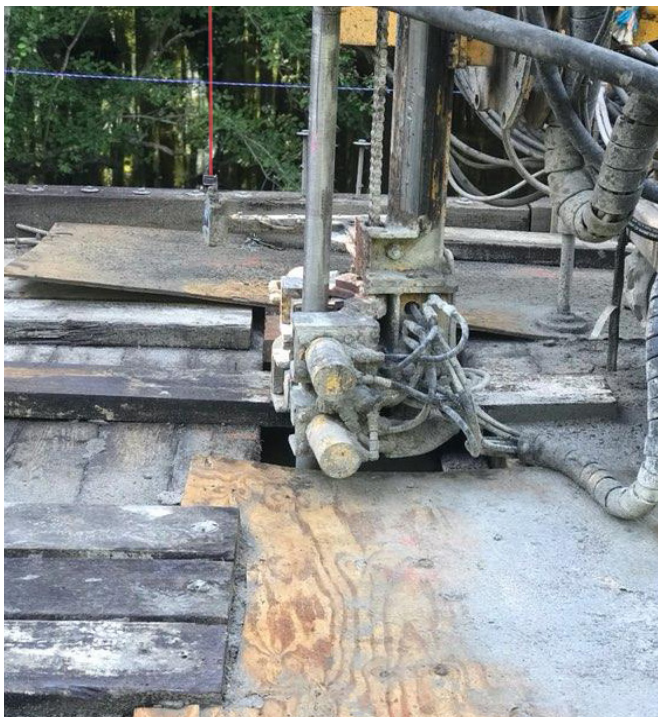


## Navigating Challenges: Challenges and Solutions in Bridge Rehabilitation

The project encountered several challenges, including limited access to the bridge structure, a remote location, and obstructions such as an active waterway and train traffic. Additionally, tight areas and the presence of a fiber optic line posed engineering challenges.

To overcome these obstacles, using virtual design construction principles, the team calculated drill angles to navigate around existing structures and utilities, ensuring minimal disruption to railroad operations and no damage utility operations.

Quality control measures were implemented to tackle concerns regarding volumetric cement, such as carefully selecting suitable fly ash and sand types and fine-tuning volumetric mixer settings to ensure the necessary concrete slump was achieved, while also enabling batching concrete precisely where needed.







## Increasing Safety and Efficiency

The project used advanced technologies to improve efficiency and effectiveness. Specifically, a volumetric mixer was used to mix grout on-site, offering increased flexibility and control over the grouting process.

Furthermore, a casing drill was employed to apply compaction grouting from multiple locations, allowing for precise and targeted stabilization efforts. The use of on-call engineering further emphasized the importance of in-house expertise in addressing structural, utility, and design challenges.

Safety remained a paramount concern throughout the project, with particular emphasis on water safety, protection of underwater utilities, and mitigation of fall hazards. Safety protocols were enforced to safeguard personnel and equipment, emphasizing the importance of proactive risk management and adherence to industry best practices.





# POWERING PROGRESS

## Georgia Data Center is a Boost for the Atlanta- Metro Area

### Project Overview:

In July, during the peak construction season, GeoStabilization International (GSI) undertook a soil nail wall project for a data center. The project had already been designed but faced challenges due to significant lead times for specialty materials like encapsulated galvanized soil nails. GSI proposed using hollow bar soil nails (HSBN) instead, maintaining project specifications while expediting material procurement to meet the demanding schedule. With in-house engineering expertise and a commitment to value engineering, GSI sought to optimize project efficiency and overcome potential obstacles.

#### Value Engineering and Design Optimization

GSI's in-house engineering team recognized the need for design modifications to address lead time issues with specified materials. By offering value engineering on the bar and sacrificial bar components, GSI proposed alternative solutions without deviating from project specifications. This proactive approach enabled the project to stay on schedule by mitigating delays associated with material procurement.

#### Collaborative Partnerships and Project Success

GSI's collaborative approach with the grading contractor ensured seamless coordination and rapid problem-solving. The project, which followed a performance on a previous site section, demonstrated GSI's commitment to delivering exceptional results. The anticipated finish date of 6-8 weeks underscored the project's success in overcoming challenges and optimizing efficiency.





## Efficiency Enhancements: Production Rates Surge

To streamline the construction process, GSI employed innovative techniques such as shotcrete robots for shotcrete application on the soil nail wall. The shotcrete robot proved invaluable during the initial structural layer phase, where efficiency gains were significant.

Additionally, because of the massive soil nail cut wall requirement, there was a significant need for shotcrete that the local area was not typically seeing day to day, but with GSI's relationship with the grading contractor, they were able to necessitate additional suppliers out on site.



As a result of our ability to quickly pivot and deploy casing rigs for open hole drilling, production experienced a significant boost. Production rates improved from 800 linear feet per day to an impressive 1800 linear feet per day.





Safety remained a top priority throughout the project. By adopting techniques such as open hole single-stroking the drill, the need for hazardous activities like drill steel changing was eliminated, reducing the associated risks. Additionally, the deployment of shotcrete robots minimized labor requirements and exposure to hazards associated with manual shotcrete application, enhancing overall safety on the site.

The data center project exemplifies the successful integration of advanced technologies, innovative solutions, and effective teamwork to overcome material and schedule challenges delivering exceptional results within a demanding timeframe.





# 100 KV Transmission Line Rebuild

## FASTER GREENER SAFER

The 100 KV Transmission Line rebuild was a challenging project located in the remote mountains of Montana, far away from urban centers. The project's remote nature presented several unique challenges that required careful planning and innovative solutions.

