



NICHOLSON

VERSATILE GEOTECHNICAL CONTRACTORS



Deep Foundations

Augercast Piles

Barrettes

Micropiles

Earth Retention

Anchors

Diaphragm Walls

Post-Tensioned Anchor Walls

Secant Pile Walls

Soil Nail Walls

Ground Treatment

Asphalt Grouting

Cement Grouting

Chemical Grouting

Compaction Grouting

Cutter Soil Mixing

Jet Grouting

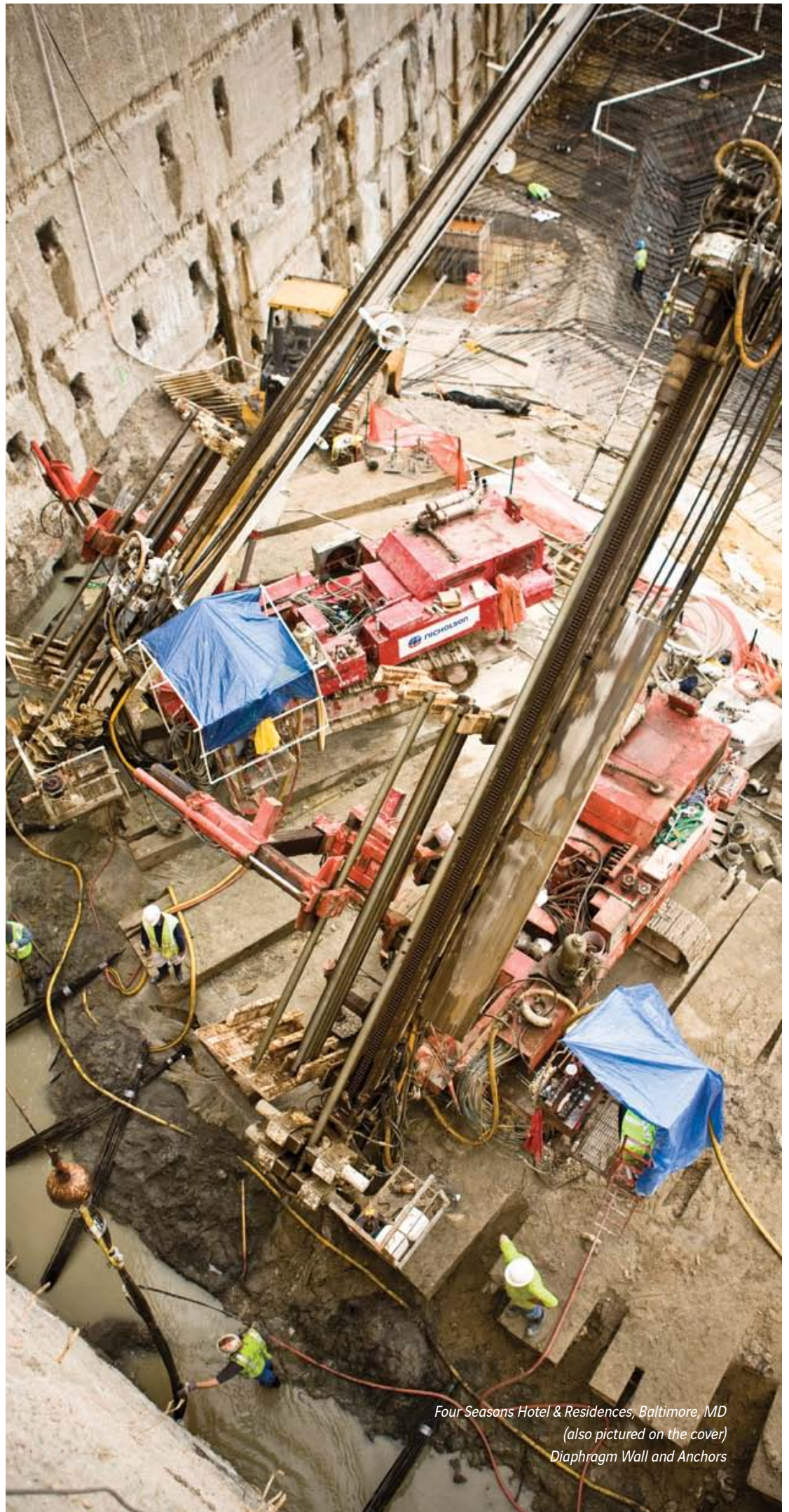
Low-Mobility Grouting

Ground Improvement

Vibro Stone Columns

Vibro-Compaction

Vibro Concrete Columns



*Four Seasons Hotel & Residences, Baltimore, MD
(also pictured on the cover)
Diaphragm Wall and Anchors*

