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2016-2017 Officers

Left to Right: Dila Saidin, Mark Rohrbach, Elizabeth Lundquist, Steve Johnson, Ben Blanchette, Brendan Cioto

Not pictured: Alex Ciccone, Ty Jahn

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Parsons Brinckerhoff

SECRETARY
Alex Ciccone, P.E.
Hart Crowser

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ILF Consultants

EDUCATION CHAIR
Steve Johnson
Sixense

WEBMASTER
Brendan Cioto
Shannon & Wilson
President’s Message

Happy Groundhog’s Day and welcome to the 2017 edition of The Groundhog!

The ASCE Seattle Section Geotechnical Group and Seattle Geo-Institute Chapter (SSGG/SGIC) produces this publication annually to share group announcements, provide our member firms with a forum to share their achievements over the previous year, and discuss our group’s activities and goals.

As President of the SSGG/SGIC, I get to be the face of the group – welcoming you to meetings, sending out all of the group announcements, and writing these introductions. However, the real work of this group is done by our officers and volunteers, and I would be remiss not to recognize them here.

- **Ben Blanchette**, our group’s President-Elect, is hard at work organizing this year’s Spring Seminar, to be held April 22nd at the University of Washington. This year’s seminar will be focused on the topic of Ground Improvement.

- Our Secretary, **Alex Ciccone**, has been taking the minutes at our meetings and has worked diligently to produce this publication.

- The group’s Treasurer, **Dila Saidin**, is the first face many of you see at the dinner meetings, making sure your payments are accounted for, so that our finances are always in order.

- Education Chair, **Steve Johnson**, found speakers all of our dinner meetings, and he also organized a Fall Short Course on instrumentation and is organizing a short course to be held the day prior to the Spring Seminar.

- Public Relations Chair, **Ty Jahn**, handled our outreach activities.

- Membership Chair, **Mark Rohrbach**, organized the Ground Improvement Committee which released its final white paper early this fall. He has also been reaching out to out member firms to make sure we have the best practices in place to keep the membership informed about events. His past experiences as President of the group help guide our decisions as we move the group forward.

- **Todd LaVielle** and **Brendan Cioto** serve as our Webmasters. They maintain the SSGG/SGIC website and helps with our Mail Chimp and Brown Paper Tickets accounts.

Our group’s mission is “to advance geotechnical practice in the Puget Sound Region by providing leadership on public issues, sharing professional experience, and promoting education.” We plan our dinner meetings, short courses, spring seminar, and outreach activities with this mission in mind. Dinner meeting topics and selected speakers, short courses, and the spring seminar are all intended to advance geotechnical practice locally, in some cases through shared professional experience.
President’s Message (cont.)

Our mission to promote education occurs via our connection to the University of Washington and their Geo-Institute Graduate Student Society (GIGSS) Chapter. Our group continues to support to the UW graduate program through the Robert D. Holtz Endowed Fellowship. Established in 2007 with an initial endowment of $50,000, this fund has grown to just over $325,000 through contributions from Dr. Holtz, local firms, and our group. Our group contributed $30,000 in 2016. We are on track to make another contribution this year, and hope to continue growing the endowment to provide more annual funding to the UW program and support geotechnical engineering graduate students.

Our group continues to grow and thrive, thanks to the dedication and support of each and every member. The board is always looking for volunteers to serve on committees, plan events, and get involved! I would encourage everyone reading this to consider helping us out and making your group even stronger.

Thanks for reading, and we’ll see you at the meetings!

Elizabeth Lundquist
President 2016-2017
## 2016-2017 Events Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Speaker</th>
<th>Topic</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/22/16</td>
<td>DM, joint with AEG</td>
<td>Michael J. Marasa (Hayward Baker)</td>
<td>Sinkhole Remediation at the National Corvette Museum</td>
<td>Best Western, Seattle</td>
</tr>
<tr>
<td>10/27/16</td>
<td>DM</td>
<td>Mike Wongkaew (Mott McDonald)</td>
<td>Design of Sound Transit East Link Downtown Bellevue Tunnel</td>
<td>Best Western, Seattle</td>
</tr>
<tr>
<td>11/4/16</td>
<td>SC</td>
<td>Campbell Scientific, RocTest, Soldata</td>
<td>Geotechnical Instrumentation and Automated Monitoring</td>
<td>Columbia Tower Club, Seattle</td>
</tr>
<tr>
<td>11/16/16</td>
<td>DM</td>
<td>John Rewolinski (Sound Transit)</td>
<td>Virtual Reality Applications for the Engineering and Construction Industry</td>
<td>Best Western, Seattle</td>
</tr>
<tr>
<td>12/15/16</td>
<td>DM</td>
<td>Robert A. Robinson (Shannon &amp; Wilson)</td>
<td>Beacon Hill Station and Tunnels, State of the Art Underground Construction in Difficult Ground</td>
<td>Red Lion, Bellevue</td>
</tr>
<tr>
<td>1/26/17</td>
<td>DM</td>
<td>David Sowers (WSDOT)</td>
<td>State Route 99 Bored Tunnel: The Ups and Downs of the State’s Largest Megaproject</td>
<td>Best Western, Seattle</td>
</tr>
<tr>
<td>2/23/17</td>
<td>DM, joint with ASCE general</td>
<td>Tale Egeberg Aasland (Norway Public Works)</td>
<td>Norway’s Submerged Floating Tunnel Concept and Design</td>
<td>Red Lion, Bellevue</td>
</tr>
<tr>
<td>3/23/17</td>
<td>DM</td>
<td>Andrew J. Whittle (MIT)</td>
<td>Prediction of Ground Movements Associated with Tunneling and Their Effects on Adjacent Structures</td>
<td>Best Western, Seattle</td>
</tr>
<tr>
<td>4/21/17</td>
<td>SC</td>
<td>Hayward Baker Menard Ground USA Condon-Johnson</td>
<td>Ground Improvement</td>
<td>Columbia Tower Club, Seattle</td>
</tr>
<tr>
<td>4/22/17</td>
<td>SS</td>
<td>Various</td>
<td>Ground Improvement</td>
<td>UW Kane Hall, Seattle</td>
</tr>
<tr>
<td>5/25/17</td>
<td>DM</td>
<td>J. David Frost (Georgia Tech)</td>
<td>The Evolving Role of Geomaterials in Infrastructure Systems</td>
<td>Red Lion, Bellevue</td>
</tr>
</tbody>
</table>

DM: Dinner Meeting    SC: Short Course    SS: Spring Seminar
2017 Spring Seminar and Short Course Update

The ASCE Seattle Section Geotechnical Group / Seattle Geo-Institute Chapter is proud to announce that our 34th Annual Spring Seminar will be held on Saturday, April 22, 2017 on the University of Washington campus at Kane Hall.

This year’s topic is Ground Improvement and will cover many types and aspects of ground improvement. This topic was selected based on feedback from our members and follows the completion of our first of its kind document “Commentary Guidelines for Ground Improvement Using Discrete Elements” (mentioned later in the Groundhog). Planning is underway. A number of regional experts will give presentations on local projects.

We are pleased to announce our speakers will include:

- George Burke, Hayward Baker
- Peter Robertson, Gregg In Situ
- Juan Baez, AGI
- Mike Gomez, University of Washington
- Brendan Bradley, University of Canterbury
- Kord Wissmann and/or Brian Metcalfe, Geopier

Presentations will cover practical design and construction as well as developments in research. We will feature 8 to 9 presentations and a panel discussion.

In addition to the specific topic presentations, the Spring Seminar will include our annual Service Award Presentation, exhibitor displays, and hosted lunch and breaks. Seminar attendees will be eligible to receive 0.8 Continuing Education Units (CEU) or 8 Professional Development Hours (PDH).

We are also planning a 1-day short course which will be held on Friday, April 21, 2017 at the Columbia Tower Club in downtown Seattle. This short course will also focus on Ground Improvement and will be put on jointly by Hayward Baker, Menard Group USA and Condon Johnson.

Volunteers for the Planning Committee are always welcome. Please contact Ben Blanchette (ben.blanchette@hartcrowser.com) if you would like to volunteer for the seminar. It is a great way to get involved with the group!

Mark your calendars and make plans to attend the 34th Annual Spring Seminar, and look to our website (http://seattlegeotech.org/) for more details and to register for the Spring Seminar and the Spring Short Course!

Ben Blanchette, P.E.
President-Elect 2016-2017
Ground Improvement Using Discrete Elements

In response to a 2015 request to evaluate common approaches for ground improvement design as it relates to the use of ground improvement to mitigate against liquefaction and/or to improve Site Class, the Seattle Geotechnical Group formed a technical ground improvement (GI) committee to evaluate and comment on the request. The GI Committee was open to all interested parties and included engineers representing small, medium and large-sized geotechnical engineering firms in private practice, geotechnical specialty contractors, university professors and staff from the Seattle Department of Construction and Inspections (SDCI).

Between January and July 2016 the GI Committee met several times and ultimately developed a document titled “Commentary Guidelines for Ground Improvement Using Discrete Elements”. Following a 45 day membership comment period, on October 12, 2016, the Group’s officers voted to approve the document and provide it to SDCI.

