



RADIAL COLLECTOR WELLS

Layne's Ranney® Collector Wells group is committed to providing efficient designs to meet growing water supply needs now and into the future.

SOURCE DELINEATION

- ✓ Exploration drilling
- ✓ Aquifer testing
- ✓ Well yield projections
- ✓ Groundwater modeling

DESIGN AND CONSTRUCTION

- ✓ Engineering design support
- ✓ Caisson design services
- ✓ Turn-key construction

PROJECT DELIVERY METHODS

- ✓ Design Bid Build
- ✓ Design Build
- ✓ Progressive Design Build
- ✓ Guaranteed Maximum Price

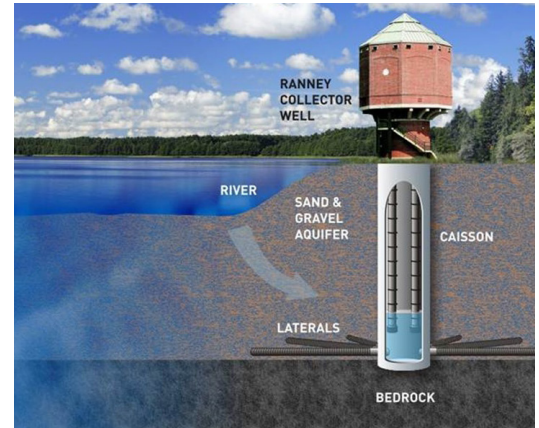
INSPECTION AND MAINTENANCE

- ✓ Record keeping
- ✓ Well inspection services
- ✓ Mechanical rehabilitation
- ✓ Chemical rehabilitation

Where ground water supplies are needed, it is often cost-effective to consider the use of a radial collector well. Collector wells can be used in almost any geologic setting where the subsurface materials are unconsolidated, consisting of sand and/or gravel. A radial collector well can be used to develop water supplies from both freshwater and seawater sources. The reinforced concrete central shaft, or caisson, serves as the collection point for the water that enters the system through the network of well screens. This wet well or pumping station, allows entry for periodic inspection of the system and permits any required maintenance to be performed at a later date. The caisson can be completed with a pump house or flushgrade top slab to minimize visual impact on the surroundings, which is often important in riverfront settings.

Riverbank Filtration

Radial collector wells that are located near rivers produce water through a process known as Riverbank Filtration (RBF), where water can be induced to infiltrate into local aquifers from a surface water. Since the rate of infiltration is very slow, particles (even microscopic) in the surface waters are filtered. This natural filtration can provide cost efficient removal of particles, at a lower cost than many conventional treatment processes. Where suitable geologic deposits exist, collector wells can be used to develop moderate to very high capacities.



Operational Advantages

Collector wells are constructed with longer lengths of well screens projected horizontally near the base of the aquifer formation. This results in lower entrance velocities through the screen which reduces the rate of plugging, and extend the interval between well rehabilitation. Other advantages include:

- ✦ Higher well yields per site: over 20 million gallons per day (MGD) from a single well
- ✦ Reduction of surface water-borne organisms
- ✦ Elimination of zebra mussels
- ✦ Lower operating and maintenance costs
- ✦ Raised caisson offers flood protection
- ✦ Simple operator requirements
- ✦ Drought tolerant, providing supply resiliency
- ✦ Fewer wells required: less connecting pipelines and electrical service needed
- ✦ Minimum property needs
- ✦ Minimum environmental impact and easier to permit than surface water intakes

For more information, or to speak with an expert please contact us at (614) 888-6263



RADIAL COLLECTOR WELLS

For Ground Water and Infiltration Water Supplies



CITY OF BISMARCK | Bismark, ND

Water demand projections developed for the City of Bismarck identified the need to expand their water supply to meet future forecasted demands of up to 50 MGD. As a result, the City elected to investigate the possibility of developing a water supply through riverbank filtration from the alluvial aquifer along the Missouri River. In response, Layne conducted a phased hydrogeological investigation, identifying a favorable alluvial aquifer adjacent to the Missouri River and determined that a horizontal collector well at this location could produce a minimum of 25 MGD. Subsequently, a horizontal collector well was constructed by Layne. This well is 90 feet deep, with a concrete caisson 20 foot inside diameter. There are 14 lateral well screens projected with a total screen length of 2,360 lineal feet. Initial testing indicated a yield in excess of 35 MGD and the well has been operated at flows of over 30 MGD. *This collector well is the highest yielding well in North Dakota.*



SOUTH ADAMS COUNTY WATER AND SANITATION DISTRICT | Henderson, CO

The Ranney Collector Wells group of Layne assisted in developing specifications and design, and then completed construction of a radial collector well along the South Platte River outside of Henderson, Colorado. The well has a design yield in excess of 6,000 gallons per minute and was constructed under a Guaranteed Maximum Price contract. The reinforced concrete caisson has a 16-foot inside diameter that was sunk to a depth of about 53 feet below grade. Five horizontal lateral well screens were hydraulically jacked out into the formation to lengths ranging from about 130 feet to 200 feet for a total length of 890 feet in a pattern toward and under the river. Performance tested was conducted on the well and indicated that the desired design flow rate of 6,000 gpm could be obtained. Maximum capacity under test conditions was estimated at over 9,000 gpm. The installed pump station is designed to house four 350 hp pumps, each capable of pumping 3000 gpm. *This collector well is thought to be the highest yielding alluvial well in Colorado.*



LE-AX RURAL WATER DISTRICT | Athens, Ohio

The Le-Ax Water District obtains its drinking water from two horizontal collector well located approximately 200 feet south of the Hocking River, near Athens Ohio. The Ranney Collector Wells group of Layne designed and constructed both collector wells. Collector Well 1 was installed in 1997 with a design production rate of 2.9 MGD. Collector Well 2 was constructed in 2010 and was designed for a maximum planned pumping rate of 5.8 MGD. The most recent project, Collector Well No. 2, consisted of the construction of a new collector well, pumps, piping, electrical service, relocation of existing standby power unit serving Collector Well No. 1, new standby unit to serve the new Collector Well No. 2, installation of approximately 2400 feet of 16" raw water pipe and construction of a 3100 lineal foot of gravel access road. The two wells provide Le-Ax Water District with a reliable water supply that requires little maintenance. Both wells continue to operate near their design capacity to this day.

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