ABOUT US

Quality, Innovation, and Versatility in Geotechnical Construction



World Trade Center Transportation Hub, New York, NY

Nicholson installed 550 micropiles through and adjacent to an active New York City Transit Authority subway line to underpin the structure as excavation proceeded below. The project also included anchor installation and jet grouting.

For over 50 years, Nicholson Construction Company has been a leader in geotechnical construction. From our early years as a regional pile driving company, Nicholson has evolved into a national geotechnical contractor specializing in deep foundations, earth retention, ground treatment, and ground improvement. As the North American business unit of the Soletanche Bachy Group, a world leader in geotechnical and civil engineering construction, Nicholson is backed by a global network of unparalleled geotechnical resources and expertise. Our fully staffed regional offices across the United States are equipped to address local project requirements and provide individual attention.

Quality

While safety is our top priority, Nicholson's dedication to quality is the basis for our reputation. On all projects, large or small, the goal remains the same: provide a quality product and satisfy our customer. Nicholson's highly-skilled technical staff enables us to offer our clients design-build and value-engineered solutions while our experienced site staff delivers an excellent product on-site. We have completed some of the country's most technically challenging geotechnical projects and earned honors such as the International Association of Foundation Drilling's (ADSC) Quality Contractor of the Year Award. To ensure consistency and

reliability, we offer real-time monitoring and instrumentation on nearly all of our techniques.

Innovation

Over the years, Nicholson has developed, introduced, and refined many of the geotechnical construction techniques commonly used today in the United States. Through industry organizations such as the Deep Foundations Institute, the American Society of Civil Engineers, and ADSC, we have shared our knowledge to advance the industry. Our relationship with Soletanche Bachy has enabled us to offer new, state-of-the-art technologies such as cutter soil mixing and real-time computer monitoring.

Versatility

From skyscrapers and tunnels to dams and power plants, Nicholson provides geotechnical solutions in nearly every imaginable environment across the country. Our versatility, resource availability, and experience allow us to meet our clients' unique needs.



New York Law School, New York, NY

Using a hydraulic grab designed by Soletanche Bachy subsidiary TEC, Nicholson constructed a 65,000-square-foot diaphragm wall for excavation support and the perimeter foundation in an extremely tight work area. Forty-four barrettes were installed for interior column support.

TECHNIQUES

Deep Foundations, Earth Retention, Ground Treatment, and Ground Improvement

Nicholson possesses a wide-ranging portfolio of geotechnical techniques. This, coupled with our design-build capabilities, allows us to develop and implement sustainable geotechnical construction solutions that are specifically tailored to our clients' needs.

Deep Foundations

Since 1955, Nicholson has been designing and installing deep foundation elements across the United States. We are internationally recognized as a leader in the design and installation of micropiles, which are small-diameter, high-capacity drilled and grouted piles. Micropiles are most applicable and cost-effective in low headroom or limited access areas and where subsurface conditions such as karstic limestone, dense urban fills, and glacial till challenge conventional piling operations.

Where physical constraints and subsurface conditions are not problematic, augercast piles can be used as deep foundation elements. Augercast piles are formed by drilling hollow-stemmed, continuous-flight augers in the ground. Grout or concrete is pumped in as the augers are withdrawn to form a pile.

Earth Retention

Earth retention systems are constructed to provide support where excavations are made or slope stability is compromised.



City Creek Center - Block 76, Salt Lake City, UT

For the construction of a mixed-use development, Nicholson provided a turnkey design-build earth retention package which included 45,000 square feet of anchored diaphragm wall and 120,000 square feet of soil nail wall. Nicholson also underpinned three buildings with micropiles and installed jet grouting for water control. Adjacent structures and the entire earth retention system were continuously monitored in real-time by Sol Data's Cyclops instrumentation system. Sol Data is a specialized subsidiary of Soletanche Bachy.

Throughout North America, Nicholson is a recognized innovator in the use of rock and soil anchors for earth retention. We have over 40 years of anchor experience, including installation of the first permanent anchored walls and first dam tiedown projects in the United States.