The document addresses the geotechnical design aspects of discrete elements, regardless of shape (circular, square, octagonal, etc.), regardless of stiffness (compacted aggregate piers, cemented aggregate piers, unreinforced concrete/lean mix concrete, etc.) and not in contact with each other. It is understood that there are many forms of ground improvement (e.g. preloading, soil freezing, soil mix panels/grids, earthquake drains, etc.) which may or may not be appropriate for a particular application at a particular site. These other common and very viable ground improvement techniques were considered beyond the scope of the GI Committee’s tasking and are not specifically addressed in the document.

During the committee’s work it became clear that the SDCI and the geotechnical community would benefit from some comments and guidance for static design. Therefore the document produced primarily addresses seismic issues (e.g. liquefaction, Site Class, bearing capacity, settlement, etc.) and in some cases addresses static issues. The members of the committee agreed that when recommending or designing ground improvements for static conditions the literature is consistent and static design methods are well established. Therefore the document does not provide technical guidance for static design.

The document is broken into the following five sections:

- **Section 1** - Provides an introduction and lists the 19 professionals who significantly contributed to the document.
- **Section 2** - Summarizes some of the technical aspects of ground improvement design.
- **Section 3** - Provides ground improvement designers with the minimum information that should be conveyed in the design calculations and plan sheets submitted to a code enforcement agency for issuance of a building permit. This information is provided in a checklist format.
- **Section 4** - Provides geotechnical engineers with a framework to consider in preparing geotechnical engineering reports that recommend ground improvement for static and/or seismic loading conditions to increase bearing capacity, reduce settlement, improve slope stability, and or limit lateral spread mitigation.
Section 5 - Provides a list of references used to develop these commentary guidelines. To avoid confusion, ASCE and SDCI opted not to include references that provide recommendations for the reinforcement mechanism based on strain-compatibility assumption (pure shear). See Section 2 for more information.

I would like to thank those who participated in the GI committee and the other 25 members of the geotechnical group who during the membership comment period provided comments on the document. I’d also like to specifically thank the leaders of the firms represented by the GI committee for allowing those individuals the time necessary to participate in the GI committee.

The GI document is posted on the Group’s website (http://seattlegeotech.org). If you would like a copy or have any questions please feel free to contact me at marohrbach@haywardbaker.com.

Mark Rohrbach, PE, GE, P.Eng.
Senior Engineer, Hayward Baker, Inc.
Secretary, GI Committee
2016 Fall Short Course Recap

A big thank you to everybody who participated in the Fall Short Course this year! The course topic was Geotechnical Instrumentation and Automated Monitoring and was held at the Columbia Tower Club in Seattle on November 4th, 2016.

We had various industry professionals from Washington, California, and Canada come together to learn more about instrumentation techniques. A special thanks to the course leaders Campbell Scientific, RocTest, and Sixense (formerly Soldata) for putting a great curriculum together for the day.

Steve Johnson
Education Chair 2016-2017
Membership Chair’s Update

In response to a modest downtick in membership participation I’ve spent the last few months reviewing the membership list. It appears that as a result of the increasing corporate email spam filters, individuals changing firms and not passing along their new contact information, and member firms changing names (and email addresses) fewer members are receiving email announcements directly from the group.

In an effort to address this, I’ve been contacting members’ firms and asking each firm to appoint a firm “champion.” Each individual designated as a champion receives an email from me (which is less likely to be flagged as spam by the receiver’s email system) and forwards the Group’s emails and announcement to others within their firm and/or professional network. Over the last few months the list of firm champions has grown to more than 30 and continues to grow.

If you do not know who your firm’s champion is, or would like to be your firm’s champion please contact me at marohrbach@haywardbaker.com.

Mark Rohrbach, PE, GE, P.Eng.
Membership Chair 2016-2017
UW Geo-Institute Graduate Student Society

The Geo-Institute Graduate Student Society, commonly known as GIGSS, is a student-run organization at the University of Washington. The group’s goal is to provide a platform for the current graduate students to gain exposure to the current industry activities and new topics within the geotechnical practice. GIGSS is also a social organization hosting pot-lucks and “GeoBeers” mixers to strengthen the bond of the geotechnical community within the university.

GIGGS hosts a seminar series at the UW featuring lecturers from the industry and academia to engage students in current projects of interest and active research in the geotechnical field. These seminars provide the students a chance to learn about interesting topics related to geotechnical engineering as well as provide a networking opportunity with geo-professionals.

GIGSS is currently looking for a speaker for the Hennes Lecture which typically takes place in late March or early April on the UW campus. This year other locations have been selected for the Geo-Institute Cross Country Lecture so GIGSS is looking to host a speaker for this seminar. The topic of this lecture is open to any relevant topic within the geotechnical engineering field. If you are interested in giving a lecture, please contact Shane Markus at markussh@uw.edu.

More informal meetings called “Lunch and Learns” are also held periodically where current students as well as industry professionals give presentations on their research or interesting projects. The next “Lunch and Learn” is scheduled for early February and will be on “Geotechnical Challenges in Development of a Former Sand and Gravel Quarry” which will be presented by Chad Lukkarila and Marcus Byers from Kleinfelder. These events afford the opportunity for the students to learn and ask questions about active research and projects within the field.

Student’s from GIGSS often participate in the monthly ASCE Geo-Institute dinner meetings. Local firms sponsor students to attend these meetings and the GIGSS group is very grateful for this support.

2016-17 UW GIGSS Members, left to right: MinYong Lee, Garrett Timm, Shane Miller (Vice President), Drew Mason (Treasurer), Jason Sved, Sara Khandaker (Social Chair), William Pollock (former President-Adviser), Marica Otto (Secretary), Shane Markus (President), Genevieve Fujimoto
Local Firm Summaries

The Groundhog is published to inform group members and others of the group’s achievements, recent activities, goals, changes in the group, and other significant issues in the local geotechnical community.

Each local organization represented by the group’s membership is invited to submit a brief article summarizing their organizations services and trends over the past year, plans for the coming year, changes in the organization and promotions.

ASCE Seattle Section Geotechnical Group would like to thank the following firms and organizations for volunteering to submit articles for the 2017 Groundhog publication:

AECOM
AESI
Amec Foster Wheeler
Aspect Consulting
CDM Smith
CH2M
Condon-Johnson & Associates
GeoBrugg
GeoEngineers
Geopier Northwest
Golder Associates
Hart Crowser
Hayward Baker
HWA GeoSciences
Kleinfelder
Landau Associates
Malcolm Drilling
McMillen Jacobs Associates
Pacific Pile & Marine
Shannon & Wilson
Seattle Public Utilities
Sixense
SubTerra
Terracon
University of Washington
AECOM geotechnical-geological staff in the Seattle office were busy serving clients around the state, the nation, and the world including:

**Infrastructure - Transportation:** Aviation projects were very active including continuation of the North Satellite Terminal expansion at SeaTac, and the US Coast Guard airport in Astoria OR, plus new projects at King County International Airport, the Tacoma Narrows Airport in WA, and Del Norte Airport in northern California. Key personnel: Martin McCabe, Brian Rapalee, Markus Walbaum, Suren Balendra and Ken Yang.

**Commercial and Medical Building Foundations and Shoring:** AECOM provided seismic/geotechnical design support for new structures including hospital expansions in Auburn and Tacoma, Seattle Cancer Care Alliance in Seattle, and various high rise building design reviews for the City of Seattle.

**Industrial – Mining:** AECOM continues to assist with tailings dam design and construction projects at Red Dog Mine in AK, a tunnel stabilization effort at Elkview Mine in BC, a tailings dam closure study at the Pend Oreille Mine in WA, environmental impact studies for the proposed Donlin Mine in AK, and planning for a copper mine in AZ. We are updating the Mining Association of Canada tailings guidelines, and making presentations at national mining conferences. Cecil Urlich and Todd Parkington are leading these activities with support of Suren Balendra, Arturo Ortiz, Rik Langendoen, Chuck Vita, Mark Molinari, Courtney O’Neill in Seattle.

**Industrial – Oil and Gas, Paper/Wood Products, Steel:** C.B Crouse and Mark Molinari continued seismic and geologic studies for and design of offshore platforms in Trinidad and Australia. A variety of refinery expansion projects have been undertaken at the Shell and Tesoro facilities near Anacortes Washington and the Exxon refinery in Billings MT, including continued work on proposed rail extensions and development of new processing and storage facilities. Paper product and steel mill expansions in WA and OR were supported. Key personnel include Pam Craig, Michaela McCoog and Bruce Cassem.

**Infrastructure – Hydropower, Water Resources and Wastewater:** AECOM continued providing civil and geotechnical support to Seattle Public Utilities during the design and construction phase of the Morse Lake Pump Station and other upgrades. Steve Benson, Steve Goodin, Bonnie Witek and Joe Howard were busy this year evaluating hydropower applications for dams in Ohio on the Muskingum River and for the Jennings Randolph Hydroelectric Project on the North Potomac River in Maryland and West Virginia. Sarah Kemp is busy on a grouting assignment at Boone Dam in Tennessee. Steve Benson continues his work as a Part 12D FERC Independent Consultant, performing the 5-year inspection with Joe Ehasz for the Taum Sauk Project in Missouri. The team continues to evaluate monthly and annual instrumentation data for the Swift No. 2 Hydro project in WA. Brian Osgood is participating in a $300 million repair job on the Mosul Dam in Iraq. Rod Denherder provided support to various public and private clients planning and constructing dike systems (e.g. City of Kent, Shell Oil Co.).
AESI had a very successful 2016 in part due to our diversified client base and continued economic growth in the Puget Sound region. Schools, mixed-use development, single and multi-family residential, affordable and senior housing, and assisted living projects kept us very busy through the end of the year and it looks to continue through 2017. On many projects our geotechnical and hydrogeologic group collaborated to evaluate stormwater infiltration feasibility and strategies for new and redeveloped sites.

