The background of the entire page is a close-up, high-magnification photograph of water. It is filled with numerous small, spherical bubbles of varying sizes. The bubbles are translucent and have a bright, circular highlight on their upper-left surface, giving them a three-dimensional appearance. They are densely packed, creating a textured, shimmering effect across the entire frame. The overall color palette is a range of light blues, from pale sky blue to a slightly deeper, more saturated blue in the shadows of the bubbles.

PROTECTING OUR WATER RESOURCE

# Guide to Responsible Well Ownership



A full-page photograph of a desert landscape at sunset. In the foreground, a curved concrete reservoir holds still water that reflects the vibrant orange and yellow sky. A tall, dark metal windmill stands on a small rise in the middle ground, its circular cap and lattice tower silhouetted against the bright sky. The background consists of a flat, arid plain with sparse, low-lying shrubs and a distant horizon line.

Well Water.  
Well Protected.

The invention of  
water-pumping  
windmills in 1854  
made it possible  
to live, farm and  
ranch on Texas land  
previously thought  
uninhabitable.



# Responsibility Starts With You

HARMFUL SUBSTANCES CAN find their way into the Edwards Aquifer and our drinking supply through wells that are improperly constructed or maintained, neglected, abandoned, or located dangerously close to contamination sources. However, with proper well construction, regular maintenance and water quality testing, you can help prevent harmful contaminants from entering the aquifer and, by doing so, protect the water we all share.

## YOUR RESPONSIBILITIES AS A WELL OWNER

### WELL CONSTRUCTION PERMIT

An Edwards Aquifer Authority (Authority) well construction permit is required to construct a new well or alter an existing well.

### REGISTRATION

All wells, regardless of their age, that withdraw water from the Edwards Aquifer must be registered with the Authority.

from potential contamination sources; disinfection of pumping equipment; surface seals; and ensuring that hazardous substances are not stored near your well.

### WELL PLUGGING PERMIT

An Authority permit is also required to permanently close an unused or abandoned well.

### MAINTENANCE

All Edwards wells must comply with Authority and state standards for separation distances

### REPAIR/PLUGGING

Wells that are no longer in use must be properly repaired to required standards or be plugged.



Courtesy of the Witte Museum, San Antonio, Texas

*San Antonio River at Guenther's Mill* by Texas impressionist Robert Jenkins Onderdonk, depicts the first mill in the city to use a water turbine for power, built in 1868. Right: The first American windmill mechanism was mounted on a four-legged wood tower that could be constructed over a well in one day. Shown: Water well drilling, Texas, ca. 1909.





# Common Types of Well Construction



With proper well location—at least 150 feet from livestock pens, septic systems, and other sources of contamination—you can help keep contaminants out of our aquifer.

## MODERN WELLS

Today's wells are usually drilled with rotary equipment to depths of hundreds or thousands of feet and are lined and sealed with well casing to prevent collapse, keep out surface contaminants, and house pumping equipment.

## OLDER WELLS

Older wells may be particularly vulnerable to contamination. These wells typically have inadequately sealed or deteriorated well casing. Likewise, shallow hand dug wells lack continuous casing and sealing, making them a potential risk for contamination.

Threaded drill pipe enables the drilling of wells to depths of thousands of feet. Above: The first windmills were greased weekly by "range riders" who had to brave swaying towers and card-table sized platforms under which swarms of wasps would hang their nests.