Diaphragm walls are an earth retention technique that provide a permanent perimeter foundation, excavation support, and waterproofing system, all in one. When a permanent, structural wall is not necessary, cutter soil mixing (CSM) provides a cost-effective solution for the rapid construction of retaining and cutoff walls by mixing soil in situ with cement and/or bentonite. CSM walls are constructed using equipment derived from diaphragm wall cutter technology.

Ground Treatment

Ground treatment can generally be defined as a process that modifies the ground properties through the addition of a binder or additive. The objectives are typically to increase strength, increase stiffness, or reduce permeability. Nicholson's grouting techniques include jet grouting, cement grouting, chemical grouting, asphalt grouting, compaction grouting, and low-mobility grouting.

Jet grouting consists of breaking up the soil with a high-pressure jet and mixing the loosened soil with a cement grout to form columns, panels, and other structures in the ground. Our proprietary JETPLUS system allows us to cut larger diameter columns through increased jetting efficiency.

Enhanced quality control on cement grouting projects is available through GROUT I.T., our real-time computer monitoring system. The Soletanche Bachy Group has been a leader in electronic monitoring systems for geotechnical processes since the mid 1980s.



Sorenson Building #8, Taylorsville, UT

Nicholson installed 112 stone columns to depths of 18 feet with the vibroprobe mounted on an excavator. This set-up is referred to as the Stitcher.

Ground Improvement

Our ground improvement techniques, such as stone columns and vibro-compaction, are ideal for projects where poor or unstable soils are encountered, especially on sites with soft or loose soils or uncontrolled fills.

For both stone columns and vibro-compaction, a vibrating probe suspended from a crawler crane or an excavator penetrates the soils until reaching the required depth. Soil that has been displaced laterally by the vibroprobe is replaced with stone to build a stone column or with in situ material for vibro-compaction.



U.S. Capitol Visitor Center, Washington, DC

Nicholson installed 130,000 square feet of anchored diaphragm wall for excavation support and the perimeter foundation. Jet grouting was performed for water cutoff and additional excavation support.



Logan Airport Expansion, Boston, MA

Nicholson, in a joint venture, installed nearly 800 micropiles for the addition of two new levels to the Central Parking Garage at Boston's Logan International Airport. Many of the piles were installed in limited access and low headroom conditions.

BUILDINGS

Solutions for Commercial, Health Care, Educational, and Government Facilities

Nicholson has built its business and reputation on its ability to provide innovative geotechnical construction techniques on building projects. Buildings that require deep foundations or underpinning for structural support, earth retention for deep excavations, and ground improvement for foundation support in marginal soils have been our most common projects over the years.

Micropiles and augercast piles are used as deep foundations for new buildings. Micropiles, compaction grouting, permeation grouting, and jet grouting are typically used for underpinning of existing buildings where additional structural load is introduced or existing foundations experience unacceptable settlement.

Nicholson uses several anchored wall types to support building excavations, such as sheet pile walls, beam and lagging walls, soil mixed walls, jet grouted walls, diaphragm walls, continuous augercast walls, and soil nail walls. Diaphragm walls are practical for buildings where movement control is critical, groundwater is high, and conventional shoring and dewatering are difficult. The most common diaphragm wall projects are deep basements for parking garages.

Nicholson is a recognized leader in the use of highly efficient and cost-effective ground improvement techniques. Stone columns and vibro-compaction provide an intermediate foundation system when subsurface materials have inadequate bearing capacity, produce unacceptable settlements, or are liquefiable.



Department of Sanitation Garage, New York, NY

Jet grout columns were used to underpin the existing shallow exterior foundation of the garage and allow for construction of an adjacent addition. The columns were installed to depths up to 43 feet. The elevation of the addition's lowest floor slab is approximately 17 feet below the bottom of the existing foundation.



Pile and jacking frame system

As hotel construction neared completion, engineers determined that the building was settling approximately $\frac{1}{2}$ of an inch per week. To arrest settlement, Nicholson designed and installed over 500 micropiles, each approximately 200 feet deep. Each pile connected to the structure's mat foundation with a jacking system.



POWER/ INDUSTRIAL

Experience at Power Plants,
Wind Farms, and Industrial Facilities

When it comes to geotechnical construction, power plants and industrial facilities present their own unique set of challenges. Nicholson has the technology and experience to provide geotechnical solutions for these sensitive environments.