At the Kirkland office, we welcomed Alex Ybarra, Cort Christopher, and Josh Greer, as Staff Geologists into our geotechnical group and in December wished Jon Sondegaard, Senior Principal Geologist a happy retirement as he completes 20 years with AESI. In our Tacoma office, we added Joe Dragovich, Senior Geologist and Angela Gelfer, Staff Geologist. We will start 2017 by adding Sam Probert, Project Engineer, to our Everett office.

Notable AESI projects in 2016 include:

- Two high-rise residential towers (Phase 1) on a site in downtown Bellevue having a deep excavation and shoring starting construction in early 2017
- Construction monitoring for a large redevelopment of an existing commercial/retail site in downtown Kirkland with multiple mid-rise buildings, underground parking and shoring
- Gravel resource evaluation for 300 acre property in south King County
- Preliminary geotechnical evaluation of numerous parcels within the Sammamish Town Center
- Kirkland Geologic Hazardous Areas Municipal Code Update
- City-wide storm water infiltration feasibility for Bellevue, Ferndale and Bremerton
- Tehaleh 5,000 acre master planned community in Pierce County
- Several large mixed-use projects
- Multiple residential subdivisions and short plats on the Eastside
- Many new K-12 schools either in design or under construction
Environment and Infrastructure

The Amec Foster Wheeler geotechnical engineering group in Washington State primarily serves local projects from our offices in Seattle, Tacoma, Bothell, and Lynnwood. For large projects or when special expertise is needed, we are connected to over 500 geotechnical engineers and geologists in offices across North America.

Here are just a few of our local projects completed last year:

**Spirit Lake Outlet Drainage Tunnel Repair:** The Corps of Engineers hired a contractor-led team including Amec Foster Wheeler for tunnel engineering and tunnel safety to reinforce a portion of the tunnel that was becoming deformed. Work was done within a limited period of time when the drainage from the lake could be shut off. Amec Foster Wheeler was retained by the Corps for other related repair projects in 2016-2017.

**Remediation Site:** Both our geotechnical engineering group and our remediation group worked together to complete innovative temporary shoring techniques to allow remedial over-excavation at an industrial site in south Seattle.

**Dam Rehabilitation:** We completed geotechnical, hydrological and seismic analyses for a dam rehabilitation in eastern Washington. We participated in a potential failure modes and risk analysis with the team to develop recommendations for the appropriate level of mitigation and repairs.

**Bridgeport Way LID Improvements:** In order to improve stormwater management, Amec Foster Wheeler designed rain gardens, pervious concrete sidewalks, and a soldier pile tieback wall to support the arterial road widening.

**Arbor Heights Elementary:** This project involved extensive site grading, ground improvement with aggregate piers, cement-treated base to protect subgrades, and rigorous erosion control. The community was pleased with the dramatic improvement from the previous school facility.

Additionally, we are working on several city and county infrastructure, school districts, and commercial development projects.

We look forward to new opportunities to contribute our geologic and engineering expertise to improve our local environment and infrastructure, while continuing to collaborate with other Amec Foster Wheeler offices worldwide.
Aspect Consulting’s infrastructure / geotechnical engineering group flourished in 2016, led by Henry Haselton, Erik Andersen, and Dave McCormack. Our practice has grown more than 20 percent in each of the last 3 years, and with it has come opportunities to work on a greater range of projects and expand into new territory.

Hello Portland: Aspect crossed the Columbia with our sixth office, the first outside Washington. Leading the Portland office are Andrew Holmson, who relocated from Aspect’s Bainbridge Island office, and new staffers Peter Stroud and Mark Swank, who have over 40 years of combined experience in the Portland market. Our new location provides greater responsiveness to clients in southwest Washington and the greater Portland area.

Hello Field Office: Aspect opened a field annex in Seattle, allowing us to mobilize equipment and vehicles easier and faster than ever. We’ve begun building a soils lab, which will expand our services to include index testing.

Habitat/environmental restoration: Aspect continues to be a key player supporting ecosystem enhancements. Our first Portland-area project is with Wolf Water Resources and KPFF on restoration of the Shillapoo Wildlife Area along the Columbia River. We teamed with HDR to replace a culvert and evaluate bank stability in Redmond for Puget Sound Energy. We entered new phases of the Green River levee setback for King County and Harper Estuary Restoration in Kitsap County. And our work on a five-year transportation and estuary restoration project ended as the new Bucklin Hill Road bridge opened to traffic in Silverdale.

Seattle Redevelopment: We continue to help shape Seattle’s cityscape with a variety of mid- and high-rise redevelopments, with some integrated geo-environmental services.

North + West Sound and Central/Eastern Washington: Alison Dennison joined us in Bainbridge Island and works on municipal and residential projects on the island and beyond. In Bellingham, we oversaw placement of the environmental cap on the former Georgia Pacific site. Erik Andersen is supporting Bellingham’s development of a new waterfront park and managed geotechnical engineering studies for bridges and culverts, including the old timber bridge across North Lake Samish. From Wenatchee, Nick Szot managed transportation and irrigation projects across central Washington and contributed to Seattle high-rise projects.

More New Faces: Aspect welcomed two junior-level staffers: Na Hyung Choi, who joined our Bainbridge Island office, and Eric Schellenger, who supports projects from Seattle. With Aspect’s continued growth, we look forward to what developments the new year will bring.
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CDM Smith provides lasting and integrated solutions in water, environment, transportation, energy and facilities to public and private clients worldwide. In the Northwest, CDM Smith has offices in Bellevue, Seattle, Portland, Helena, Libby, Kellogg, and Burnaby, B.C.

The close alignment between CDM Smith’s geotechnical and structural engineering technology groups contributed to another successful year where we provided innovative solutions for the design and construction of complex infrastructure projects in the Pacific Northwest, including underground construction, slope stabilization, reservoir, dam, levee, foundation, and geoenvironmental projects. We contributed presentations to the World Tunnel Congress 2016 held in San Francisco, highlighting some of our tunnel projects.

**John Newby, P.E.**, continues to serve as a program lead and lead geotechnical practitioner for major infrastructure projects in the Western U.S. and Canada, including the Annacis Island WWTP transient mitigation and outfall project in the Vancouver metropolitan area. **Joe Souther, P.E.**, was commended by the State of Oregon and the Federal Emergency Management Agency for his outstanding contribution to the recovery from severe storms, flooding, and landslides in the state. He also worked on soil and rock slope stabilization and mine reclamation projects throughout the Western U.S. **Dr. Sri Rajah, Ph.D., P.E.**, worked on numerous high-profile pipeline design projects and conducted forensic investigations into large-diameter pipeline failures at the East Coast. He is an active member on several technical committees of ASCE, AWWA, and ASTM related to pipeline design and has been appointed the chair of the Utility Engineering and Surveying Institute’s new Standards Division. **Ulf Gwildis, L.E.G.**, provided his expertise in mechanized tunneling, trenchless technology, and ground freezing to several clients including SPU, Sound Transit, and Metro Vancouver. He served on the Value Engineering Panel for the Ship Canal Storage Tunnel and provided assistance after the derailment of a commuter train in California’s Bay Area by investigating the causative rock slope failure and developing mitigation options in close cooperation with our construction branch and cost estimators. **Karen Irby-Smith**, managing our geotechnical laboratory in Bellevue, also worked on construction monitoring for the mitigation of a landslide that affected a rail road in Oregon. **Jose Aguilar, P.Eng.**, after joining our office in Burnaby, is working on the tunnel design for the Annacis Island WWTP’s new outfall system.

We continue seeking to add geotechnical professionals to our nation-wide team working on numerous technically exciting and challenging projects throughout the U.S. and beyond.
Bellevue’s geotechnical group continues to support CH2M’s work as a world-wide leader in the design and construction of transportation, water, environmental, energy, and facility projects. We employ over 100 geotechnical engineers and tunneling specialists throughout the U.S. and about 315 world-wide to support CH2M’s total staff of approximately 21,000.

A sampling of interesting projects this year included:

- Completing the design of the first of 4 construction contracts for a King County 70 MGD combined sewer overflow treatment plant, conveyance system, and outfall in the Georgetown neighborhood of Seattle.
- Continuing work on design for the Anchorage Port Modernization Project (APMP). Recent work involved a pile load test program, where dynamic and hydro-acoustic monitoring was conducted during installation of ten 200-foot long 48-inch diameter steel test piles.
- Assisting the U.S. Army Corps of Engineers (USACE) with design of on-shore and off-shore facilities at Lower Granite Dam, located on Snake River. Recent work included construction of eleven 5-foot diameter concrete piers founded in the basalt bedrock supporting a 3-foot diameter outfall pipeline.
- Assisting the U.S. Environmental Protection Agency (EPA) with design and construction of environmental improvements at Point Rustin, Tacoma. Recent work included removal of tailings and the design and construction of extensive shoreline erosion protection measures along the Puget Sound shoreline on the Rustin Peninsula.
- Assisting the USACE on the Puyallup River Basin flood risk management general investigation 35% design analysis, cost-integrated feasibility report, and environmental impact statement. The project includes levee and flood-wall design and evaluation for 19 miles along the Puyallup River Basin.

