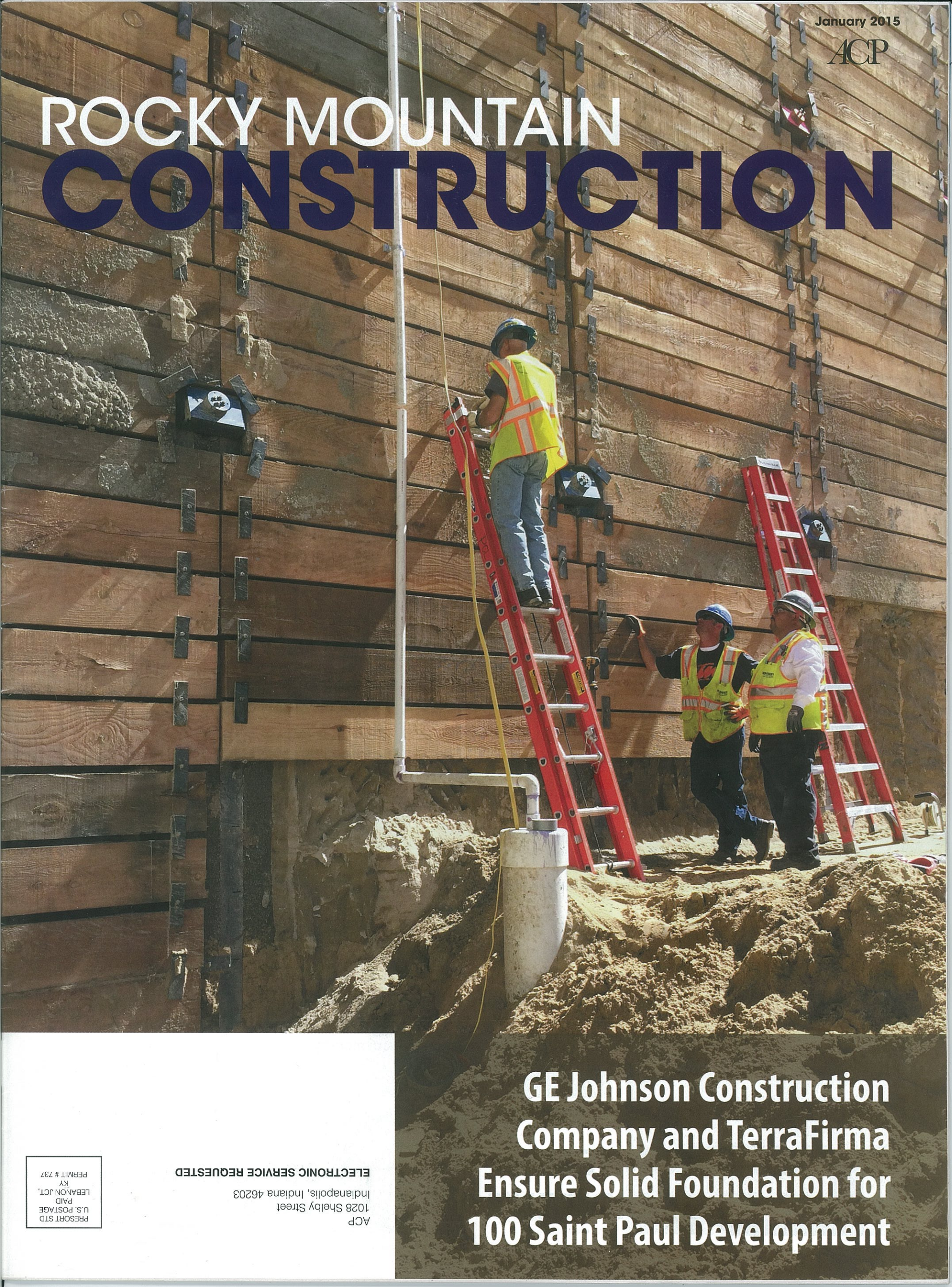
January 2015
ACP

ROCKY MOUNTAIN CONSTRUCTION



GE Johnson Construction Company and TerraFirma Ensure Solid Foundation for 100 Saint Paul Development

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TerraFirma and GE Johns
Create Innovative De
100 Saint Pau

TerraFirma Earth Technologies, an elite groundwater control contractor, is the newest arrival among Denver's burgeoning construction sector and for one of their first construction jobs is the 100 Saint Paul Development, an office and retail development in the popular Cherry Creek business district.

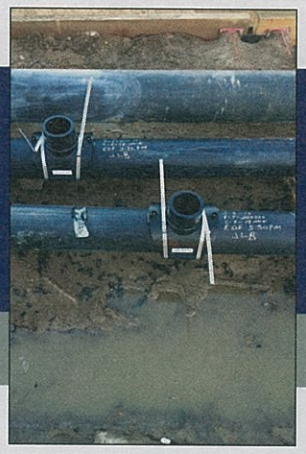
The construction of 100 Saint Paul marks the first class A office development in this area in 25 years. When complete, the building will have 149,000 square feet of rentable space (including office and retail), eight stories and parking underneath the building. It will also contain updated amenities such as a 9,000 square foot green patio area, electric car charging stations and secured bicycle storage. The building is LEED Gold pre-certified.