At coal-fired power plants across the country, Nicholson has installed thousands of micropiles for foundations for new Selective Catalytic Reduction (SCR) units, which are large pieces of emissions control equipment that reduce nitrogen oxide (NOx) emissions. Micropiles are often the foundation of choice for SCR units and other power plant equipment such as scrubbers and flue gas desulfurization units. Because vibration and impact to adjacent structures are minimal during installation, micropiles can be installed in limited-access areas such



Casselman Wind Power Project, Somerset, PA

Nicholson installed 24 micropiles at each of eight new wind turbine foundation locations. A total of 192 piles were installed for approximately 14,400 lineal feet. Piles were installed through the strip-mine fill and bonded into bedrock.

as building interiors and below overhead structures. Micropiles can also be installed adjacent to, or through existing foundations. We also install augercast piles and perform jet grouting for new construction and renovation projects at power plants.

Nicholson has also provided foundation solutions for the wind energy industry. Micropiles are effective foundation elements for new wind turbines in areas with problematic geology and are useful in the repair and strengthening of existing wind turbine foundations. At other industrial sites, such as manufacturing facilities, Nicholson's techniques have been widely used. We have designed and installed foundation systems to accommodate new machinery and facility additions.

La Cygne Generating Station, Linn County, KS

Nicholson installed 150 micropiles to support a new Selective Catalytic Reduction (SCR) system. The piles have a design load of 240 kips in compression and 100 kips in tension.





Miamitown Interceptor Sewer, Miamitown, OH

Nicholson constructed a 29-foot diameter, 61-foot deep shaft using overlapping jet grout columns. Work also included the installation of a 20-foot thick bottom plug using jet grout columns.

WATER MANAGEMENT

Expertise in Dams, Levees, Combined Sewer Overflows, Utility Tunnels, Reservoirs, and Waterways



McCook Reservoir, Chicago, IL

Nicholson constructed a 7,800-linear foot grout curtain around a combined sewer overflow (CSO) system's new surface reservoir. On this project, we used our GROUT I.T. system which measures, records and graphically displays pertinent grouting parameters in real time.



Nicholson's techniques are uniquely suited for the construction and rehabilitation of dams, waterways, and sewer systems. We are a recognized leader in the design and installation of high-capacity anchors for dam rehabilitation. Nicholson completed its first U.S. dam anchor project for the U.S. Army Corps of Engineers in 1972. Since then, we have installed thousands of anchors at dams around the country. On several occasions, Nicholson has installed the largest and highest capacity anchors in the United States. Our efforts have advanced the anchor industry and refined and improved dam anchor installation processes. In addition, our soil mixing techniques are well-suited for levee-strengthening projects.

A wide range of Nicholson's techniques have been applied on sewer projects, especially Combined Sewer Overflow (CSO) systems. We have constructed access shafts with diaphragm walls and jet grouting, performed rock and soil grouting for shafts and tunnels, and installed grout curtains for surface reservoirs. On cement grouting projects, our GROUT I.T. computer-monitored grouting software enhances quality control.



*Gilboa Dam, Gilboa, NY
High Capacity Dam Anchors*



Replacement Bridge Number 791 Over Duey River, San German, PR

Nicholson installed 33 drilled shafts for the foundation of a new bridge in western Puerto Rico. The drilled shafts are 36 inches in diameter and reach depths of 40 feet.

TRANSPORTATION

Performance on Bridges, Transit
Tunnels, Roads, Railways, and Ports

From new construction to rehabilitation projects, Nicholson offers a wide range of geotechnical solutions for transportation infrastructure projects.

We install micropiles to support new bridges and rehabilitate older ones. Micropiles are often used as foundation elements when a bridge is being constructed in areas with problematic geology. They are ideal for bridge rehabilitation because they can be installed under existing bridge decks and adjacent to sensitive structures.

For tunneling projects, many of our techniques are used. Nicholson has constructed circular access shafts for tunnel projects using diaphragm walls and jet grout columns. A variety of soil and rock grouting techniques are used to support tunneling operations. Objectives are commonly related to improving stability and controlling groundwater, either at the tunnel face or at connections. Chemical grouting is used to stabilize loose soils between the tunnel and the ground surface. Jet grout columns can be installed to reduce ground loss and water infiltration at various locations where the tunnel alignment intersects the vertical access shafts and other miscellaneous structures.

