

DAMS & LEVEES

Services for Construction and Remediation

- ◆ Foundation Improvement
- ◆ Seismic Mitigation
- ◆ Overturning and Slide Stabilization
- ◆ Seepage Cutoff
- ◆ Sinkhole Stabilization

Clockwise from top left:

Herbert Hoover Dike is a 140-mile-long, 25-foot-high earthen levee surrounding Lake Okeechobee in southeastern Florida. Keller used the trench mixing deep (TRD) method of soil mixing to construct a 50- to 80-foot-deep cutoff wall from the crest of the levee.

Jet grouting was used to construct a 60-foot-deep and 60-foot-wide cutoff wall to prevent the Péribonka River from seeping into a diversion tunnel for the new earth embankment hydroelectric dam in Péribonka, Quebec, Canada.

Keller's iGrout is a proprietary data acquisition system that enables optimal management of quality controls.



Keller is North America's leading specialty foundation contractor, providing the complete range of ground improvement and other geotechnical services for planned and existing dams. From grouting for seepage control to vibro for the seismic remediation of dam sites to the installation of cutoff walls, Keller has delivered on hundreds of dam projects. We are committed to providing the best solution that satisfies the technical requirements of your project, at a competitive price. Our nationwide network of offices and full-service equipment yards means fast mobilization and reduced start-up costs.

Quality control has always been a key aspect of our work. Computerized data acquisition and remote control for grouting was first used during construction of Ridgeway Dam in Montrose, CO, back in 1980. Keller performed curtain and blanket consolidation grouting for both the floor and core trench foundation preparation of the dam. To this day we continue to implement the most advanced quality control methods for all of our techniques.

Whether your situation is typical or unique, Keller has the experience and innovation to assist engineers, contractors, and owners with identifying and implementing the best solution.

Case Histories

W.A.C. Bennett Dam, Williston Lake, BC

Compaction Grouting



W.A.C. Bennett Dam is a zoned, sand/gravel fill dam, 1.25 miles long and 600 feet high. It is one of the largest hydroelectric dams in the world, containing the 74 km³ reservoir of Williston Lake. A sinkhole on the crest and a sinkhole on the upstream slope each developed around a corrugated metal pipe survey benchmark used during construction. Keller performed compaction grouting to remediate both sinkholes to depths of 400 feet. The treatment restored the damaged core such that the strength, permeability, deformation properties, and in situ stress conditions were similar to that of the adjacent, undisturbed core.

Wickiup Dam, La Pine, OR

Jet Grouting

Wickiup Dam is a zoned, rolled earthfill dam with a main river embankment section height of 100 feet and a crest elevation of 4,347 feet. The left abutment dike contained separate layers of liquefiable diatomaceous silt and volcanic ash. Keller performed jet grouting to construct 14-foot-diameter columns along a 2,250-foot length of the dam toe. This stabilized the liquefiable soil layers while allowing the reservoir to operate normally during the project, and reduced the inherent risk associated with an excavate-and-replace alternative.

