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**Delaware Valley  
Chapter**

# DELAWARE VALLEY GEO-INSTITUTE

DVGI September 2023

Volume 23 Issue 6

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## September DVGI Meeting 2023

**SPEAKER:** Bashar Qubain, Ph.D., P.E., President/Founder  
GeoStructures, Inc.

**TOPIC:** DVGI Project of the Year - The Laurel Rittenhouse Square

**DATE:** Tuesday September 19, 2023 – 5:30 PM to 8:30 PM

**WHERE:** Valley Forge Casino– Parkview Ballroom, 1160 1st  
Ave, King of Prussia, PA 19406

**COST:** \$55 Standard, \$20 Government/Retired, \$10 Students

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## September DVGI Dinner Meeting 2023

**MEETING ABSTRACT:**

A 52-story high rise building in Philadelphia is constructed adjacent to a 3-story historic structure, supported on a rubble foundation at a depth of 8 ft below grade. The high rise is supported on a mat foundation at a depth 36 ft below grade with an average service contact pressure of 14 ksf. Evidently, the existing foundation requires underpinning but extra care is necessary to safeguard the historic building. A detailed finite element analysis, accounting for the construction sequence, showed that the mat foundation would settle about 1.5 in. Although such settlement would be acceptable for the high rise it would cause intolerable distress to the historic building by dragging down its underpinning. To minimize the settlement impact, an innovative micropile solution was implemented to safely transfer the underpinning load into the underlying mica schist bedrock and prevent the existing building from being overstressed by the mat foundation. Validation of the concept was achieved by FEM modeling of the mat foundation together with its surroundings. Settlement monitoring records were also carried out until the building was topped off and showed that the settlement had indeed stabilized with measurements in remarkable agreement with the FEM results. The new building was completed almost two years ago and the adjacent historic building has been functioning well without any signs of distress.

**ABOUT THE SPEAKER:**

Bashar is the founder and president of GeoStructures, Inc. He has over 30 years of professional experience in geotechnical engineering for buildings, bridges and sensitive machines. His expertise and research interests are in foundation analysis and design and soil-structure interaction. Bashar served as the chief geotechnical engineer on many transportation and high-rise projects.



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## **May DFI/DVGI Joint Meeting 2023**

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**Speaker : Scott Jacobs, P.E., D.GE. - Senior Engineer Keller –North America**

**Topic : Working Platform Stability**

### **MEETING ABSTRACT:**

The presentation first illustrated the need and importance of working platform safety and awareness. Major highlights of the industry wide (ADSC, DFI, and PDCA ) Recommended Industry Practices for Safe Working Platforms for Construction Equipment guidance document were then covered. Working platform design was then reviewed starting first with track pressure calculation followed by the design of the working platform itself using a method by the Building Research Establishment (BRE 470 from the United Kingdom). Lastly, basic working platform evaluation was discussed including current research efforts being performed by DFI and the European Federation of Foundation Contractors (EFFC) to improve working platform evaluation.

### **ABOUT THE SPEAKER:**

Scott A. Jacobs, P.E., D.GE. Mr. Jacobs is a senior engineer for Keller supporting the northeast region but assisting on projects nationwide. He holds a B.S. in civil engineering and a M.S. in geotechnical engineering from the University of Florida. Mr. Jacobs is a registered professional engineer in 7 east-coast states spanning from Florida to New York and has 22 years of experience in geotechnical engineering and contracting. He is co-chair of the DFI Working Platform Group, Vice Chair of the DFI Drilled Shaft Committee, and a voting member of ACI 336 Drilled Shaft Committee.

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## DVGI Golf Outing June 2023

### Annual Delaware Valley Geo-Institute Golf Outing

On June 15<sup>th</sup>, 54 DVGI members and friends participated in the Annual DVGI Golf Outing at Kimberton Golf Club in Phoenixville. Engineers, Contractors, and Suppliers took time out of their busy schedules to support the DVGI scholarship fund. The weather was perfect, and the refreshments were cold for the shotgun start at 9 am at the beautiful venue. The outing was a scramble format inviting all levels of golf skill. Shout out to Conrad Cho (Langan), Alexis Gawelko (Gannett Fleming) and Hannah Miller (Pennoni) for staffing the registration table and roaming the course with refreshments.

The Keller/Pennoni team took home the overall best team score (63), while the Earth Engineering team had the dubious honor of the worst or “most honest” team score. After the round of golf, participants gathered for lunch and drinks on the patio. It was a great event to get to socialize with DVGI members and friends at a more informal gathering. Special thanks to our 20 sponsors which made the event a huge success, providing over \$4,400 for the DVGI Scholarship fund given out to students during the annual March Student Night dinner meeting. Looking forward to next year’s outing!