Professional activities of our group have included:

Don Anderson is the current president of the Academy of GeoProfessionals and serves on the TRB AFF50 seismic bridge design committee. Don was one of 6 speakers at the Opening Session of GeoStructures Congress. Karen Dawson co-authored papers for DFI NY and CGS Vancouver and is co-authoring DFI’s Helical Pile Design Guide. Menzer Pehlivan authored a journal paper in Soil Dynamic and Earthquake Engineering, First Person article in Civil Engineering Magazine, and co-authored a technical article in GeoStrata. She chairs the Outreach and Engagement Committee of Geo-Institute. She represented ASCE during Emerging Leaders Association Conference. Menzer is one of the 5 engineers featured in the IMAX film, Dream Big. Karen and Menzer assisted with ASCE Seattle Geotechnical Section Commentary Guidelines for Ground Improvement Using Discrete Elements. Travis Kraupa gave a presentation on professional development during CH2M’s Annual JUMP Conference.
Condon-Johnson & Associates Inc. (CJA) is a diversified heavy/civil engineering and construction company whose core competencies include drilled shafts, micropiles, displacement piles, anchored earth retention, dewatering, grouting, and ground improvement.

In 2016, our Northwest Region office added the following key personnel:

- **Nikolay Kuzmanov** joins CJA as a Project Engineer with extensive experience in ground improvement, drilled shafts and tunneling. Nik has worked on major infrastructure projects in Alaska and Europe.
- **Doug Rosenthal** comes to CJA as a Project Safety Director in the Northwest District. Doug has a background in large heavy/civil projects with Kiewit and Skanska.
- **Dillon Emtman** is a recent graduate of Washington State University’s Civil Engineering program. He joins CJA as a Field Engineer with his first assignment at the Sound Transit N160 Project.
- **Soheil Kamalzare** recently obtained his doctorate in Geotechnical Engineering from Virginia Tech. He will contribute as a geotechnical engineer focused on ground improvement and design build projects.

**2016 Project Highlights:**

- **E330:** Sound Transit is expanding light rail in the surrounding Seattle area. Part of that expansion is a tunnel through downtown Bellevue. Condon Johnson was responsible for installation of over 27,500 square feet of temporary and permanent shoring to support the excavation of the tunnel portal along with barrel vaults for tunnel support.
- **Oak Harbor Clean Water Facility:** Condon Johnson was selected by Hoffman Construction to design and install the sheet pile temporary shoring as well as the permanent micropiles required for the modernization of Oak Harbor’s existing wastewater system.
- **Blue Lake to Troutdale Foundations:** Portland Gas and Electric contracted with CJA’s Portland office to complete the design and installation of micropiles, as well as, earthwork and pile cap construction for relocation of a segment of power distribution line outside of Troutdale, OR.
- **Port of Tacoma Pier 4 Phase 2:** As part of the modernization of the Port of Tacoma CJA was subcontracted by Manson Construction to install over 1,300 stone columns for slope stability and to mitigate settlement.

We are committed to serving its clients and the engineering community. During the design phase of your next project, please feel free to contact Doug Watt (dwatt@condon-johnson.com) for assistance with conceptual design, feasibility studies, and budget pricing. If you have specific questions, you can also contact Dominic Parmantier (DParmantier@condon-johnson.com) for grouting/ground improvement or Spark Johnston (SJohnston@condon-johnson.com) for small diameter drilling/grouting project, as well as work in the Portland market.
**Geobrugg North America, LLC** has over 60 years of experience developing and supplying Natural Hazard Mitigation Systems that protect against rockfall, unstable slopes, landslides, debris flow, and snow avalanche. As a manufacturer of protection systems against natural hazards **Geobrugg** offers integral solutions and comprehensive service working with consultants during the project design phase, contractors during supply and construction, as well as providing service to the end owner during their inspection and maintenance activities. Geobrugg is an American company based just north of Albuquerque in New Mexico and is serviced by five Regional offices throughout the USA. We manufacture in the United States and comply with Buy America requirements for steel products.

**Geobrugg is the world leader for protection systems** against natural hazards. Last year saw the completion of some very notable projects, including:

- **Parks Canada - Trans-Canada Highway – Cougar Corner Snow Net project**  
  Each year, numerous snow avalanches threaten the Trans-Canada Highway in Glacier National Park. Parks Canada commissioned the largest snow net project to date in the western hemisphere. Alpine Solutions Avalanche Services completed the design, which included the installation of 1850 m of Geobrugg snow nets in 65 separate rows.

- **Oregon DOT - OR 224: Rockfall Mitigation Project Estacada, OR.**  
  Steep cliffs and wildfires along the Clackamas Highway outside of Estacada, OR spurred the Oregon DOT to install 1290 linear feet of GBE Attenuator system. The Attenuator utilizes 105,000 ft2 of TECCO mesh tail for controlling and directing rockfall to a safe fallout zone. Hi-Tech Rockfall Construction expertly installed two separate barrier lines where the rockfall sources required a system with multiple height transitions.

- **Montana Department of Transportation - D3 Rockfall Mitigation**  
  Hi-Tech Rockfall Construction completed the installation of the first and largest phase of a three phase rockfall mitigation project in the Prickly Pear Canyon on I-15 north of Helena. The project included slope scaling, installation of rock bolts, 218,000 ft2 of draped TECCO mesh, 125,000 ft2 of Attenuator System, and a GBE-1000A rockfall barrier. Under a separate contract, Rock Supremacy LLC installed 575 linear feet of a 2,000 kJ Geobrugg rockfall barrier as part phase 2.

- **CALTRANS - Lee Vining, CA**  
  After a wildfire stripped the hillsides of vegetation near Lee Vining, CA rockfall ensued creating an emergency need for rockfall protection. Geobrugg immediately responded to calls from CALTRANS and Access Limited Construction supplying 3,300 linear feet of GBE-500A-R rockfall barrier in just under 10 days. Site conditions required a unique “floating” post design where the posts were only secured with upslope anchors.
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Business was steady in 2016, ramping up throughout the year and strengthening into the fourth quarter. *Engineering News Record* (ENR) ranked GeoEngineers 188 in its annual list of the top 500 design firms in the country by revenue in 2016, marking the third consecutive year of growth.

**2016 Project Highlights**

GeoEngineers engaged in challenging and diverse geotechnical and environmental projects throughout the Puget Sound in 2016. You’ll find GeoEngineers on the team for many of the largest development and transportation projects in the region. Notable projects include:

**Development**
- R.C. Hedreen’s hotel development at 9th and Stewart, downtown Seattle.
- The 1.2 million-square-foot expansion of the Washington State Convention Center.
- University of Washington (Seattle), North Campus Housing project.
- King County’s new Children and Family Justice Center.
- Marriott Convention Center Hotel in Tacoma.
- City of Redmond Downtown Park redevelopment.
- Seismic retrofits and upgrades for several Tacoma K-12 schools.

**Transportation**
- Washington State Department of Transportation’s (WSDOT) Interchange Direct Connector at I-405 and SR 167.
- Sound Transit’s Federal Way Extension Project.
- Sound Transit’s Lynnwood Link Extension Project.
- WSDOT’s Hot Lanes Design-Build project along SR 167.

**Energy**
- Puget Sound Energy’s new liquefied natural gas facility in Tacoma.
- Puget Sound Energy’s North Lake Union RI/FS.
- Bonneville Power Administration along the I-5 corridor.

**Award-Winning Projects**

We are proud to have played a role in a number of award-winning projects in 2016:
- The design-build team for the SR 520 Floating Bridge won the 2016 Design-Build Project/Team Award of Merit from the Design-Build Institute of America.
- ACEC gave a Bronze Best in State award to Reid Middleton’s team, which included GeoEngineers, for Ivar’s Pier 54 seismic upgrades in Seattle.
- ACEC gave a Silver Best in State award to the Allen Institute of Brain Science development team.

**Award-Winning People**

2016 brought new hires and new responsibilities for GeoEngineers’ Puget Sound geotechnical team:
- Mike Hutchinson (LG, LHG) took over as CEO in March of 2016.
- Teresa Dugger (PE), Lindsay Flangas (PE), Joel Purdy (LG, LHG) and Greg Landau (PE, GE), were promoted to associates.
- Joining GeoEngineers in 2016 were Glen Cope, Cora Johnson, Chelsey Gohr, Colton McInelly, Lucy Astorga, Jaclyn Bronner, Matt Blakeslee, Taylor Booker and Patricia Bennett.
- Eamaan Tabatabai, Tyler Coy, Carl Longton and Chris Newton all received their PE licenses in 2016.

To learn more about our award-winning people and projects, please visit [GeoEngineers.com](http://www.geoseattle.com).
We are thankful for the support of the geotechnical engineering community which allowed us to have a great 2016! We were fortunate to be included on many design-build where we could offer value added ground improvement solutions for issues ranging from organic soils to undocumented and contaminated fills to liquefiable soils. Our continued growth is a direct result of geotechnical engineers thinking outside of “the box” in order to come up with innovative and cost effective solutions for their clients. A special thank you goes out to the following geotechnical firms that included us on their projects: AMEC Earth & Environmental, Associated Earth Sciences, Carlson Geotechnical, Columbia West Engineering, Earth Solutions NW, GRI, GeoDesign, GN Northern, GeoEngineers, Geotech Consultants, GeoTest Services, Golder Associates, Hart Crower, Kleinfelder, PSI, Robinson Noble, Ins., Shannon & Wilson, Strata, Terra Associates, Terracon, and URS.