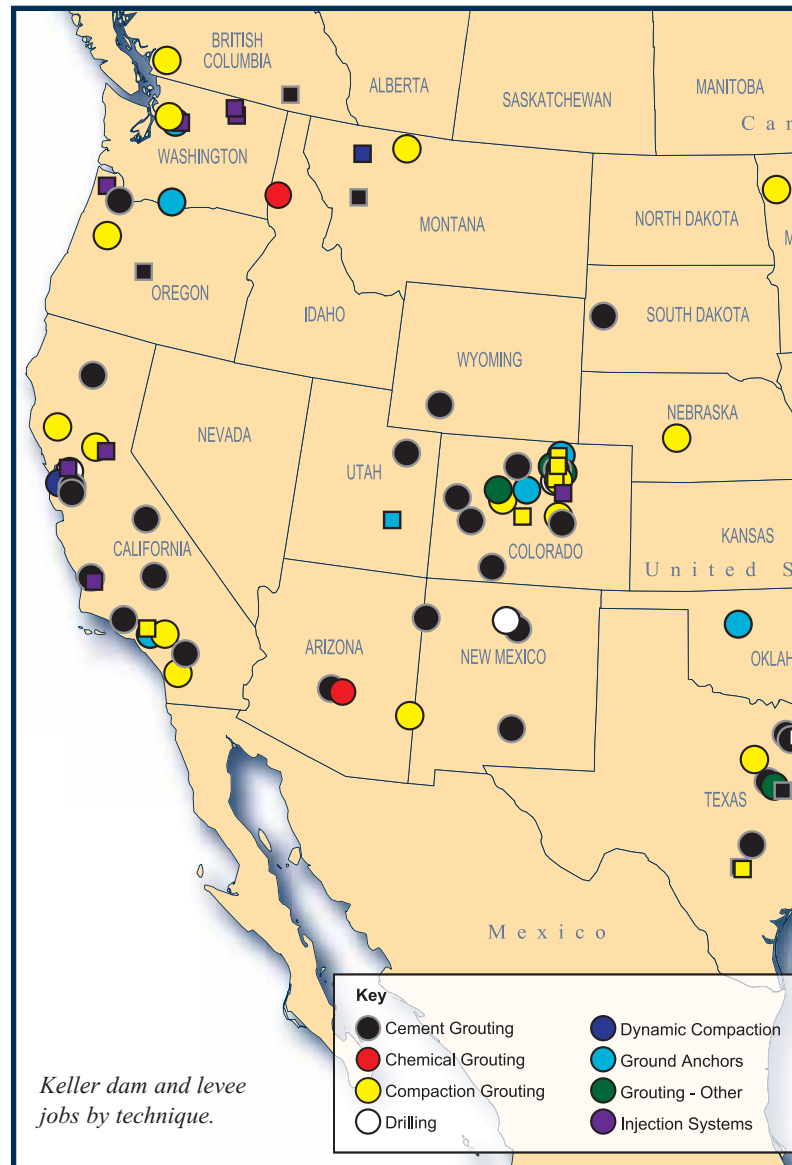


Lopez Dam, Arroyo Grande, CA

Vibro Replacement



Lopez Dam is a zoned earth embankment with a hydraulic height of 166 feet, impounding a 52,500 acre-foot reservoir. Keller installed 180,000 linear feet of Vibro replacement stone columns to depths of 30 to 95 feet to stabilize alluvium, protecting the dam from liquefaction that could occur in the event of the maximum credible earthquake.

