WATER SUPPLY:
RIVERBANK FILTRATION & INFILTRATION GALLERIES

As communities continue to grow, water suppliers face difficulties in meeting new demands and quality requirements. Intelligent planning and innovative design are the only ways to ensure an adequate water supply is available in the face of changing water supplies, demands and quality requirements.

INFILTRATION GALLERIES
Infiltra
tion galleries are typically designed and utilized when there is an insufficient ground water supply or water depth in rivers causing environmental concerns during low flow periods. This innovative water supply system provides pre-filtered water with minimal impact to the stream biota.

RIVERBANK FILTRATION
Induced infiltration provides aquifer recharge by reversing the hydraulic gradient in an alluvial aquifer adjacent to a surface water source. The drawdown created by a well in the aquifer induces infiltration of the surface water, naturally filtering the water in the process as the water flows toward the well. This infiltration process, referred to as riverbank filtration (RBF), typically replenishes the water pumped from the well to sustain well yields and improve water quality.

HYDROGEOLOGIC INVESTIGATIONS
Layne has extensive and diverse expertise developing water supplies from a variety of sources. Ranney® (a Layne company) has 80 years’ experience investigating alluvial aquifers for developing filtered water supplies through RBF, including hydrogeologic investigation techniques specific to evaluating surface water infiltration as a recharge mechanism and means for quality improvement.

Ranney® staff works across the U.S. and abroad conducting hydrogeologic investigations to site and design wells and wellfields for the development of ground water and RBF sources for municipal, industrial and cooling water needs.

TECHNICAL SERVICES FOR THE EVALUATION OF RBF INCLUDE:

- Hydrogeological Survey & Studies
- Test Drilling Programs
- Water Quality Evaluations
- Aquifer Testing
- Well Design and Maintenance of
- Vertical Water Wells
  - Slant/Angle Wells
  - Horizontal (Ranney®) Collector Wells
- Infiltration Galleries
- Seawater Collector Wells
- Dewatering Systems
- Recharge Wells
- Groundwater Monitoring / Compliance
- Groundwater Flow and Transport Modeling

WATER MANAGEMENT

+ SOURCING
+ WELL & PUMP MAINTENANCE
+ WATER TREATMENT TECHNOLOGIES
+ WATER RECYCLE & REUSE
+ WATER TRANSFER
+ WATER STORAGE & CONTAINMENT

CONSTRUCTION

+ GEOTECHNICAL CONSTRUCTION
+ TREATMENT PLANT CONSTRUCTION
+ ALTERNATIVE DELIVERY
+ RENEWABLE ENERGY
+ SEWER SYSTEMS
+ TRENCHLESS REHABILITATION
+ WATER SUPPLY
+ WATER TRANSMISSION & DISTRIBUTION

DRILLING

+ EXPLORATION DRILLING
+ SPECIALTY DRILLING
+ WATER WELLS
+ BOREHOLE SERVICES

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EXAMPLES OF OUR SUCCESS

ACAPULCO, MEXICO
Rio Papagayo, Guerrero, Mexico

RBF using horizontal collector wells was the selected alternative for the City of Acapulco, Mexico when it came time to upgrade the city’s supply. Their aging surface water intake and treatment system was experiencing many problems with high sediment and organic loads and highly variable quality during the rainy season.

In 2011, Layne de Mexico (Mexican affiliate of Layne Christensen) was contracted by the project’s general contractor to finalize the design and construct two horizontal collector wells. The collector wells were completed by Layne Heavy Civil, Ranney Collector Wells in early 2013, each easily capable of producing up to 20 million gallons per day (MGD).

RIVERBANK FILTRATION AND TUNNEL PROJECT
Louisville, KY

Louisville Water Company, looking to upgrade the quality of its potable water turned to an innovative riverbank filtration and tunnel system to take advantage of natural riverbed filtration to deliver a water lower in mineral content than groundwater and lower in turbidity and pathogens typically found in the Ohio River. As result Layne built 4 collector wells to produce a minimum of 60 mgd through riverbank filtration.

Since the wells are located in public areas, including a residential neighborhood, they are completed as “low-profile” units, designed to operate by gravity (with no pumping equipment or above-grade structure) connected to a conveyance tunnel installed in the underlying bedrock formation, which connects to a large pumping station (also constructed by Layne) located out of the flood plain.

NUCLEAR POWER PLANT PROCESS/COOLING WATER
Port Gibson, MS.

When it came time to upgrade Grand Gulf Nuclear Facility’s cooling makeup and process water system, a fifth horizontal collector well was selected. Layne Heavy Civil was contracted to as part of a design/build project to install the complete unit.

The unit located adjacent to the Mississippi River was completed in 2012, is comprised of a 20-foot ID caisson 150 feet in length, and equipped with 10 stainless steel gravel packed laterals with a total length of 2000 feet. Design yield in 10,000 gallons per minutes (gpm).

Horizontal collector wells were the selected option to provide most of the facility’s water needs when the plant was being designed in the early 1970’s. RBF water was determined to be superior to the highly variable, turbid water typically found in the lower Mississippi River. These five (5) continue to provide process and cooling water of low turbidity under highly varying river conditions.