Nicholson constructs anchored retaining walls and soil nail walls for slope stability along roads and highways. Ground improvement techniques such as stone columns, vibro-compaction, and soil mixing can be employed to improve in situ soil properties under mechanically stabilized earth (MSE) embankments.

Retaining walls constructed with soil nails or micropile soldier piles are commonly used to support new and existing rail lines. These walls are ideal because of the limited access on railway alignments.

Ground improvement techniques are applicable at port facilities with granular soils such as loose sands and gravels. At ports, land is often reclaimed from wetlands or in water by using dredged or imported fill materials. With ground improvement methods, unsuitable soils are improved in situ, rather than removed and replaced or bypassed with deep foundations.



*North Shore Connector, Pittsburgh, PA
Cutter Soil Mixing and Anchors*



Cutter Soil Mixing Equipment

For this light-rail tunnel project, Nicholson provided support of excavation for the tunnel boring machine launching and receiving pits using cutter soil mixing (CSM) methods. The CSM wall is constructed using newly-developed equipment derived from diaphragm wall cutter technology.



Isle of Grain Pump House, Kent, UK

Bachy Soletanche constructed a series of uniquely shaped diaphragm walls for this underground pump house.

SOLETANCHE BACHY

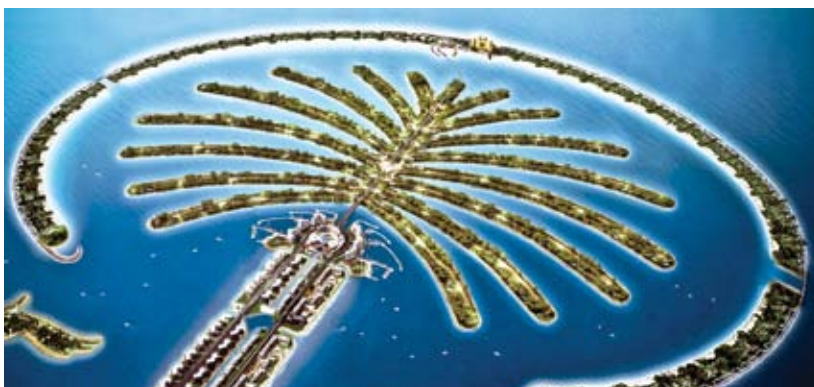
Global Geotechnical and
Civil Engineering Contractors

Nicholson is the North American business unit of the Soletanche Bachy Group. Soletanche Bachy specializes in the construction of geotechnical and civil engineering projects around the world. They serve a wide range of clients in the public and private sectors and offer an extensive portfolio of geotechnical solutions, special foundations, underground construction, ground improvement, and pollution treatment and control.

Working in over 100 countries worldwide, Soletanche Bachy provides Nicholson with an international network of resources and expertise. Their reputation is deeply rooted in safety, quality, technical excellence, and innovation. As a developer of various construction processes and equipment that have been adopted

around the globe, innovation is at the center of Soletanche Bachy's culture. The research and development team of experts is an internal network of specialists from across the Group that creates an environment of new development.

Soletanche Bachy is a part of the Soletanche Freyssinet Group. The subsidiaries that make up Soletanche Freyssinet include geotechnical and civil engineering companies Soletanche Bachy, Reinforced Earth and Menard; Freyssinet who works in pre-stressing, cable-stay structures and structural repair; and Nuvia, a leader in the nuclear field. Soletanche Freyssinet is a part of the Vinci Group of companies.



Palm Jumeirah, Dubai, United Arab Emirates

Soletanche Bachy performed nearly 880 million cubic feet of vibro-compaction and constructed 7.5 miles of diaphragm walls.



NICHOLSON

Corporate Headquarters - 12 McClane Street - Cuddy, PA 15031
Tel. 412-221-4500 - Fax 412-221-3127 - E-mail: info@nicholsonconstruction.com

www.nicholsonconstruction.com

Austin Office
512-858-7373

Denver Office
303-926-0411

Kansas City Office
913-851-2800

Pittsburgh Office
412-221-4500

Boston Office
978-568-0351

Kalamazoo Office
269-353-8421

New York Office
973-383-8884

Salt Lake City Office
801-296-5899