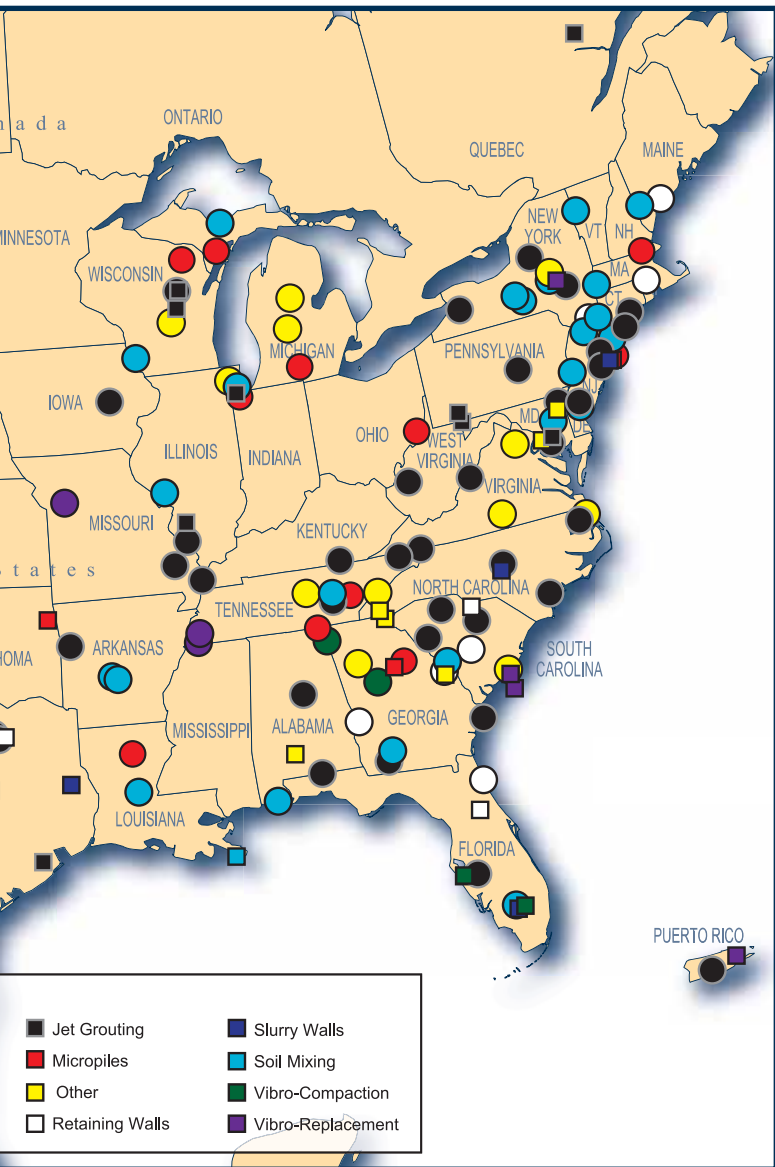


Reuter Hess Dam, Park, CO

Microfine Cement Grouting

Reuter Hess Dam is an earthen dam containing a 16,200-acre-foot reservoir in Park, CO. Prior to construction of the dam, seepage cutoff was required within the sandstone, claystone, and granite underlying the overburden beneath the dam footprint. Keller performed microfine cement grouting over several thousand linear feet of the centerline, with over 100,000 linear feet of drill holes.





Hoopes Reservoir Phase 1 Improvements, Wilmington, DE

Anchors

Edgar M. Hoopes Dam is a 135-foot-tall concrete dam built in 1932. Improvements included widening the spillway to increase capacity and meet current flood design standards. Keller installed and tested 37- and 48-strand anchors for stability of the widened spillway. The anchors were as long as 175 feet, with design capacities up to 1,600 kips. All of the work was performed from the dam's 14-foot-wide crest.



Lake Auman Dam, Pinehurst, NC

Vibrated Beam Slurry Wall



Lake Auman Dam is an earthen dam in the Pinehurst area of North Carolina that retains a manmade, 5-mile perimeter lake that is up to 90 feet deep. The dam was

listed by the North Carolina Department of Environment and Natural Resources as a high hazard dam in need of repair. To re-pair the leaks in the Seven Lakes Community area, Keller installed a vibrated beam slurry wall for seepage control along 1,200 linear feet of the dam's centerline. The slurry wall depth ranged from 20 to 47 feet.

Willow Creek Levee, Henrietta, MO

Injection Systems



Willow Creek Levee, approximately one mile from the Missouri River, was built as a flood control measure for local farmers. The 15-foot-high levee had been constructed with 3:1 side slopes from alluvial

river deposits consisting primarily of highly plastic clay and silt. Large shrinkage cracks had become a pathway for rainwater, which subsequently saturated the levee, causing shear strength reduction and numerous slope failures. Keller performed lime/fly ash injection over 11,200 linear feet of levee, and to a depth of 10 feet through the crown of the levee and into the face of the slope to repair the shrinkage cracks, using a custom-built, track-mounted injection unit.

West Bank Levee Repairs – Contract P24, Plaquemines Parish, LA

Dry Soil Mixing

The West Bank Levee repairs, 60 miles southeast of New Orleans, included a new stretch of levee three feet higher than the existing levee. Keller performed dry soil mixing to increase the bearing capacity of the existing soils along a 40-foot-wide, 1,900-foot-long tract of land. A total of 4,524 dry soil mix columns, each 40 feet long and 2.6 feet in diameter were constructed. The project ran 6 days a week, 24 hours a day to keep pace with the schedule set by the U.S. Army Corps of Engineers.