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## **DVGI Project of the Year 2022-23 : Geostructures, Inc.**

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**Submitting Company:** Geostructures, Inc.

**Submitting Person(s):** Bashar S. Qubain, Ph.D., P.E.

**Project Name:** The Laurel Rittenhouse Square

**Client/Owner(s):** Sothern Land Company

**Contractor(s):** Construction Manager: Hunter Roberts Construction Group; Earthwork Contractor: JPC Group, Inc.

**Engineer(s):** Solomon Cordwell Buenz Architects; Structural Engineer: The Harman Group; Geotechnical Engineer: Geostructures, Inc.

### **Project Description:**

A 52-story high rise building on Rittenhouse Square in Philadelphia is constructed adjacent to a 4-story historic structure, supported on a rubble foundation at a depth of 8 ft below grade. The high rise is supported on a mat foundation at a depth 36 ft below grade with an average service contact pressure of 14 ksf. Evidently, the existing rubble foundation requires underpinning but extra care is necessary to safeguard against the influence of mat.

A detailed finite element analysis based on consolidated-drained triaxial tests on reconstituted Trenton gravel specimens as well as in-situ pressure meter tests showed that the mat foundation would settle about 1.5 in. To minimize this adverse settlement impact on the historic building, the underpinning piers were supported by rock-socketed micropiles as depicted in the subsurface section, Figure 1. More importantly, an isolation gap was constructed to absorb the mat settlement and prevent transferring its corresponding heavy load to the micropiles which would undoubtedly crush them. To be on the safe side, a 3-in. gap was maintained between the micropile caps and the mat—double the FEM calculated settlement as shown in Figure 2. In order to properly create this gap, a 3-sided masonry wall with footings encapsulating each pile cap was constructed as illustrated in Figure 3. With this arrangement, once the mat and the subgrade below the intermittent underpinning piers start to settle, the micropiles would simultaneously pick up the load. Being rock-socketed, the settlement of the underpinning-micropile system would be primarily limited to elastic shortening at about 0.25 in. This limits the angular distortion of the historic building within tolerable limits.

The new tower has been completed for more than a year and the adjacent historic building has been functioning well without any signs of distress.

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## DVGI Project of the Year 2022-23: Geotechnical, Inc.

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**Submitting Company:** Geotechnical, Inc.

**Submitting Person(s):** Bashar S. Qubain, Ph.D., P.E.

**Project Name:** The Laurel Rittenhouse Square

**Client/Owner(s):** Sothern Land Company

**Contractor(s):** Construction Manager: Hunter Roberts Construction Group; Earthwork Contractor: JPC Group, Inc.

**Engineer(s):** Solomon Cordwell Buenz Architects; Structural Engineer: The Harman Group; Geotechnical Engineer: Geotechnical, Inc.

### Geotechnical Challenges:

Numerous investigators have studied the settlement of buildings (Skempton and MacDonald, 1956; Grant and Christian, 1974; Whals, 1994). In addition, Leary and Langan, 1982 documented the effectiveness of shallow foundations with tolerable settlement for tall structures in Florida. In Philadelphia, however, it has been customary to support high-rise buildings on deep foundations, mostly caissons. So this project represents a well-documented precedent for a major tower with a mat foundation on dense soils—a solution that resulted in significant savings and reduced the construction schedule by at least two months. However, even though the mat settlement would be acceptable for the high rise it would cause intolerable distress to the historic building due to soil-structure interaction complications. Basically, as the high rise is fully loaded, the mat will settle causing the underpinning of the historic building to be dragged down more on the underpinning side in comparison with the opposite side, thereby causing intolerable differential settlement. As such, an optimal mat foundation system was made possible by an innovation micropile underpinning of an adjacent historic structure. A gap which was purposely set above the micropile caps (Figures 2 and 3) allowed the mat settlement to take place without overstressing or compromising the micropiles. This ultimately safeguarded the adjacent historic building.