Our growth has been driven by continued increasing awareness of seismic performance of structures and liquefaction hazard by owners. We were fortunate to be included in the ASCE geotechnical committee tasked with providing discrete column ground improvement liquefaction recommendations. Many of our projects in 2016 included some form of liquefaction mitigation to varying degrees. The patented Geopier-Impact™ displacement system is perfectly suited to mitigate liquefaction hazards and provide foundation support by installing stiff Geopier® elements to depths of up to 50 ft. beneath the water table while creating no spoils and not utilizing air or water jetting during installation!

We have also seen our market for rigid solutions grow. Our offerings include Geopier-Armorpact, grouted Geopier-Impact and GeoConcrete Column rigid inclusions. These systems offer the same benefits of rigid inclusions with the additional benefits of the displacement process and compacted lifts which help improve the surrounding soil and in the case of Geopier-Armorpact, a confining HDPE shell. Many of our projects involving these rigid elements involve penetrating very soft/loose fill soils or organic soils beneath the groundwater.

We are looking forward to teaming with old and new professionals in 2017. Cheers to 2016 and we are excited about continued growth and exciting opportunities for ground improvement in 2017! If you would like to discuss potential projects or schedule a Geopier seminar please contact David Van Thiel, P.E., G.E., at dvanthiel@geopiernorthwest.com or (425) 646-2995.
Golder Associates Inc. (Golder) had a successful and productive 2016 with our Pacific Northwest geotechnical group working on exciting and challenging projects locally and worldwide.

Some highlights for Golder’s Redmond team include:

- Starting work on final design for Sound Transit’s Lynnwood Link project, as the prime geotechnical consultant for HNTB | Jacobs Trusted Design Partners.
- Performing analyses for City of Seattle’s Piers 62 and 63.
- Issuing the final report for WSDOT’s Coleman Dock project.
- Several high rise and other development projects in Seattle, Bellevue, Redmond, and surrounding areas.
- WSDOT design-bid-build and design-bid-build projects such as I-90 and I-405.
- Completing site-specific seismic analyses for projects located on 6 of the 7 continents in 2016. We completed our first probabilistic seismic hazard analysis (PSHA) for a site on the Antarctic Peninsula! We developed 2015 IBC-ASCE 7-10 parameters for an upgrade to US facilities there.

Golder is also excited about the addition of two geotechnical engineers to the team, Carly Schaeffer and Max Ros-siter. We also congratulate Kyle Obermiller, Hamidreza Nouri, and Feng Li on successful completion of PE licensing examinations.

Golder looks forward to a successful 2017 by continuing to work with teaming partners. We thank these partners for the opportunities to work together. Golder plans to continue growing our business with unique and rewarding project opportunities, and enhancing our relationships with our industry colleagues. For more information on our projects and Golder job openings, visit www.golder.com or call us at (425) 883-0777.
2016 was filled with many exciting projects, new hires, and promotions. David Winter was selected as our new president and CEO following the retirement of Mike Bailey in June. David has been with Hart Crowser for 26 years and we are really excited for a future guided by his ideas and leadership. Jeff Wagner was named COO and Garry Horvitz was promoted to Vice President. In Seattle, Michael Schmitz was added as an Associate and Andrew Makdisi, Barbara Thunder, Michael Chamberlain, and Jenna Jacoby were added as Senior Staff Engineers to our geotechnical group.

We opened an office in Honolulu, Hawaii and added Tim Lin as an Associate geotechnical engineer. Hart Crowser has partnered with WRK Engineers, Jay Raskin Architect, and ECONorthwest to form Salus Resilience. Salus offers resilience assessments, planning, and design among other services with the intent to reduce the impact of natural hazards on communities, organizations, and businesses. Allison Pyrch, who is based out of our Portland office, is a leader of Salus Resilience. To learn more about our people and projects visit www.hartcrowser.com.

**Notable projects in 2016 include:**

**Transportation**
- Sea-Tac Airport projects
- Mukilteo Multi-Modal Ferry Terminal

**Development**
- Expedia Campus at Piers 88 and 89
- The Mark (5th and Columbia) and First United Methodist Church Renovation
- Southport Office Buildings
- Maritime Building Seismic Upgrade and Addition

**Government**
- Port of Everett South Terminal Upgrade
- Port of Tacoma Pier 4 Reconfiguration
- Port of Seattle Terminal 5 Deepening and Crane Rail Upgrade
- Denny Substation
- US Navy projects

To go along with big projects, we performed several large load tests. We completed 9 statnamic load tests on a combination of instrumented concrete piles and open ended steel piles with some derived static resistances in excess of 3,000 kips at the Port of Seattle. At Sea-Tac Airport we recently completed a bidirectional load test on a 6.5-ft diameter drilled shaft with some very interesting results.

**Projects recognized by the industry for their engineering excellence include:**

State Route 167 Puyallup Bridge Replacement. ACEC Washington 2016 Washington Silver Award
South Waterfront Greenway Park. ACEC Oregon 2016 Honor Award
You Never See Our Best Work
but you have confidence in knowing we've been there.
With emphasis on “global strength with local focus”, Hayward Baker’s Seattle office celebrates its 30th anniversary of operations in the area, beginning in 1987. Globally in North America, Hayward Baker is supported by the Keller Group of companies, as shown below, providing all manner of design and construct services for Ground Improvement, Piling, and Excavation Support.

Locally, the Seattle office continues to offer design and construct services for Ground Improvement, to include Aggregate Piers and Stone Columns, Soil Mixing, Jet Grouting, Compaction Grouting, Chemical Grouting, Slurry Grouting, and Dynamic Compaction. In addition, recent emphasis upon structural solutions has been made to include Micropiles and Earth Retention.

Our design services continue to provide the local geotechnical and structural engineers with support to develop project specific documents for: 1) Conventional Design-Bid-Build work; 2) Design-Build work; or 3) Full Service work for the Owner. Several projects were undertaken within the past year in collaboration with local Geotechnical firms to address static and seismic settlement, lateral spreading, underpinning, and excavation support.

Local focus work over the past year has included project sizes of vast differences in scope and price, in part, to include:

Small – Grouting for sinkhole/catch basin remediation at Boeing Field; Aggregate Pier projects for commercial, residential, and nursing home development;
Moderate – Micropiles/Compaction Grouting building retrofit for the Navy; Stone Columns for a precast concrete facility and a large school expansion;
Large – Continuing work on the Seawall Retrofit, the largest Jet Grouting project in North America; Ground improvement design/build services for tank support in Edmonton, AB.

Management of Hayward Baker’s services in the Northwest includes Mike Blanding/Branch Manager, Mark Rohrbach/Senior Design Engineer, Adam Gerondale/Project Manager, Andrew Malinak/Project Manager, Drew Flack/Project Engineer, Dylan Fisher/Project Engineer, Jeff Pattison/Project Engineer, Taylor Cox/Field Engineer, Adam Horton/Field Engineer, and Mark Koelling/Senior Engineer. (206) 223-1732
2016 was a year of growth and refinement for HWA. We focused on our customers’ needs by improving our process and operations, updating our equipment and technology, and nurturing our new and continued relationships both internal and external.

We’ve had many proud highlights during this past 2016 year!

- We celebrated two weddings and two babies on the way.
- Zakeyo Ngoma joined the HWA team as a geotechnical engineer. He has over 15 years of experience and came from Puget Sound Energy.
- Worked on over 300 new projects including three United States Embassies around the globe.
- Performed over 2,700 laboratory tests across 120 different projects with over 85 different clients.
- Officially became certified as a minority and women owned firm.
- Our very own Donald Huling became the APWA Treasurer for 2017.
- We held our 2nd Annual Client Appreciation Party celebrating the many wonderful clients, partners, and colleagues we have the pleasure of working with.

The HWA full service laboratory supported its clients in a myriad of projects, ranging from Municipal and federally funded roadway and pavement improvement programs, regional light rail improvements, storm water management facility design, and for the design of U.S. Embassies in Colombo, Sri Lanka and Hyderabad, India. Our construction inspection group led by Bret Salazar continues to grow at a steady pace with new projects focusing on WSDOT and Sound Transit.

For the year ahead, our dedication to our clients, quality of service, and giving back to the community will be our top priority. We thank the many wonderful clients, partners, and colleagues who help to let us follow our passion

About HWA
HWA is a Minority and Women Owned Business that provides our geotechnical engineering and geoenvironmental expertise on projects across the Pacific Northwest and abroad. Since 1978, our technically skilled team of engineers, geologists, environmental scientists, construction inspectors and laboratory technicians have been helping to create a better, safer, more sustainable environment. Our technical expertise and team approach puts our clients first and helps them confidently meet their project goals with cost-effective solutions.

