The Geo-Institute Soil Improvement Technical Committee will live-stream the *session* *"Case Histories in Ground Improvement"* on Thursday, December 10, at 2 PM EST. The talks include:

Talk #1: "The Story of Passed-Over Property: Ground Improvement for Warehouse Development on a Former Municipal Landfill in Dallas, Texas", (presented by Kevin Scott, P.E., Menard USA)

Historically, many closed landfill and brownfield properties in large metropolitan areas were bypassed by developers because the geotechnical, environmental, regulatory, and cost risks were difficult to quantify and even harder to finance. Today, as readily developable infill land becomes scarce and industrial users seek sites with access to highways, labor, utilities, and logistics infrastructure, these once-overlooked properties are being reconsidered as valuable redevelopment opportunities. The U.S. Environmental Protection Agency notes that brownfield and infill sites are often located near existing transportation and utility infrastructure and can be transformed from abandoned or underused properties into economic assets, although remediation and redevelopment can add cost and complexity. Recent reporting on landfill redevelopment similarly highlights that large landfill tracts can be attractive for redevelopment, but require careful management of settlement, landfill gas, leachate, environmental controls, and construction risk.

This presentation will examine that trend through the 635 Exchange project in Dallas, Texas, a 36 acre municipal landfill (and former Christmas Tree farm site) proposed for speculative tilt-wall office/warehouse buildings totaling approximately 596,000 square feet, with associated paving and site improvements. The site is located within a portion of the closed City of Dallas Landfill and is subject to Texas Health and Safety Code and TCEQ development requirements, making it a representative example of the "passed-over property" now being revisited by developers seeking strategically located industrial land for transformation into multi-building logistics facilities.

The case history will walk through the anatomy of the site and the construction challenges posed to the consulting team, developer, and general contractor. Subsurface exploration identified municipal solid waste across most of the site extending to depths of approximately 12 to 47 feet and underlying the MSW were residual soils and weathered shale bedrock. The geotechnical study identified expansive soil potential and long-term settlement potential of MSW on the order of two to four feet, which raised the question of how can the property be developed economically and without environmental concerns?

As part of the project due diligence, ground improvement techniques were evaluated including deep dynamic compaction to reduce post-construction settlement for pavements, flatwork, utilities, and retaining wall areas. In settlement sensitive building areas, the use of Controlled Modulus Columns™ (CMCs) extended to a competent bearing stratum and a Load Transfer Platform were used as an alternative to augercast piling and structurally-supported floor slabs. The presentation will discuss how ground improvement and practical engineering can provide solutions and manage risk for consultants and developers taking a harder look at landfill and uncontrolled fill sites.

Talk #2: Beyond the Submittal: Integrating Design, Construction, and QA/QC for Rigid Inclusions (Presented by Kassandra Kromish, P.E., M.ASCE, Keller North America)

Ground improvement is a common recommendation in geotechnical reports, but selecting the appropriate solution requires more than simply applying a generalized recommendation. Successful implementation depends on understanding subsurface variability, evaluating constructability, and confirming that the selected system satisfies project performance criteria while accounting for site-specific constraints. This case study presents a project with multiple geotechnical recommendations and describes how the design team evaluated the subsurface conditions to develop the most efficient rigid inclusion solution. The project also provides an example of how construction observations and installation data can be used to address soil variability during execution.

During construction, significant quality control challenges were encountered, where full displacement installation tools met refusal and experienced elevated equipment stress in the northern portion of the site before achieving the anticipated tip elevations. Daily review of DAQ reports and a feedback look between the office and field, enabled the team to rapidly identify soil-related trends and implement a zone-based installation approach with defined refusal criteria, selective predrilling, and engineer verification in critical transition areas. This proactive QA/QC process, combined with early planning for risks such as working pad maintenance, utility conflicts, and cutoff elevation coordination, allowed the project team to adapt in the field, maintain the schedule, and preserve profitability despite the need for additional equipment and oversight. The project underscores the importance of integrating geotechnical interpretation, constructability considerations, and active field quality review to achieve successful rigid inclusion performance.

Talk #3: Vibro Ground Improvement for the St. Louis Ice Center & Blues Practice Facility (Presented by Lyle Simonton, P.E., M.ASCE, Subsurface Constructors)

Subsurface Constructors completed the vibro stone columns and vibrocompaction ground improvement for the new St. Louis Ice Center project located in Maryland Heights, MO. This project consisted of construction of approximately 300,000 sq. foot ice center with three indoor ice rinks and a fourth rink outside of the main structure.