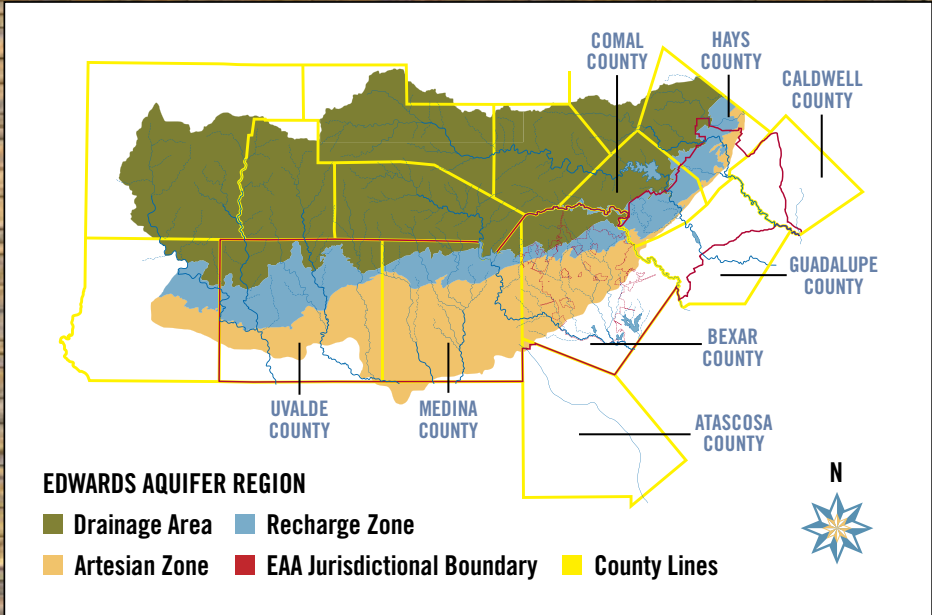
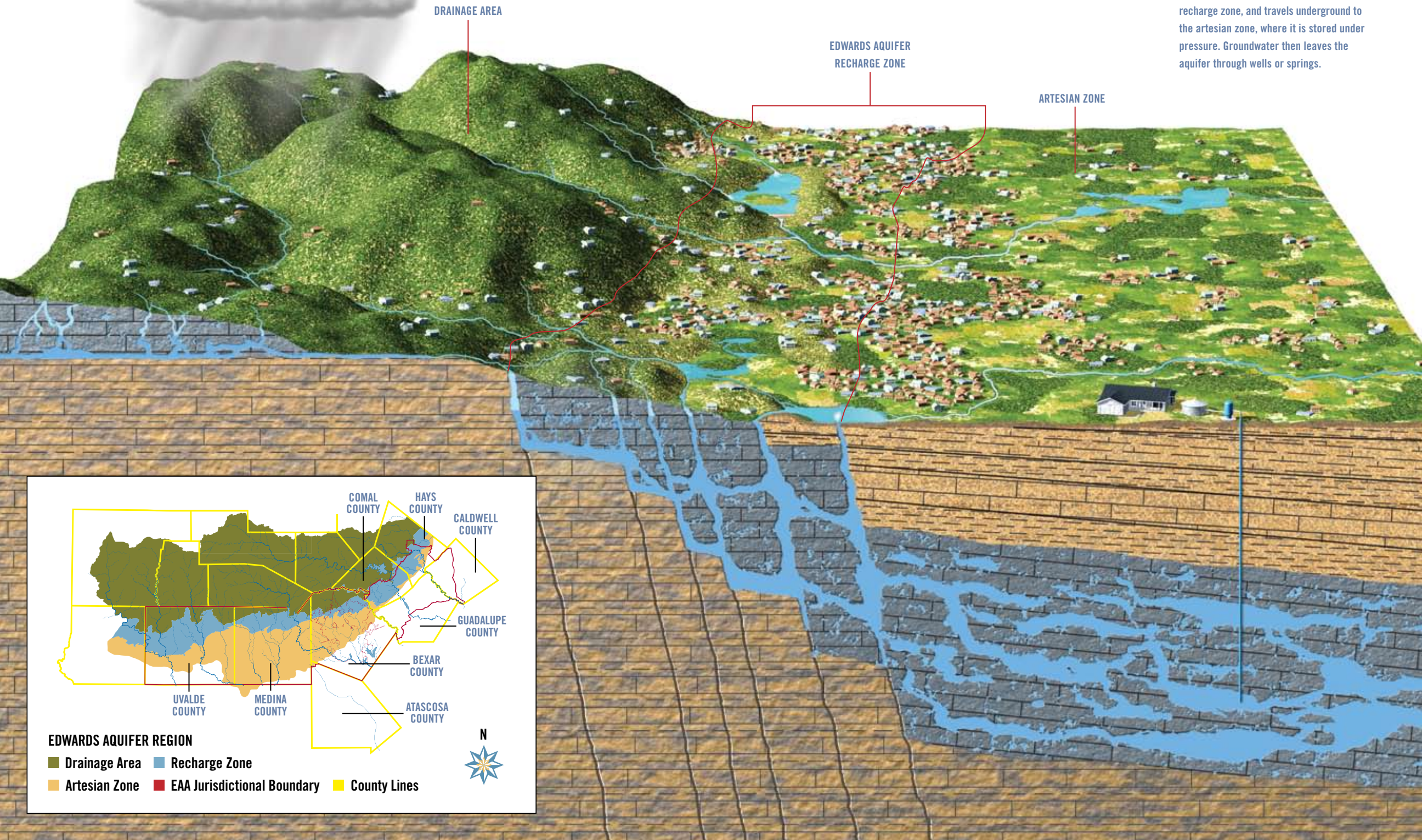




# The Edwards Aquifer System

From the western-most reaches of our region in Uvalde County to points east in Hays County and many places in between, the Edwards Aquifer is the natural water resource that supports approximately 1.7 million of us.

This generalized cross section of the Edwards Aquifer region highlights the key components of the aquifer and how they inter-relate to form a natural underground water system. Rain falls onto the drainage area, enters the aquifer through the recharge zone, and travels underground to the artesian zone, where it is stored under pressure. Groundwater then leaves the aquifer through wells or springs.





# Maintaining Your Well

## PROTECTING OUR WATER AT THE SOURCE

You can minimize problems and protect our water by working with a licensed well contractor to establish a routine inspection and maintenance schedule based on your well's characteristics and your specific water supply needs.