Specialized areas of focus:
- Geotechnical Engineering
- Pavement Engineering
- Geoenvironmental
- Construction Inspection
- Materials Testing
Kleinfelder’s Redmond team had a busy 2016 working on local projects as well as assisting other Kleinfelder offices on national and international projects. Some favorites include:

- 39 Story hi-rise in Seattle
- Multiple slope stability assessments in Kirkland
- Multiple retaining wall assessments in Bellevue
- Southern Gateway Design-Build Project in Dallas
- Boulder City Bypass in Nevada
- 15 story mid-rise near the Sculpture Park in Seattle
- Excavation shoring and dewatering design for site remediation in Saskatchewan
- New Costco warehouses and retaining walls on challenging sites in Redmond and Bellingham
- Sierra Madre Dam Access Road in California
- Site development and foundation design for commercial development on highly expansive soils in Saskatchewan
- Multiple bridge and road projects requiring rock engineering in Massachusetts
- An eight-story parking garage in Issaquah
- A datacenter
- SeaTac Airport apron improvements and repairs

Michael Magnan joined our group as a staff engineer and is busy working on a wide variety of projects including test pits, drilling, shoring and slope stability analyses. Chad Lukkarila continues in his role as a national resource for Kleinfelder and Engineering Geology Service Line Director. David Cotton continues to provide technical and strategic leadership for local commercial and transportation projects. Marcus Byers remains busy working in the NW as well as western Canada on a variety of commercial and municipal projects.

Kleinfelder is ranked 48th on ENR’s Top 500 Design Firms list and 93rd on ENR’s Top 150 Global Design Firms.
Landau Associates’ geotechnical team was busy in 2016 with public works and private development projects, and 2017 looks to be another busy year. Landau Associates hired Daniel Simpson, PE as a Senior Project Engineer, promoted Lance Levine, PE to Project Engineer, and Ben Ford, EIT to Senior Project EIT. Interns Annabel Warnell, EIT and Brandon Mowrey, EIT were promoted to Staff EITs (both passed their EIT exams this year), and Devan Brandt passed his GIT exam and was promoted to Staff GIT.

In Olympia, Calvin McCaughan, PE worked on several transportation and landslide mitigation projects for local city and county government, supported design and construction of water and sewer improvement projects throughout Western Washington, assisted local school districts with design and construction of many K-12 facilities, and provided design consultation for development projects throughout Thurston County. Craig Jordan, PE provided geotechnical services for transportation improvement projects, including bridges in Thurston County, Kent, and Tukwila. Craig is also working on several K-12 projects and provides peer review services for local government. Lance Levine, PE completed geotechnical investigations for K-12 projects, senior living facilities, and public transit facilities. He also provided construction monitoring for K-12 projects throughout Western Washington. Ben Ford, EIT worked on several public utility projects including Southwest Suburban Sewer District’s Salmon Creek wastewater treatment plant improvements project and pump stations for Kitsap County and City of Lacey. He also worked on several K-12 projects, and stormwater improvement projects for City of Olympia, City of Lacey, and Thurston County. Annabel Warnell, EIT managed services for the Hoodsport Hatchery Raceway Replacement project and contributed construction monitoring and drilling oversight services to various projects. Brandon Mowrey, EIT spent a lot of time in the field doing construction monitoring on a variety of projects all over Western Washington.

In Edmonds, Steve Wright, PE worked on a number of transportation improvement projects, including the City of Bellevue’s Mountains to Sound Greenway Trail project. Steve also continues to work on data center projects throughout the West and manages on-call geotechnical engineering contracts with the counties of Island and Snohomish and the cities of Edmonds, Poulsbo, and Shoreline. Chad McMullen, PE wrapped up a large equipment foundations project for a local aerospace manufacturer, shored up an important regional communications vault above a troubled subgrade, and completed an extensive soil and rock exploration program for a large electrical transmission line project near Wenatchee. Daniel Simpson, PE has been involved with landslide analysis and mitigation projects for Island and Mason counties. Sean Gertz, EIT, Brian Christianson, LEG and Devan Brandt, GIT provided field exploration, construction monitoring, and laboratory testing services for a variety of projects, including numerous roadway and utility improvement projects. Dave Pischer, PE semi-retired last year, but continues to work on projects on an as-needed basis.
Malcolm Drilling is the leading drilled foundation contractor in the United States. We provide geotechnical construction services including: drilled shafts, excavation support systems, micropiles, cutoff and secant pile walls, chemical grouting, jet grouting, deep soil mixing, Cutter Soil Mixing, stone columns, underpinning, and dewatering. These services have been applied on complex and technically challenging projects throughout North America. Malcolm Drilling continues to grow, expanding its expertise and geographical reach. Our continued investment in equipment and personnel is instrumental in keeping Malcolm the most sought-after, full service geotechnical contractor in the US.

Based in San Francisco, California, with offices throughout the western United States, Malcolm has expanded to the Southeast US, with our office in Miami; and the Great Lakes, with our newest office in Milwaukee, Wisconsin. We are actively pursuing work throughout the US and Canada. Malcolm continues to expand its fleet of equipment, the most extensive fleet of state-of-the-art drilling equipment in the United States. Our fleet includes two of the world’s largest top-drive crawler-mounted drill rigs (Bauer BG-50), the world’s largest casing oscillator (3.8m OD Leffer VRM3800) capable of drilling 12 ft diameter holes in excess of 300 feet deep, down to limited access and low overhead equipment, capable of passing through interior doorways. We continue to upgrade and replace our fleet of top-drive drills and support equipment, keeping it the most advanced in the world.

Some of our notable recent projects completed or acquired include:

- **North Meyers Road Bridge Replacement**, Toppenish, WA - 10’ OD Drilled Shafts.
- **970 Denny Way**, Seattle, WA - Soldier piles & lagging, tiebacks, soilnails, bracing.
- **IA-100 Bridge at E. Avenue**, Cedar Rapids, IA – Secant pile wall for new highway bridge.
- **I-90: Hyak to Snowshed** – 178 ea. 3’ to 8’ ID Drilled Shafts, Soil Nails.
- **UW Life Sciences Building**, Seattle, WA – 21,000SF soldier pile & lagging shoring.
- **AML Mine Grouting** – Reliance, WY – Grouting & backfilling abandoned coal mines.
- **Theatre Building** - Seattle, WA – Compaction grouting, underpinning to preserve Historic Building.

Malcolm continues to advance geotechnical construction through active participation in ADSC, DFI, the Geotechnical Institute and ASCE. For assistance with conceptual design and budgeting, please contact John Kvinsland (jkvinsland@malcolmdrilling.com), for Construction Dewatering contact Matt Kennedy (mkkennedy@malcolmdrilling.com). For a complete list of our services and contact details please visit our website (www.malcolmdrilling.com).
2016 was a year of significant growth for McMillen Jacobs Associates in the Pacific Northwest – our Design-Build team was selected for Sound Transit’s E360 (SR 520 to Overlake Transit Center) contract, we submitted the 60% design packages on both Seattle Public Utilities’ (SPU) Ship Canal Water Quality Project - Tunnel Storage and Metro Vancouver’s Second Narrows Water Tunnel project, and continued to lead Seattle City Light’s Multidisciplinary Engineering Services team. Work is also continuing on Translink’s Broadway SkyTrain Extension in Vancouver, and SPU’s 3rd Avenue West Tunnel Water Main projects.

The Railroad Services Group worked on numerous railroad siding extensions for capacity improvements for BNSF and UPRR as well as providing design services on the Washington State Parks and Recreation’s Tunnels Repairs project. Geotechnical and rock engineering included emergency response for rockslides, site characterization, rock mechanics (stability assessment, rockfall mitigation, reinforcement design); geotechnical site characterization and design of road beds, retaining walls, causeways, and bridge foundations; assessment and repair of tunnels, including liners, portals and drainage employing shotcrete and rock anchors; and blasting consulting.

McMillen Jacobs Associates celebrated the opening of University Link with Sound Transit in March 2016, while work on the Northgate Link Extension continued to move successfully forward. Tunneling was completed, and cross-passage/invert/walkway work is well advanced. In addition, design of the three stations on the alignment: U District, Roosevelt, and Northgate, was completed and moved forward into construction, with the first two stations being delivered using GCCM delivery methods.

Our Construction Management (CM) Division continued work on Sound Transit’s East Link Bellevue Segment Construction Management Consultant Services and the Alaskan Way Viaduct Replacement Program.

Key hires in the Seattle office in 2016 include James Wonneberg, Lead Associate; Brian Lausch, Lead Associate; Paul Fikse, Project Engineer; Jennifer West, Senior Staff Engineer; Morgan Vane, Staff Geologist; Elizabeth Carnogursky, Staff Engineer; Tom Hartman, Inspector; Joseph Toal, Inspector; Raina Gray, Project Control Administrator; and Melanie Owings, Project CAD. The Vancouver office continued to grow as well with Marco Moccichino, Associate; Edwin Policarpio, Senior Staff CAD; Kevin Ruston, Project CAD; and Jake Facey, Staff Engineer all joining, resulting in an office move to a larger space in November 2016.

www.seattlegeotech.org
Pacific Pile & Marine, LP (PPM) is a heavy civil and marine infrastructure group based in the Pacific Northwest. Our team specializes in logistically demanding construction, such as remote and/or difficult to access sites, environmentally sensitive areas, and seasonal restrictions and/or accelerated schedules. Our safety record is one of the best in the industry and a cornerstone of our business.