D A M S & L E V E E S



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

- Alamagordo Reservoir
- Altrista Zinc Reservoir
- Anacoco Lake Dam
- Arkansas Nuclear One
- Ashland Levee II NW Corne
- Ashoken Reservoir Drilling
- Attoyac Bayou Watershed Project
- Auburn Dam — Slurry Mixing
- Austrian Dam
- Barnes Ridge Levee
- Bartlett Dam
- Bayou Rapides — Drainage Structure
- Beacon Lake Dam
- Beaver Dam Creek Pump Station
- Bennett Dam II
- Bert Adams Dam
- Big Creek Lake Dam Spillway Anchors
- Big Tujunga Dam
- Big Fork Diversion Dam
- Blalock Dam Grouting
- Blue Canyon Dam
- Braddock Lock & Dam Grouting
- Brinton Lake Dam
- Broadmoor Reservoir
- Brohm Mining Corporation
- Brookfield Power
- Burgess Falls Dam
- Calaveras Dam Drilling Test
- Canton Dam Spillway Test Anchors
- Carpenter Dam
- Carroll's Foods
- Cascade Dam
- Center Hill Dam
- Cerillos Dam
- Chambers Lake Dam Rehab
- Charleroi Locks & Dam
- Chatfield Reservoir
- Cherokee Dam
- Cherry Creek Diversion Dam
- Cliff Lake Dam
- Clifton Dam
- Clinchfield Decant Abandonment
- Cofferdam Seal
- Coleman Fish Hatchery
- Columbia Crossing Pond
- Columbia Gateway SWM Spillway
- Cordillera Ranch
- Cornish Creek Dam
- Croton Dam Liquefaction
- Crow Lane Reservoir
- Cytec Industries
- Delta Dam Rock Anchors
- Domenigoni Dam
- Dry Earth Pond
- Dworshak Dam
- Elkwater Fork RCC Dam
- Erie Lake Dam
- Evins Residence
- Fairfield Glade
- Falulah Dam
- Ferro Debris Basin
- Five Channels Hydroelectric Plant
- Flint River — GA Power
- Fortune Reservoir
- Foundex Drilling
- Frederick Dam
- Freestate Pond Outfall
- Frito-Lay Va
- Gales Lane Outfall
- Gallipolis Locks Replace
- Gammon Levee
- Garner Dam
- Glen Park Hydro
- Goat Rock Hydro
- Goose Pasture Dam
- Grand Forks Cofferd Dam
- Grand Road Storm Pond
- Great Western Shaft Stabilization
- Grindstone Canyon Dam
- Grizzly Reservoir
- Ground Storage Reservoir
- Hackensack Meadowlands
- Haleside Levee
- Hanksville Diversion — Cutoff
- Hatada Ranch
- Helms Pump Storage
- Herbert Hoover Dike Rehabilitation
- High Falls Hydro
- Hillsborough County Reservoir
- Himmelland Dam
- Hinckley Embankment
- Hoist Dam
- Holcim Dam Grouting
- Hoopes Reservoir Ph I Improvements
- Hop Brook Lake Dam Grout Test Program
- Horse Mesa Dam 2
- Hult Pond Dam Repair
- I 370 Levee: NSRR: Crossing
- IMC Hopewell Mine Dam
- Impoundment Levee
- Ironworks Dam Upgrade (Churchville Rsvr.)
- Island Creek Pond "A"
- John Day Dam Test Anchors
- Keenleyside Dam
- Keeton Reservoir
- Kitty Hollow Levee Stabilization
- L-8 Levee South Crossing
- Lake Auman Dam
- Lake Brazos Dam Replacement
- Lake Chaplain South Dam Seismic Upgrade
- Lake Frances East Dam
- Lake Isabella Aux Dam Tail Race Canal
- Lake Lariat Dam III
- Lake Prince Dam Grouting
- Lake Tapps Dike II
- Lake Watchong Dam
- Lee Creek Dam
- Little Falls Hydro
- Little Goose Lock & Dam
- Lock & Dam 24
- Lockhaven Levee