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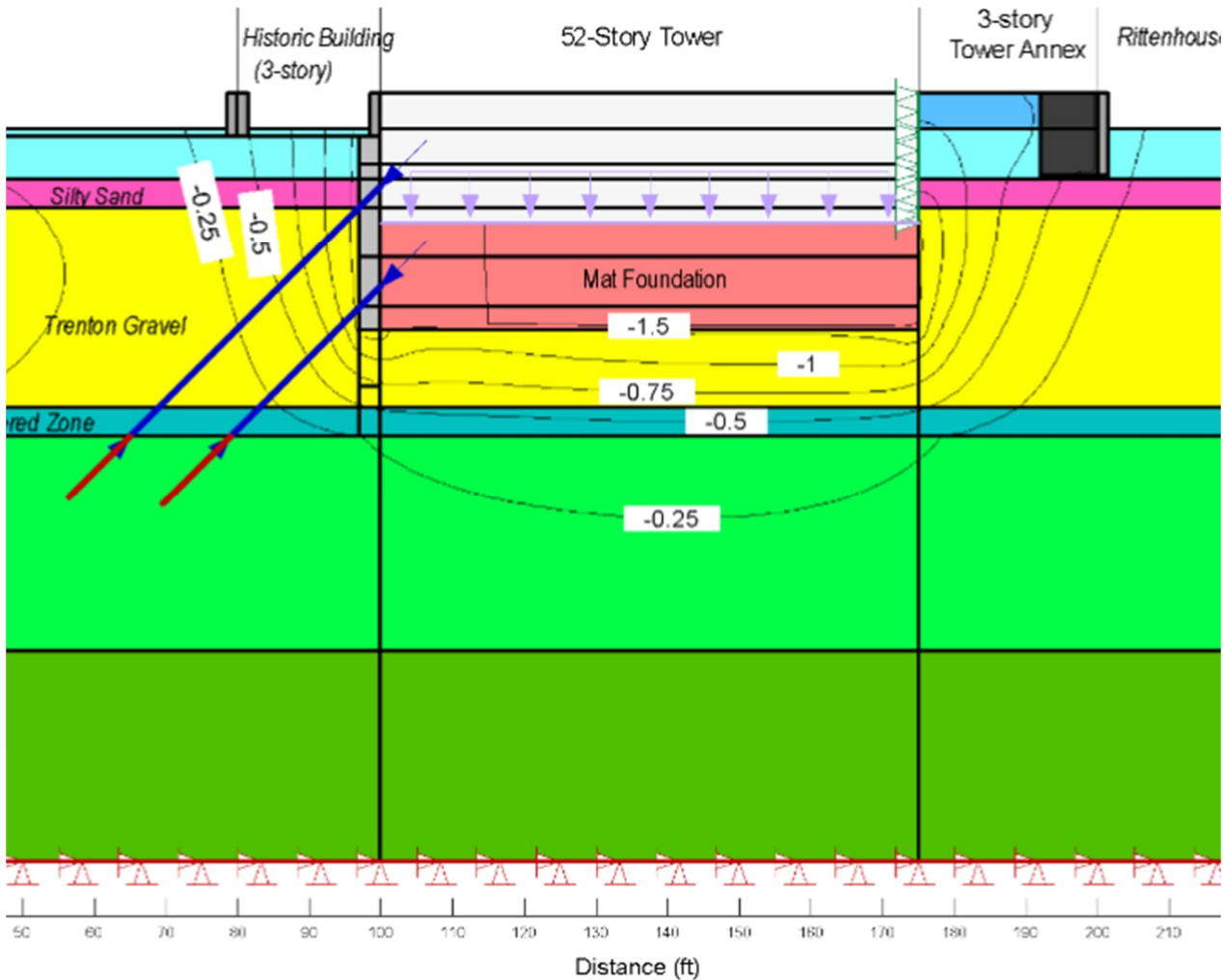




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## DVGI Project of the Year 2022-23!

**Geostructures, Inc.**



**Figure 2:** Settlement contours (in.) under mat foundation and underpinning—without micropiles

(GeoStructures, Inc., 2018).



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## DVGI Project of the Year 2022-23!

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**Geostructures, Inc.**



**Figure 3:** Enclosures with steel plate covers around micropile caps at the intermittent underpinning piers to create a 3-in. gap below mat (GeoStructures, Inc., 2018).