PPM excels in over-water construction and deep foundation systems and shoring. Our in-house capabilities make us especially well-suited for alternative contract delivery such as design-build and GC/CM services. Our construction portfolio includes various driven and drilled pile foundations including drilled sockets, rock anchors, augercast piles, sheet pile, access trestles, and shoring along with specialty services such as emergency response and marine salvage services. Headquartered in Seattle, WA, PPM operates throughout the Western United States and British Columbia.

In 2016, PPM was involved in some of the most recognizable projects in the Puget Sound Region including the SR 520 Montlake to Evergreen Pt. Bridge West Approach Bridge North for WSDOT, the Elliott Bay Seawall Replacement Project for the City of Seattle, and various other projects along the region’s waterfront. PPM also completed some critical projects in Alaska including the Kodiak Pier 3 Replacement project for the City of Kodiak, Kodiak Ferry Terminal for the Alaska Dept. of Transportation and Alaska Marine Highway System, and Chignik Public Dock, also for the Alaska Dept. of Transportation.

A few other projects of note include the Lower Duwmaish Waterway Pilot Study involving environmental capping with placement of ENR and ENR+activated carbon materials to evaluate the effectiveness as a remedial sediment cleanup measure and the Swan Lake Reservoir Expansion project raising the capacity of a hydroelectric facility in a remote area of Ketchikan, AK including the installation of a Austrian design and sourced flashboard system.

In 2016, PPM added the following key personnel:

- Jacob Zacharda as a Senior Estimator. Jacob brings 14 years of heavy civil construction experience focused in bridge and deep foundation construction.

- Jack Stockman as a Field Engineer. Jack graduated with a BS in Construction Engineering from Montana State University and previously interned with PPM.

For more information, we invite you to visit our website: www.pacificpile.com. If you have a project you would like to discuss in more detail, please contact us direct at 206.331.3873.
Seattle Public Utilities (SPU) Geotechnical Engineering is responsible for completing geotechnical studies to support design and construction of City capital improvement projects, as well as operations and maintenance projects. We also perform special studies and technical consultation for various City activities. The Group provides geotechnical services to many City departments, mainly SPU, Seattle City Light, Seattle Parks and Recreation, and Seattle Department of Transportation.

The group is led by Juan Carlos Ramirez, P.E., Geotechnical Engineering Supervisor. Our staff includes Megan Higgins, P.E and Sean Caraway, P.E., Senior Geotechnical Engineers, Aaron Clark, L.G., Senior Geologist, Hilja Welsh, Associate Geotechnical Engineer, and Keishi Hashimoto, Associate Geologist. We also get part-time assistance from Natasha Howe, Student Intern (SU).

The SPU Geotechnical Engineering Group has continued involvement in high profile SPU projects, such as the North Transfer Station and South Transfer Station Phase II, and a large slope stabilization study at the Tolt Watershed. We continue to work on multi department/agency projects such as the Street Car Center City Connector, Lander Grade Street Separation, and the Ship Canal Water Quality Project. During 2016, we also worked on various phases of a range of facility improvement projects for Seattle City Light, Seattle Parks and Recreation and Seattle Department of Transportation.

We are happy to be challenged by increasingly interesting projects for the City. We actively seek continuing education opportunities, and appreciate the efforts of the local ASCE Section Geotechnical Group in providing us with accessible professional lectures and seminars.
GEOPIER IS GROUND IMPROVEMENT®
Delivering cost-effective, reliable, engineered foundation systems

PROVIDING CUSTOMIZED SOLUTIONS FOR ALL SOIL TYPES

SEND US YOUR PROJECT DATA
Let our geotechnical engineers customize a solution that meets your needs. Submit your project details to receive a feasibility assessment and cost estimate at geopier.com/feasibilityrequest

For more information call 800-371-7470, e-mail info@geopier.com or visit geopier.com.

Geopier’s goal is to bring you advanced, innovative ground improvement technology in a way that is easy to use every day. Geopier Rammed Aggregate Pier® and rigid inclusion products enable you to:
- Improve variable fill soils in place
- Replace deep foundations
- Control settlement
- Increase soil bearing capacities

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Shannon & Wilson had a successful 2016 filled with challenging new projects, new hires, and steady growth and is off to a great 2017.

**2016 Project Highlights**
Shannon & Wilson has been involved in several exciting and diverse projects throughout the nation. Some notable projects included:

- **Fir Island Farm Estuary Restoration, the Nooksack River System Wide Improvement Framework, and the Smith Island Restoration Project: Key Personnel** – Dave Cline, Chris Robertson, Brian Reznick, Jason Garner, Chris Helland, Chad Krofta, Stephen Thomas, Sarah Corbin, Kerem Kalkay, Katie Walter
- **Montlake Triangle and Lower Rainier Vista Pedestrian Bridge: Key Personnel** – Martin Page, Kevin Wood
- **Honolulu Rail Transit Project (HRTP) - Airport Segment: Key Personnel** – Hisham Sarrieddine, Milan Radic, Bruce Reynolds, Monique Andersen, and Gerard Buechel
- **The Yakima Grade Separations: Key Personnel** – Mike Harney, Will Hultman, Hisham Sarrieddine, and Jim Wu
- **SPU Henderson CSO: Key Personnel** – Mike Harney, Red Robinson, Jake Dafni, Ben Warren, Sam Sideras, and Erik Blumhagen
- **Trans Alaska Pipeline Mainline Refrigeration Unit 2 and Milepost 17.99 Excavation Stabilization: Key Personnel** – Wendy Mathieson, Erik Blumhagen, and Oliver Hoopes
- **Chehalis Basin Flood Study: Key Personnel** – Bill Laprade, Erik Scott, Rex Whistler, Jorge Avalos, and Stan Boyle

**2016 Project Awards**
Shannon & Wilson has been fortunate enough to be involved in multiple award winning projects in 2016:

- ACEC of Washington Platinum Engineering Excellence Award for Structural Systems **Port Mann Bridge/Highway 1** (national finalist), Surrey, BC
- ACEC of Washington Gold Engineering Excellence Award for Structural Systems **Tilikum Crossing** (national finalist), Portland, OR
- ACEC of Washington National Silver Engineering Excellence Award for Special Projects **Mercer Corridor Improvements**, Seattle, WA
- ACEC of Washington Gold Engineering Excellence Award for Complexity **University of Washington Montlake Triangle and Rainer Vista**, Seattle, WA
- ACEC of Washington Silver Engineering Excellence Award for Future Value to Engineering Profession **City of Yakima Railroad Grade Separation**, Yakima, WA
- ACEC of Washington Silver Engineering Excellence Award for Complexity **State Route 520 Pontoon Casting Facility**, Seattle, WA

Shannon & Wilson is excited to have expanded into the Washington D.C. metro area and looks forward to assisting our valued clients in the Northwest and Nationwide on more interesting projects throughout 2017.
The combined SIXENSE (formerly SOLDATA) offering is world-class excellence in digital services and monitoring solutions. We specialize in infrastructure, soil, and the environment. As a group, SIXENSE aims to provide integrated support to designers, builders, operators and municipalities to help them to successfully deal with monitoring based risk management, construction based project management, and life cycle asset management. The SIXENSE group operates in 20 countries, with over 600 employees worldwide. Our local office based in Seattle houses approximately 20 employees working in the Pacific Northwest and beyond.

SIXENSE brings engineers and designers the data required to make informed decisions through construction, concession and demolition of a building or structure.

We’ve had many exciting projects locally and throughout the country this year, with many more to come in 2017. For some details on our monitoring systems on two local projects, see YouTube: ‘Soldata SR99’ and ‘Soldata N125’.

We strive for repeat business through a commitment to quality and customer satisfaction shared culturally throughout the group. This culture has allowed us to work on many exciting projects throughout the United States and Canada. For more information, contact General Manager Loic Galisson.

**2016 Sixense Project Work:**

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<thead>
<tr>
<th>Project</th>
<th>Owner</th>
<th>Location</th>
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<tbody>
<tr>
<td>Alaskan Way Viaduct Replacement</td>
<td>WSDOT</td>
<td>Seattle, WA</td>
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<tr>
<td>SR-520 Floating Bridge and Landings</td>
<td>WSDOT</td>
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<td>Northgate Link Extension (N125)</td>
<td>Sound Transit</td>
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<td>Miramar Water Treatment Plant</td>
<td>San Diego City</td>
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<td>Oceanwide Towers</td>
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<td>Venice Dual Force Main</td>
<td>City of Los Angeles</td>
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<td>Miami Ferry Terminal Upgrade</td>
<td>Port of Miami</td>
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<td>Virginia Ave Tunnel</td>
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<td>Champlain Bridge SHM</td>
<td>JCCBI</td>
<td>Montreal, QC</td>
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<tr>
<td>Ohio River Bridge</td>
<td>WVB EEP, LLC</td>
<td>Louisville, KY</td>
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</table>
SubTerra, Inc. completed our 25th year in business with tunneling, blast engineering, and geotechnical instrumentation projects throughout the US, Canada, and Israel.

Sub-T-Engineers Ltd, our Israeli sister company completed a building damage assessment and an instrumentation tender for the Turkish Alignment of the Tel Aviv Metro which will start construction in early 2017. We furnished the design for the tunnel connection to and enlarging the high pressure shaft for the 340MW Gilboa pumped storage project and were appointed as the Statutory Underground Designer for the 340MW Kochav Ha Yarden pumped storage project in northern Israel (working for the EPC Contractor, Sino Hydro). We continued to provide blast engineering services in Haifa and in Jerusalem. Both Chris Breeds and Brian Ages are registered Engineers in Israel.

