



Liquid storage tanks

- Tank-ready foundation support
- Settlement control
- Liquefaction mitigation
- Foundation rehabilitation
- Re-leveling



**200
million+**
BARRELS STORED

WHY CHOOSE KELLER?

- North America's leader in tank specialty foundation construction
- Design, management, and field staff experienced in geotechnical construction services for planned or existing tanks
- The most complete suite of geotechnical construction techniques to provide the long-term foundation performance required by API
- Over 30 regional offices with yards across the country to respond quickly and efficiently
- An extensive fleet of equipment and specialty tooling to address various geologic and logistical conditions
- In-house designed DAQ systems to document performance and provide industry-leading quality assurance
- Part of the connected companies of Keller with direct access to the largest centralized geotechnical construction knowledge base in the industry.

LIQUID STORAGE TANKS

Tank foundation services for new construction and remediation

Keller has supported tanks on improved ground and repaired tanks built on unsuitable ground conditions for decades, meeting demanding schedules and delivering on time. Whether the challenge at a site is unacceptable settlement, insufficient bearing capacity, or liquefiable soils with a planned or existing tank, Keller provides on-time design-build foundation solutions that meet the American Petroleum Institute (API) performance criteria and supply long-term performance of any demanding tank project.



Safety is critical to all operations at Keller. The ultimate goal of our global THINK SAFE program is zero incidents. Our crews begin each day with a daily site hazard analysis meeting in which hazards related to the specific tasks being performed that day are identified and the required safety measures to avert an incident are implemented.





PRE-CONSTRUCTION GROUND IMPROVEMENT

BUILDING TANKS ON UNSUITABLE GROUND—Faster and lower-cost ground improvement techniques are often the preferred option. Whether you are dealing with highly compressible soils that will produce unacceptable settlement, soils that can liquefy during a seismic event, or slowly consolidating soils that will delay your construction schedule, just ask Keller. Chances are we have designed and constructed a pad-ready ground improvement system in similar soils for an aboveground storage tank (AST) project similar to yours.

6,000,000 BARRELS GREATER HOUSTON AREA



The variable soil conditions in the greater Houston area provide site-specific challenges that require various techniques to ensure acceptable tank settlements. Keller has enabled construction of tanks up to 225 ft. in diameter and 60 ft. high in this area, on soils ranging from uncontrolled fill to soft clay.

3,600,000 BARRELS EDMONTON, AL, CANADA



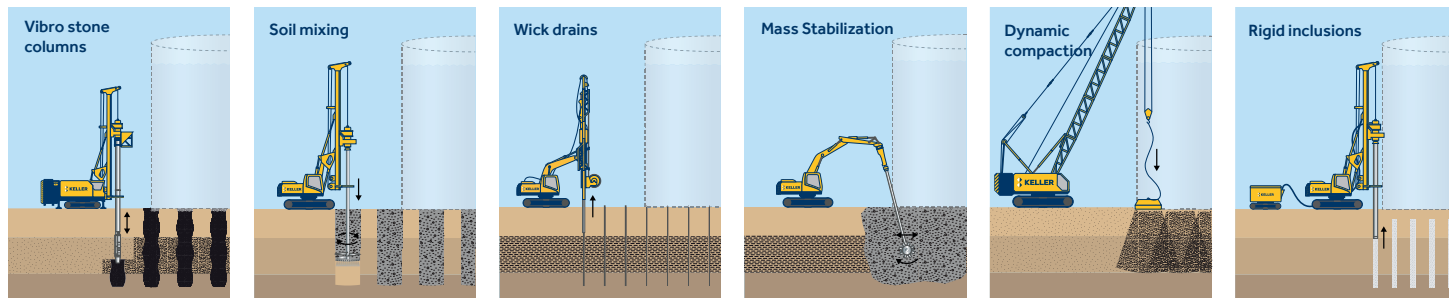
The site of a planned tank farm expansion was underlain by variable layers of fill, organics, and clays underlain by glacial till. Keller designed and constructed soil mix columns overlain with load transfer platforms to increase bearing capacity and control settlement for the ten planned 70 feet high and 150 to 200 ft. in diameter tanks.

1,500,000 BARRELS SOUTHERN FLORIDA



Eleven 125-foot-diameter tanks, and two 100-foot-diameter fuel storage tanks were plan on a former coastal marsh area reclaimed for industrial development. Keller designed and constructed an innovative and economical mass stabilization solution that strengthened the soft soils in place to support the new tanks.