Due to the relative proximity of the site to the New Madrid fault and its location in a floodplain, liquefaction was a concern in the alluvial soils. Additionally, the footings for the structures required a bearing pressure of 5,000psf that could only be achieved with some type of ground improvement. Subsurface Constructors worked with the project geotechnical consultants and the general contractor to design a plan consisting of vibro stone columns (aggregate piers) and vibrocompaction to provide the required bearing pressure, and to mitigate the potential for liquefaction to depths of 40 to 45 feet below grade.

Subsurface installed approximately 825 stone columns under all of the continuous and spread footings on this site using a wet top-feed method. In doing so, they were able to change the Seismic Site Class from an F to a D by densifying the loose to medium dense sands and provide the required 5,000psf for a post-treatment bearing pressure.

In this presentation, Lyle will discuss the site stratigraphy, why the technique was selected, challenges during installation and post-treatment testing and analysis. He will also discuss the owner's understanding of the geotechnical risks of the site regarding liquefaction mitigation.

Talk #4: Sagamore Spirit Whiskey Distillery (Presented by Andy McKeen, P.E., M.ASCE, GTA)

The Sagamore Spirit Whiskey Distillery is located within Baltimore, Maryland, and was one of the first projects constructed within the Baltimore Peninsula Development which is a redevelopment of the former Port Covington railroad terminal in south Baltimore. The distillery started construction in 2015 and opened in 2017. The distillery complex includes a Distillery Building, a Processing Building, a Restaurant, a water tower, and various other ancillary structures that are sensitive to settlements. The subsurface profile at the site includes historic uncontrolled fills associated with the former development, to depths of up to 15 to 17 feet, underlain by native medium stiff silt and clay, transitioning to more overconsolidated deposits at depths ranging from 30 to 60 feet.

Considering the challenging soil conditions at the site, several ground improvement techniques were implemented for support. For the buildings, rigid inclusions below the proposed foundations, and heavily loaded slabs in the distillery building were utilized. For the pavement areas, and more lightly-loaded slab areas, dynamic compaction was utilized to mitigate the risk of support of these structures on the historic fill. Throughout the construction, installation and implementation of these techniques were impacted by, buried mass concrete and structures associated with the former development, as well as proximity to the adjacent marina, which at the time had boats stored close to the eastern end of the property. Ground improvement at this project was successful in helping to control project costs by limiting the need for alternative, and more costly improvement options (removal and replacement, and/or deep foundations). Coordination with the entire project team on this project was critical to select ground improvement options that align with the owners' requirements.

Talk #5: Case Histories in Ground Improvement Using Vertical Drains: Performance and Prediction from Australian Projects (Presented by Buddhima Indraratna, Ph.D., CPEng, FTSE, F.ASCE, University of Technology Sidney)

Ground improvement using prefabricated vertical drains (PVDs) has become a cornerstone technique for accelerating consolidation of soft soils, with well-documented case histories playing a critical role in improving design reliability. This presentation covers three Australian case histories where PVDs were implemented under distinctly different loading conditions, providing valuable insights into field performance and engineering practice. The first case examines the Sandgate rail track constructed over deep estuarine deposits and stabilized using relatively short PVDs without surcharge preloading. Despite the absence of external preload, the drains effectively reduced cyclic loading–induced excess pore water pressures and improved track stability under repeated train loading, demonstrating the feasibility of targeted ground improvement in constrained rail environments.

The second case presents land reclamation at the Port of Brisbane, where PVDs combined with vacuum preloading significantly accelerated consolidation of thick, soft clay deposits. Field data confirm that vacuum pressures of up to 70 kPa can be effectively transmitted through the drain network, leading to substantial increases in soil stiffness and reductions in post-construction settlement. The third case involves the Ballina trial embankment, where conventional PVDs and biodegradable jute drains were installed to assess consolidation efficiency. Field monitoring highlights the influence of smear effects and drain type on settlement and excess pore water pressure dissipation, offering important guidance for drain selection and design. Collectively, these case histories demonstrate the versatility and effectiveness of PVD-based ground improvement under surcharge, vacuum, and cyclic loading conditions. Comparisons between observed behavior and predicted responses further emphasize the importance of incorporating key mechanisms such as smear effects, staged loading, and vacuum pressure in design. The findings provide practical guidance for transport and coastal infrastructure projects on soft soils and establish benchmark references for future ground improvement applications