Locally, we completed blast engineering services for the Box Canyon Dam in Ione, WA where blasts were detonated within ten feet of the existing powerhouse. We also worked as the Blasting Consultant on the Diversional Dam in Snohomish County where 2 MS spaced electronic delays were used to break rock inside and beneath the spillway with blast holes located within two feet of existing structures.

We continued to provide automated Geotechnical Instrumentation and Vibration Monitoring for WSDOT’s I-90 road widening project at Hyak, the Lake Barkley Bridge in KY, and the shafts for the Rainier Wet Weather Storage project on MLK in Seattle.

Tunnel services were provided to Poseidon resources for conveyance tunnels on the first major seawater desalination project in Carlsbad, CA. We also completed design and construction management services of our second large diameter (38-ft) tunnel in Bellevue between Lincoln Square and Lincoln Square Expansion which was a Design Build led by Northwest Boring. The tunnel was built between parking levels P4 and P5 and included a WISKO water proofing membrane.

Microtunneling services were provided for several projects in Oregon and Washington as well as for the Fremont Syphon project in Seattle which was successfully completed in 2016.

Active mine subsidence work included monitoring our design for re-ballasting a 2,500-ft length of UPR track that was subjected to longwall induced, differential subsidence of 84-inches over a period of six weeks while maintaining daily railroad traffic.

Thanks to all our Clients! SubTerra, Inc. is a registered small business providing services directly to Owners and Contractors and as a teamed Subcontractor on Engineering Design and Construction projects. Please visit our website at www.subterra.us. Thank You.
The big news for Terracon in 2016 was acquisition of Mayes Testing Engineers. With the 2015 acquisitions of RGA Environmental and Argus Pacific, the combined Seattle and Tacoma offices of Terracon now total more than 170 staff members. On a national level, we have grown to more than 3,500 employees in 130 offices and advanced to No. 32 in the Top 500 Design Firms list.

The Seattle geotechnical department, managed by Dr. Dave Baska, is one of a handful of technical resource centers within Terracon. The distinction translates to high-level technical analyses including shoring design (Richard Luark’s group), transportation and infrastructure (Dennis Stettler’s group), earthquake engineering, and numerical analyses for all of Terracon’s offices. Jim Schmidt’s presence in the Seattle office as Terracon’s National Director of Transportation certainly helps our stature as the go-to office.

Our local geotechnical/shoring projects in 2016 included the following:

- Nalley Valley (I-5/SR-16) Interchange
- UW Computer Science Building
- Northgate and Alderwood Mall Additions
- Kirkland Park Lane
- Capitol Lake Dam
- Kent-Auburn Conveyance System

Local Terracon projects in 2017 will include the Washington State Convention Center expansion, two 41-story mixed-use towers with below grade parking for 1,300 vehicles at 1120 Denny Way, and pursuit of the Puyallup River Bridge (I-5 Southbound) design-build project.
It was a busy and exciting year for the University of Washington Geotechnical Engineering Group that included hiring two new faculty members, a host of honors, and award of a major new research center.

**New Faculty**
We welcome two new faculty—Brett Maurer and Mike Gomez—to the group. Brett arrived in January from Virginia Tech, where he completed his Ph.D. focusing on geotechnical earthquake engineering. Mike will arrive this March from UC Davis, where he completed his Ph.D. focusing on bio-mediated soil improvement. The addition of these two new faculty members will greatly increase and expand the capabilities of our group, and we are excited to have them. Profiles of Brett and Mike can be found at: [http://www.engr.washington.edu/facresearch/newfaculty2016](http://www.engr.washington.edu/facresearch/newfaculty2016).

**Faculty Honors**
- Pedro Arduino and co-authors from the University of Washington received the best paper prize from the international geoenvironmental research journal Acta Geotechnica. The paper was one of the most cited papers published in Acta Geotechnica in 2015.
- Michael Gomez and co-authors from UC Davis and Geosyntec Consultants were honored with a 2016 Telford Premium Journal Prize from the Institution of Civil Engineers (ICE) for their publication “Field-Scale Bio-Cementation Tests to Improve Sands,” which was published in the ICE Ground Improvement Journal.
- Steve Kramer was honored with the 2016 Nigel Priestley Prize by the EUCENTRE in Pavia, Italy, and is the first geotechnical engineer to receive the award. The award honors individuals who have demonstrated excellence in innovation, creativity, research and education in earthquake engineering and engineering seismology.
- ASCE awarded Brett Maurer and co-authors from Virginia Tech and the University of Canterbury, New Zealand, with the 2016 Norman Medal for their publication “Evaluation of the Liquefaction Potential Index for Assessing Liquefaction Hazard in Christchurch, New Zealand” which appeared in the ASCE Journal of Geotechnical and Geoenvironmental Engineering.
- The Geological Society of America (GSA) awarded Joe Wartman and his colleagues from the GEER Oso landslide research team with the Edward Burwell, Jr. Award. The award, which is GSA's highest honor in engineering geology, honors the GEER team’s investigation of the Oso, Washington landslide (http://www.washington.edu/news/2016/07/15/joseph-wartman-david-montgomery-honored-for-oso-landslide-report/).
**New RAPID facility**

In September, NSF selected the UW to develop and host a new $4.1 million Post-Disaster, Rapid (“RAPID”) Response Research Facility. The facility will provide the necessary instrumentation, hardware and software tools, and research services to collect and assess critical post-disaster data, with the goal of reducing physical damage and socio-economic losses from future events. Joe Wartman serves as the Principal Investigator and Director of the facility. More information about the global facility, including videos demonstrating its advanced virtual reality tools, can be found in an article published in the Seattle Times: www.seattletimes.com/seattle-news/science/uw-will-host-global-center-for-disaster-reconnaissance-research/

**Faculty Activities**

Pedro Arduino continued his research work in computational geomechanics with emphasis in meshless techniques, constitutive modeling and earthquake engineering problems. Over the last year he has been active in the recently funded NHERI Cyberinfrastructure DesignSafe and SimCenter centers. He made invited presentations at the PEER Annual Meeting, ASCE EMI conference, and was the keynote speaker at the First International Material Point Method Conference (MPM2017) in Delft, Netherlands. He also continued his service activities as Associate Dean of Infrastructure for the UW College of Engineering.

Steve Kramer continued his research work on the multi-disciplinary M9 research project and on the PEER Next Generation Liquefaction (NGL) project he is co-organizing with Jon Stewart of UCLA. He also gave several invited lectures including the ASCE Geo-Structures Congress in Phoenix, the GEDMAR conference in Kyoto, Japan, the SO-CHIGE conference in Valdivia, Chile, and was the geotechnical keynote speaker at the recent 16th World Conference on Earthquake Engineering in Santiago, Chile.

Joe Wartman was awarded a new FHWA/Pactrans-supported project “Resiliency in the Face of a Changing Climate,” which will study the influence of climate fluctuations on rock-slope stability in Alaska. Joe also continues his USAID work on geohazard risk assessment in Lebanon and his NSF projects on regional-scale landslide risk assessment and the effects of a Cascadia earthquake. He presented a keynote talk at a recent landslide risk assessment workshop in Canada and published papers in the journals *Engineering Geology, Geomorphology, Remote Sensing*, and *Landslides*.
Career Opportunities

Kleinfelder’s Redmond office is busy and growing! We are seeking a Project to Senior level Geotechnical Engineer to join our team and take their career to the next level. We have been providing geotechnical services in the Pacific Northwest for over thirty years and have built a fantastic local client base in municipal, industrial, technology, transportation, and commercial market sectors. We offer a collaborative team environment and opportunities for mentoring, professional development, and interaction with Kleinfelder’s national team of geotechnical subject matter experts.

The ideal candidate will possess a WA PE, a MS in Geotechnical Engineering, a minimum of 10 years of related experience, at least 5 years of project management experience, and at least 2 years of experience supervising a team. Project experience in the Pacific Northwest and Western Washington is key, along with strong analytical skills in multiple subject areas including seismic hazard analysis, slope stability evaluation, earth retention systems, deep foundation design, and ground improvement techniques. Knowledge of transportation and multi-story building infrastructure, drilling operations, heavy civil project design, and construction are preferred. Strong communication skills are required, including oral and technical report preparation and review. Environmental site assessment experience is desired but not required.

This person will be responsible for managing all phases of project delivery with a team of geoprofessionals including proposing, planning, and executing technical work. This person will work with our team to identify, propose, and develop work with new and existing clients. They will manage a diverse portfolio of work, direct project teams, and mentor staff.

Kleinfelder is an employee-owned engineering and science consulting firm providing solutions to meet our world’s complex infrastructure and natural resource challenges.

Kleinfelder has nearly 2,000 employee-owners with offices nationwide and abroad. With over 50 years of experience, Kleinfelder’s reputation for providing innovative, commonsense solutions to the most complex challenges has solidified its status as a trusted partner to its global clients and a leader in the industry. Kleinfelder offers an excellent compensation and benefits package including medical, dental, vision, life insurance, 401(k) plan, and paid holidays.

Kleinfelder is an Equal Opportunity Employer – Minorities/Women/Disabled/Veterans (Compliant with the new VEVRAA and Section 503 rules)
To find out more about us, please contact: Rick Della / rdella@kleinfelder.com / (425) 636-7900

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