Typical pre-construction techniques



POST-CONSTRUCTION FOUNDATION REMEDIATION

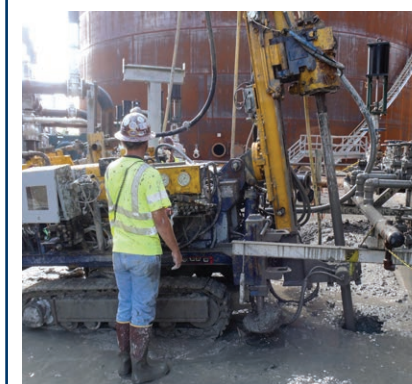
REPAIRING EXISTING TANKS EXPERIENCING UNACCEPTABLE SETTLEMENTS—Settlement of existing tanks can be remediated economically with specialty grouting and piling techniques that offer limited access constructability, pinpoint treatment, void filling and floor and shell lifting, and re-leveling. Keller understands that empty tanks represent lost revenue. Our experienced crews can mobilize fast and work quickly and safely, helping to minimize the owner's losses.

COMPACTION GROUTING FOR TANK STABILIZATION AND RE-LEVELING



Keller has designed and constructed compaction grouting treatment programs to relevel and stabilize small to large diameter ASTs at multiple facilities. When faced with difficult access or out-of-plane foundations, compaction grouting offers an economical solution to allow your tank to store product again.

JET GROUTING FOR AST PERIMETER STABILIZATION



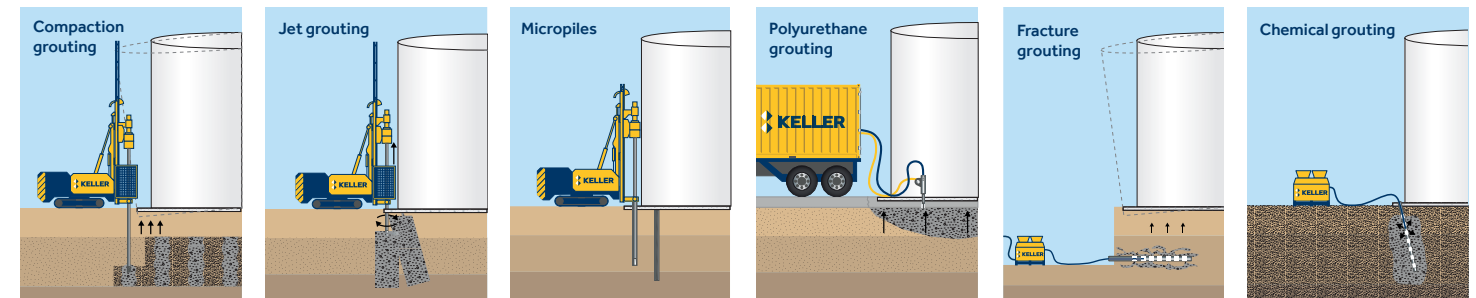
Keller has designed and constructed jet grouting perimeter treatment programs for multiple clients to successfully stabilize settling large-diameter ASTs against shear failure. In some cases, Keller also designed and constructed an injection program to re-level tank floors, reinstating the tanks to operating condition.

MICROPILES FOR FOUNDATION RETROFIT



Keller has designed and constructed micropile programs to provide a stable foundation for distressed tanks at petroleum storage and industrial facilities. Our compact equipment permits construction at limited access sites. Besides soft soil sites, micropiles are also effective for tanks constructed over karst (sinkhole) sites.

Typical post-construction techniques





QUALITY CONTROL

Quality control is critical to a successful tank foundation project. Keller's data acquisition (DAQ) systems enable optimal management of quality control during ground improvement projects.

We have developed the most advanced DAQ systems to support our technologies, thus providing our clients with the most reliable foundation systems in the industry.