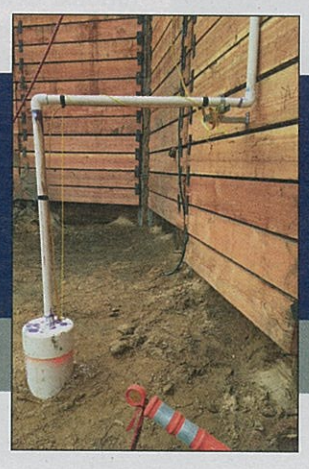
David Giles and partners Josh Peltier and Mike Giles founded TerraFirma Earth Technologies in 2004 with the idea of becoming a key player in the dewatering industry. Headquartered in Houston, Texas, TerraFirma helps owners and contractors throughout the United States

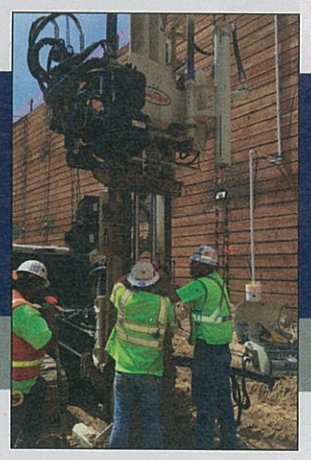
TerraFirma provides ongoing training and certification for its crew members. All safety initiatives are continuously reviewed and updated to keep employees proficient in new safety policies and procedural methods. The firm calls this plan "Target Zero", and its goal is to achieve zero accidents and injuries during every dewatering project.

on Construction Company ewatering System for Development

Owner: 100 Saint Paul, LLC
General Contractor: GE Johnson Construction
Geotechnical Engineer: Terracon
Dewatering Contractor: TerraFirma Earth Technologies
Total Finished Area: 310,000 square feet (including parking structure)







Placement of the PVC dewatering well assembly following drilling of the bore hole with the track mounted Watson drilling rig.

maintain acceptable groundwater levels for both temporary projects and permanent installations. Past deep excavation projects include athletic stadiums, hospitals, high-rise facilities, transportation facilities, power plants, waterways, petro-chemical plants, and municipal infrastructure sites. The firm has recently opened a permanent satellite office in the Denver Tech Center.

Electrical submersible pumps were placed near the bottom of each dewatering well.

TerraFirma was selected by Colorado Springs-based general contractor GE Johnson Construction Company to install a groundwater control system and innovative groundwater collection and treatment system designed by Terracon, headquartered in Olathe, Kansas, in Cherry Creek. When ground broke last February, neither GE Johnson, 100 Saint Paul, LLC (the owner), nor the geotechnical consultant Terracon, could predict the unforeseen conditions that would require on-the-spot installation of additional dewatering features than were originally designed. TerraFirma worked congruently with the owner, general contractor, and design consultants to come up with an innovative, supplemental dewatering system that averted delays and minimized costs.

Modifying the System

According to TerraFirma's Giles, the original design included widely spaced deepwell dewatering wells meant to maximize drawdown, while minimizing the rate of groundwater flow, in an effort to prevent migration of potentially contaminated groundwater from adjacent properties. The modified system meant adding mini-vacuum wells directly adjacent to the building's elevator pits and a permanent dewatering sump pit that TerraFirma was able to custom design on the job, making for a unique hybrid of dewatering methods to better suit the actual soil and jobsite conditions.

TerraFirma utilizes Holland's Rotary Lobe wellpoint pump for its mini-vacuum well dewatering system. The traditional deepwell dewatering wells can be seen in the background.

Completed installation of the PVC mini-vacuum well-assembly following drilling of the borehole, utilizing track mounted Geoprobe hollow stem drilling rig.

Giles explained, "Usually when we pump water from the ground, we pipe it directly to a storm sewer drain. However, there was concern that this ground water was contaminated from three different sources: chemicals from a dry cleaning business, hydrocarbons from a previously demolished fuel station, and dissolved metals, which occur naturally in the earth."

"By isolating the supplemental dewatering to just those few areas needing it, we saved precious time and reduced costs. Also, by limiting supplemental dewatering efforts to just those few areas, we reduced the required amount of groundwater to be pumped, thereby reducing the risk of pulling in contaminants identified on adjacent properties during the investigative phase of the project."

Brian Lawrenson, GE Johnson's Superintendent, added, "The project is situated in the heart of Cherry Creek, with very little or no laydown. TerraFirma worked with us during the logistical challenges we faced daily. Due to the complexity of the site excavation and ever-changing conditions, we had TerraFirma install two areas of vacuum-well assemblies to provide additional localized dewatering. TerraFirma reacted quickly to these unforeseen conditions and was able to minimize the impact to the construction schedule."

A Unique Design

The final dewatering system included 11 extraction wells, one injection well, 42 mini-vacuum wells, three perimeter HDPE groundwater discharge manifold lines, and a groundwater treatment system. "It was first time I have seen such a unique groundwater collection and treatment system design in my 28 years in this business," said Giles. "It was much easier and less expensive to design and install this at the outset, just to cover the possibility that it would be needed. Had we not planned in advance for the three possible discharge routes and needed them, it would have been expensive to do so later. Terracon deserves credit for a really unique design."

According to Giles, in the end Terracon's samplings were all within limits, and the water didn't have to be redirected away from the sewer. The injection wells will remain in place after completion of the construction and incorporated into a separate, permanent dewatering system.

David Cross of 100 Saint Paul, LLC, was pleased with the result. "TerraFirma brought a high level of expertise and extensive knowledge base to the table when we hit the bottom of the hole. They were instrumental in bringing about a speedy resolution to unforeseen subsurface conditions to the benefit of the general contractor and us."

At current construction, the steel structure rises to eight levels above grade over three below-grade parking levels. 100 Saint Paul is scheduled for tenant occupancy in the summer of 2015.

Unique, innovative groundwater collection lines allowed clean groundwater to be directed to the city storm sewer drain, contaminated-treatable ground water to an on site groundwater treatment system, or contaminated, untreatable groundwater to be re-injected back into the ground, to its original source.