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## ANNOUNCEMENTS

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### **\*\*DVGI SCHOLARSHIP WINNERS\*\***

Congratulations to the following scholarship winners for 2022-2023

Scholarship Winners:

Gwen Clark, Temple University - \$1500

Anupam Bhattarai, Villanova University - \$1500

Katherine Weimann, Lehigh University - \$1000

Thomas Mayer, Villanova University - \$1000

Andrew Kline, Villanova University - \$1000

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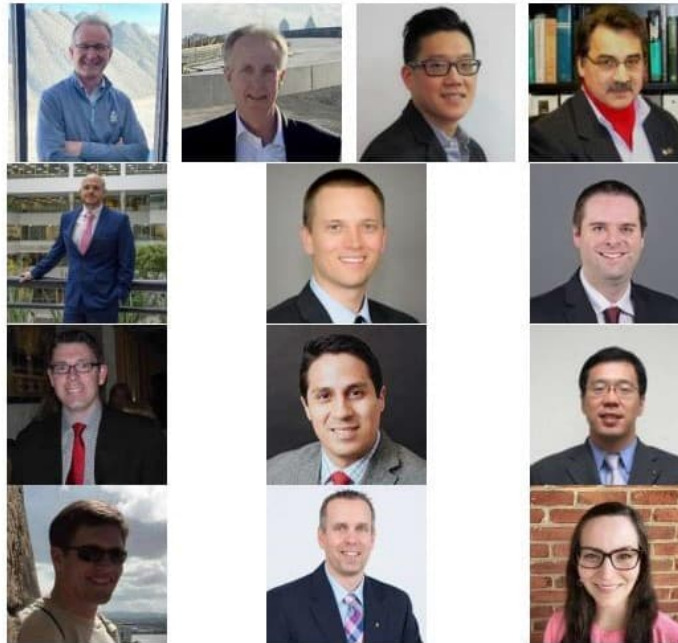
The advertisement is a rectangular graphic. On the left side, the text 'GRL' is written in large, bold, green-outlined letters. Below it, 'Engineers, Inc.' is written in a smaller, black, sans-serif font. Further down, the text 'Deep Foundation Testing and Analysis' is displayed in a green, sans-serif font. At the bottom left, the website 'grlengineers.com' and the phone number '610-459-0279' are listed in a black, sans-serif font. On the right side of the graphic, there is a photograph of a construction worker wearing a white hard hat, a blue long-sleeved shirt, and a high-visibility yellow safety vest. The worker is looking towards the right, and the background is a blurred outdoor construction site.



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## ANNOUNCEMENTS



## Geosynthetic Institute

### GSI RECORDED WEBINARS

- Topics, and Registration at [www.geosynthetic-institute.org/webinar.htm](http://www.geosynthetic-institute.org/webinar.htm)
  - Each Webinar Carries 1.5 Professional Development Hours Upon Completion of a 10-Question Multiple Choice Test
    - Each presentation lasts approximately 90 minutes

### Upcoming GSI Webinars for 2023

11-Oct	W-26	<a href="#">Applications and Design of Geotextile Tubes- Description</a>
15-Nov	W-34	<a href="#">Geosynthetics in Roadways- Description</a>
13-Dec	W-6	<a href="#">Geosynthetics in Heap Leach Mining - Description</a>

ALL WEBINARS WILL BE RECORDED AND CAN BE PURCHASED FOR VIEWING AT YOUR CONVENIENCE

**GSI/GMA Members \$200.00 USD per each Webinar**

ASCE/G-I Members:

Read past and present issues of Geo-Strata magazine online at [www.asce.org](http://www.asce.org)



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Upcoming Dates for 2023-24 Dinner Meetings and events are as follows:

10/17/2023 – TBA

11/21/2023 – DFI Lecture- Jesus Gomez

*One PDH will be awarded for most meetings that you attend.*

*If you are interested in presenting at one of our monthly meetings or have ideas about potential speakers, please get in touch with a DVGI board member.*

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### *On Director's Cut*

Geo-Institute Director Brad Keelor interviews G-I members about anything and everything. You might hear about their favorite geotechnical project, their favorite music, or their favorite pie. In Episode 18 of Season 3, Brad speaks with Theresa Andrejack Loux of Aero Aggregates!

See the video here: <https://youtu.be/Gn-aDAHfCXg>

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ASCE/G-I Members:  
Read past and present issues of Geo-Strata magazine online at [www.asce.org](http://www.asce.org)

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## **ANNOUNCEMENTS**

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### **HAVE DVGI PUBLISH YOUR ARTICLE, ADVERTISEMENT, OR JOB POSTING**

- Do you have an interesting article on a project or individual in your organization that you would like to have published in the DVGI newsletter?
- Would you like to get the word out about a job opening, new venture, etc. to our membership via the newsletter?

Please submit your articles or news items for consideration in the next edition of the newsletter or get in touch about our reasonably priced advertising by contacting Neil Scafonas ([neil.scafonas@aecom.com](mailto:neil.scafonas@aecom.com)).

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