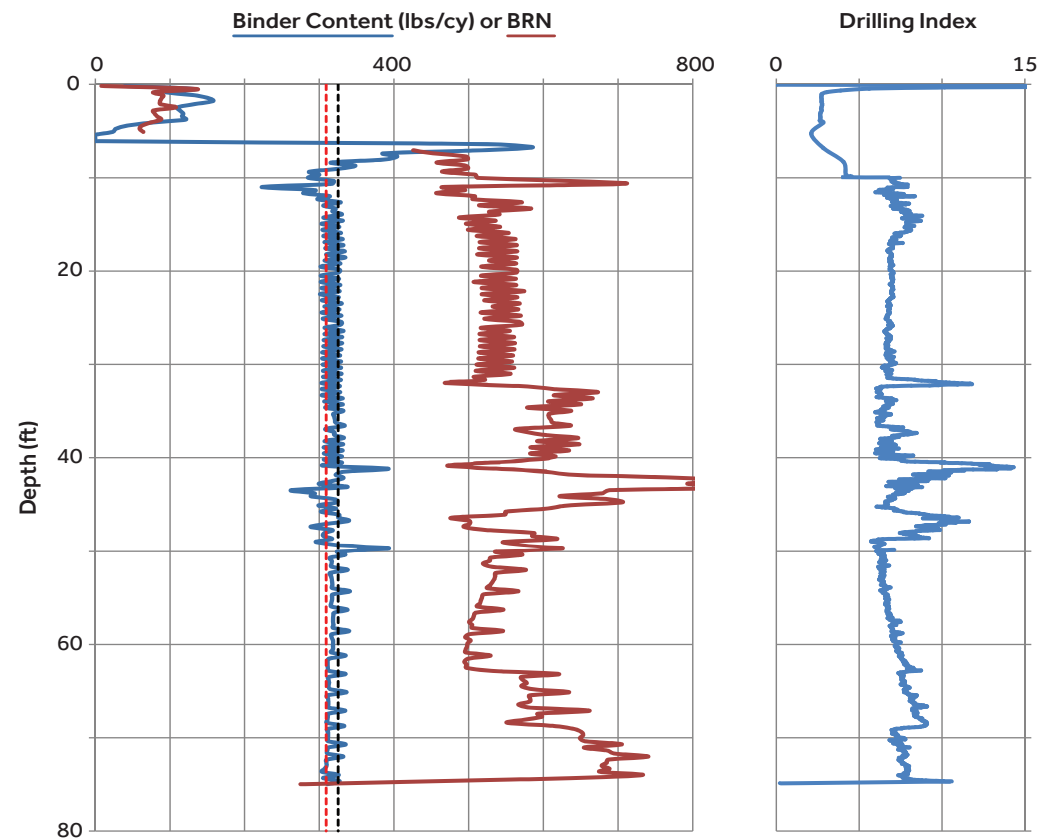
Our proprietary hardware and software records and controls the construction process in real time, helping to ensure that your tank foundation system is built as designed.

Comprehensive quality control programs comprised of traditional procedures and methods are also incorporated in our foundation projects to ensure that the process and materials are as designed.

Load carrying elements such as vibro replacement stone columns, aggregate piers, soil mix columns, jet grout columns, and micropiles can also be load tested to industry standards to verify their capacity.

Keller completes the tank foundation installation with monitoring of the hydrotest to ensure compliance with design standards.

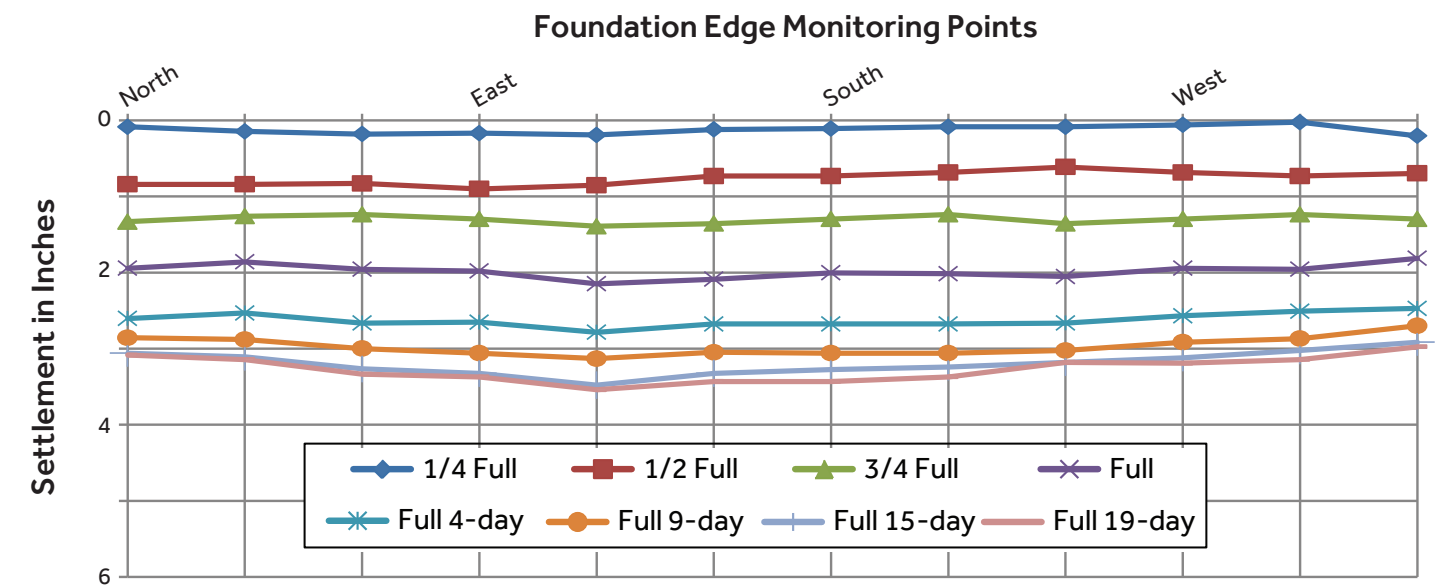
DAQ log of wet soil mix column installation as part of an AST foundation