- Lonetree Reservoir Phase II
- Lopez Dam Seismic
- Los Alamos Dam
- Louisville Reservoir
- Loveland Lake
- Lower Peltzer Dam
- Lower Pine Dam & Bridge
- Lutz Reservoir
- M. K. S. Business Park
- Mackintosh Water Supply
- Manenggon Hills Dam
- Mariano Reservoir
- Marina Bay Esplanads
- Mayport Naval Station
- McClure Dam
- McCook Reservoir
- McGregor Dam Repair
- MaGuire Reservoir
- McMillan Creek Reservoir
- MDC Reservoir 6 Grouting
- Meadow Woods Farms Dam Grouting
- Middle Branch Dam
- Midkiff Residence
- Mill Creek Dam
- Mill Street Dam Phase II
- Miller Reservoir — LF
- Milltown Reservoir/I-90
- Modesto Reservoir Outlet
- Moravian Dam Repair
- Mormon Island Aux. Dam
- Mosinee Paper Co.
- Musgrave Reservoir
- Nebraska Public Power
- New Hampshire Waterproof
- New Penn Truck Terminal
- Niagara Paper Corp.
- Nichols & McClure Dam
- North Greenbrier Pond Outfall
- OCI Wyoming Main Dam
- Ocoee Dam #2 Pedestrian Bridge
- Olivenhain Dam
- Omni Supply Inc
- Orchard Development
- Overflow Structure
- Ox Mountain/BFI
- Pacoima Dam Permanent
- Pagosa Dam
- Painted Rock Dam
- Park Ridge Reservoir Tank Demolition
- Parr Dam
- Pecan Point Levee
- Penny Creek Fish Passage
- Peribonka Dam Cutoff Wall
- Petenwell Dam
- Phillips 66 Reservoir
- Pierce Ranch — Lake
- Pinopolous Dam Seismic Mitigation
- Plant Bowen Ash Pond
- Quarterfield Section I
- Ranch Road 12 Private Lake
- Rbt. Moses Penstocks II
- Remmel Dam
- Rhinelander Spillway
- Ridgeway Dam
- Riley Dam
- Rio Blanco Reservoir
- Rio Grande Diversion Dam
- Rocky Mountain Consultants
- Rueter Hess Dam
- Ruth Burnett Fish Hatchery
- Sacramento Levee Mile 75.1 Emergency CG
- Safe Harbor
- Salmon Lake Dam Modification
- Salt Fork Dam Rehab
- Saluda Dam Excavation Support
- Sema — Slurry Wall
- Shades South Dam Grouting
- Shoal Creek
- Shores Bore
- Sinnissippi Dam
- Snuff Mill Dam
- Sodom & Bog Brook Dams
- Solomon's Island Dam
- Southwest Levee Cutoff Wall
- Spence Reservoir
- Spillway Anchor Bolt
- Standley Lake Micro-Tunneling
- Steel Creek Dam
- Stevens Creek Dam
- Stewart, Mo Levee
- Stillwater Dam Test
- Stora Enso Roll Grinder
- Structure 354 Cofferdam
- Sump Pit Drilling/Goat Rock Hydro
- Tallasee Dam
- Tas 05-32c — Lock E-26
- Taum Sauk Reservoir
- Tim's Ford Hydro Plant
- Tolt River
- Tower Lake Dam
- Town Hall — Overflow Structures
- Town Of Addison Overflow — Phase II
- Tralee SWM Pond
- Turnbull Lower Pine Dam
- TVA Widows Creek Pipe Abandonment
- Union Grove Lake
- Unmun Dam
- Victoria Dam
- W.A.C. Bennett Dam
- Wayside Park — Overflow Repair
- West Bank River Levee Repairs P24
- Weyerhaeuser Paper Co
- Wheeler Reservoir
- White River Levee
- Whitetail Resort
- Wickiup Safety of Dams Modification
- Willow Bend Lakes Overflow Repair
- Willow Creek Levee
- Windsor Lake Outlet
- Windsor No. 8 Dam
- Wohlford Penstock
- Wolf Creek Dam — Foundation Remediation
- Wood Dale Reservoir
- Yosemite Penstock