### Remote Location:

One of the standout features of this project was its remote location, which posed significant logistical difficulties. The rugged terrain and limited access made it challenging to transport equipment, materials, and personnel to the site. The absence of nearby facilities meant that the project team had to rely on meticulous resource allocation and strategic planning to ensure the smooth operation and timely completion of the project.

### Moving Fast with Minimal Impact

The spider's speed and efficiency were instrumental in overcoming the challenges posed by the remote location. Equipped with a hydraulic breaker, it swiftly and effectively hammered through the rocky ground during the removal of old wood H-frame structures. This significantly accelerated the construction process and reduced the time required for each pole installation, enabling the project to progress swiftly despite the challenging terrain, saving the utility almost a year on their project.







## Increasing Safety and Efficiency

In terms of speed, the spider proved invaluable. It was equipped with a hydraulic breaker, enabling efficient excavation of rock during the removal of old wood H-frame structures. This significantly accelerated the construction process and reduced the time required for each pole installation. The spider's agility and maneuverability in the challenging terrain allowed for quick progress along the transmission line.

The spider also played a significant role in promoting greener operations. One notable contribution was the utilization of a hydraulic breaker for rock excavation, which effectively eliminated the need for traditional methods like blasting. The spider's unique mobility capabilities enabled it to navigate the job site with minimal impact on the surrounding environment. Its efficient movement and reduced footprint minimized disturbances to natural habitats and ecosystems.

The remote location and challenging ground conditions posed risks for the construction team. However, having the spider on-site helped mitigate these risks, increasing overall jobsite safety. Its mobility allowed it to reach various points along the transmission line, stabilize the poles, and dig the holes, reducing the need for workers to navigate treacherous terrain. This minimized physical strain and enhanced safety for the construction team.

Hand digging was considered as one of the competing solutions for this job. Typically, hand digging necessitates a team of 4-6 groundsmen who must trek to the work site and manually excavate holes while relying on a helicopter to assist in pole placement. This means that the groundsmen have to work on small holes that can be several feet above them, in soil conditions that are not stable. Steep slopes often require a compressor to be airlifted multiple times throughout the project, enabling the crews to employ a jackhammer in rocky areas. These challenging job site conditions significantly heighten the risk of safety incidents that need to be documented.

In contrast, Access Limited's excavators and experienced operators require only a fraction of the personnel typically needed on-site to complete the job, even on unstable terrain. Not a single crew member is sent to manually dig holes. Additionally, they can safely utilize a hydraulic rock breaker and set poles without relying on additional crew members or helicopters. This leads to an overall improvement in job site safety and project productivity.



# FASTER GREENER SAFER



Access Limited was subcontracted for critical excavation tasks, including the excavation of culverts for new pole installations and the installation of guy anchors for the new guy cables. Their specialized expertise in excavation techniques tailored to challenging ground conditions played a vital role in ensuring the stability of pole installations and the safe and reliable installation of guy cables.

They successfully offered a heavy equipment solution for a labor-intensive project while adhering to environmental guidelines. This innovative approach allowed for the ultimately saving the utility company a year on their initial scope of work.

By implementing these advancements, Access Limited delivered exceptional results, setting a precedent for sustainable construction practices in the industry. Their ability to balance efficiency, environmental responsibility, and project requirements positively contributed to the overall success of the project.







## Customer Value

**Our value is to deliver effective and innovative solutions that contribute to safety, cost-efficiency, and the long-term project success.**

- Expertise
- Innovative Approach
- Mitigate Risks
- Cost Savings
- Reduce Downtime
- Turnkey Solutions
- Long-Term Performance
- Minimal Environmental Footprint
- Streamlined Approach



[www.geostabilization.com](http://www.geostabilization.com)



[www.accesslimited.com](http://www.accesslimited.com)





## Technology Spotlight: GCS Wall

### Background:

Our team swiftly addressed a retaining wall remediation for a commercial client in Nashville, ensuring minimal disruption. Following a rapid site assessment and engineering analysis, we proposed a solution that allowed the loading dock to remain operational during repairs.

### Challenge:

A failed retaining wall along the parking lot's northeast side, impacting both the adjacent wall and the public's safety.

### Solution:

The solution included excavation, soil nails/micropiles installation, shotcrete application, micropiles cap, and GCS wall.

### How GCS Walls Work:

GCS (Geosynthetically Confined Soil) walls are a type of retaining wall that stabilizes slopes or supports structures by reinforcing the soil for infrastructure projects. This technique involves layering soils with geosynthetic materials, such as geotextiles or geogrids, which provide tensile strength and confine the soil. By confining the soil, these materials prevent movement and erosion, making GCS walls highly effective for supporting slopes, embankments, and other structures.







## Technology Spotlight: Soil Nail Launcher™

### Background:

Sections of coastal bluff along Pebble Beach Drive in Crescent City, Del Norte County, were experiencing erosion. Launch soil nails were decided to be the best option for a permanent stabilization by the project engineer.

### Challenge:

Nails launching too far into the soil, air pressure in launcher was lowered to rectify.

### Solution:

Launched soil nails in a triangular pattern.

### How the Soil Nail Launcher Works:

The Soil Nail Launcher is a highly specialized tool used in geotechnical and slope stabilization projects to quickly and effectively stabilize loose soil and rock. The launcher propels soil nails at high speeds, driving them into slopes or embankments to provide immediate stabilization. Unlike traditional methods, which involve time-consuming drilling, the Soil Nail Launcher allows for rapid deployment, making it especially useful in emergency situations where unstable slopes pose immediate risks.