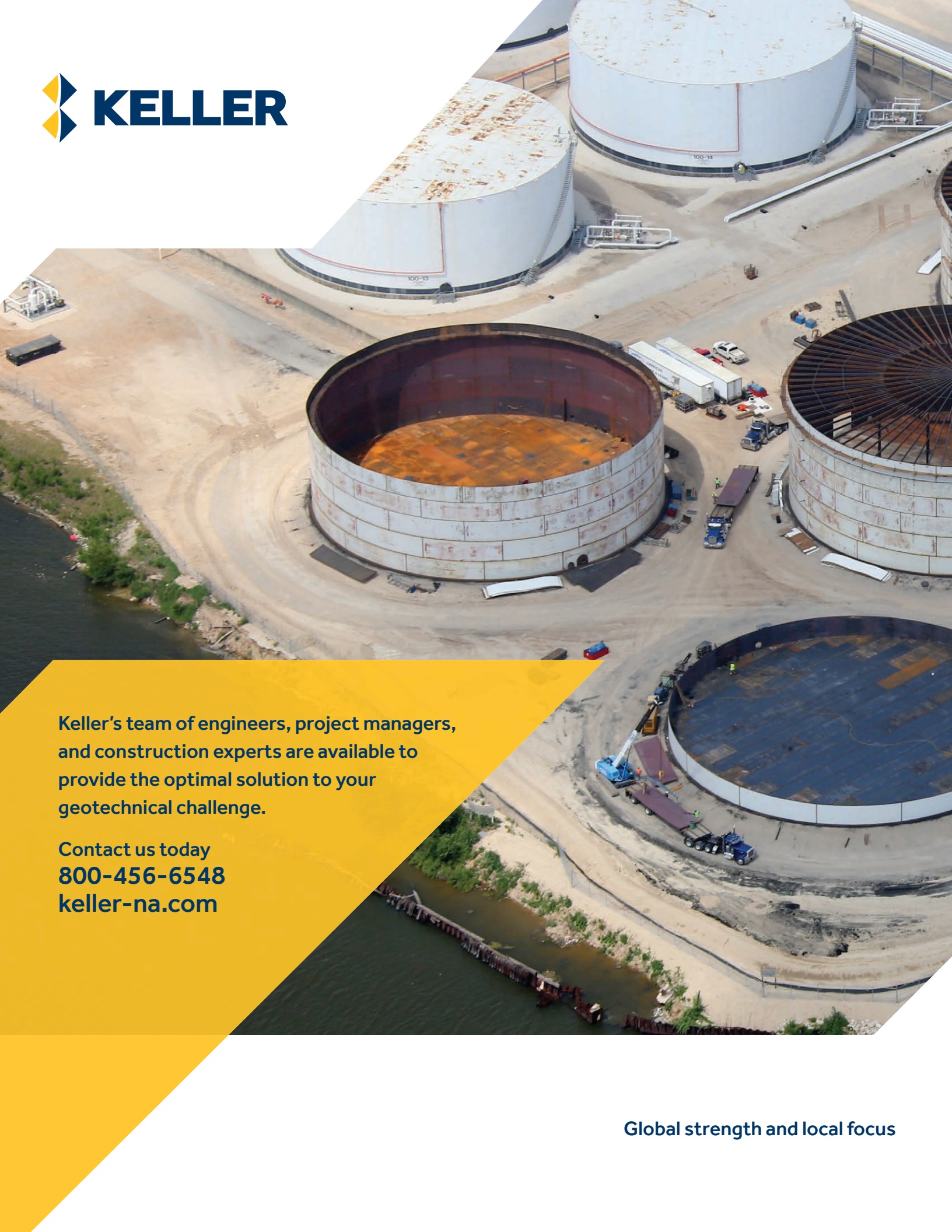
Our involvement does not stop at the completion of our work but follows the construction to the final acceptance of the tank's foundation during the hydrotest.



Real time settlement monitoring system performed by affiliate Keller company GEO-Instruments.



Sample foundation edge settlement monitoring results during an AST hydro test.



Keller's team of engineers, project managers, and construction experts are available to provide the optimal solution to your geotechnical challenge.

Contact us today
800-456-6548
keller-na.com

Global strength and local focus