## INSPECT THE WELLHEAD SEVERAL TIMES A YEAR

- ◆ Prevent surface water from collecting and flowing into the well by making sure the ground slopes away from the well and that the well casing extends at least one foot above the ground.
- ◆ Cap, seal, or plug any unintended cracks or openings.
- ◆ Ensure there are no open spaces around the well casing into which contaminants could flow.
- ◆ Have your well contractor stop any water flowing from the top of the well.
- ◆ Remove pest-attracting foliage and other debris from around the well.
- ◆ Never use or store hazardous chemicals around your well.
- ◆ Check inactive wells as you would an active one.
- ◆ Turn the pump on several times a year to ensure proper functioning. If you won't be using the well again, properly plug it.

## KEEP COMPLETE WELL RECORDS

- ◆ *Permits.* Keep all permits required for constructing your well.
- ◆ *Driller's records.* Describes well construction details including total depth, amount of well casing installed, type of well casing used, any uncased or screened



interval, depth where water was encountered, and soil or rock types encountered.

- ◆ *Pump Test Data.* Notes how much water the well can produce.
- ◆ *Distribution Map.* Draw or obtain a map of all the buried water pipes connected to the well. If you share the well, map the plumbing in neighboring property, too.
- ◆ *Physical Location.* Measure the distance from the well to permanent structures (e.g. centerline of the road or corner of the house).
- ◆ *Maintenance Records.* Include details of all maintenance performed.
- ◆ *Water Quality Data.* Helps detect changes, which may indicate problems. Annual testing for harmful bacteria is recommended.
- ◆ *Disinfection History.* Note why, when, and how it was done.

## REPAIR OR PLUG ABANDONED WELLS

Unused and abandoned wells (inactive for six months or more and in deteriorated condition)

can channel contaminated water straight into our aquifer. Improperly plugged wells can also cause future aquifer contamination.

These wells must be cleared of any equipment or debris and sealed from the bottom up with special sealing material by a licensed well contractor. You must obtain a plugging permit from the Authority before plugging procedures begin. Additional well plugging permits may be required by other local governmental entities.

## DELAY DETERIORATION AND PROLONG PERFORMANCE

Whether from well casing failure or pump problems, all wells will deteriorate over time. But with proper design and construction, pump sizing, operation and regular maintenance, most problems can be prevented.

Licensed well contractors can help you devise a long-term maintenance plan. Left: Well enclosures help protect precious water from contamination. This photo by renowned photographer Russell Lee captures a man dipping from an enclosed well in Texas in 1939.





# Preventing Well Contamination

## IF YOU DON'T WANT TO DRINK IT, DON'T PUT IT NEAR YOUR WELL OR ON THE GROUND

Contaminants can flow down your well just as easily as water flows up. Take measures to protect our water supply.

## CREATE A CONTAMINANT-FREE SAFETY ZONE

Keep at least 50 feet around your well free from chemicals, equipment storage, and recreational activities. Also, keep septic leach fields or spray areas, animal enclosures, manure/compost piles, chemical/fuel storage, machinery maintenance, and auto repair activity at least 150 feet from your well.

## MAINTAIN YOUR SEPTIC SYSTEM

While the 150-foot required distance between your well and septic leach field or spray area provides relatively good protection against bacteria and viruses, it doesn't protect against all household hazardous waste. It's also important to maintain your septic system by:

- ◆ Not putting hazardous chemicals down the drain.
- ◆ Having an inspector examine clogged drains, sewage odors, and pooling areas.
- ◆ Having your system inspected and pumped every three to five years.
- ◆ Not using your toilet as a garbage can.
- ◆ Not parking or driving heavy equipment over your leach lines.
- ◆ Not planting trees near your leach line.

## PROTECT YOUR WELL STRUCTURE

You can protect your well from physical damage and costly repairs by building a small structure or fence around it, allowing access for maintenance and repairs. Locking the enclosure helps protect your well from possible intruders such as pets, livestock, and other animals. At a minimum, clearly mark the well so it doesn't get lost in surrounding vegetation.



Our survival depends on reliable access to clean water. This photo by renowned photographer Russell Lee captures a girl getting water from a faucet that served twenty houses in 1949.





# Typical Domestic Well Design Layout





## Protecting Water Quality

### WATER SAMPLING IS PARTICULARLY IMPORTANT

Surface water can flow quickly into a karst aquifer, picking up substances in its path, including naturally occurring minerals and potentially harmful substances resulting from animal and human activity.

### WATER SAMPLING AND TREATMENT

Knowing and tracking changes in the quality of your well water is an important step in ensuring it remains safe for consumption. The Authority recommends well owners periodically submit water samples from their well to a certified laboratory to check:

- ◆ Annually for bacteria, nitrates/nitrites, and any contaminants of local concern.
- ◆ More frequently if there is a change in taste, odor, appearance, or the introduction of possible contamination sources in the area.
- ◆ If family or visitors have recurrent gastrointestinal illness.
- ◆ If an infant is living in the home.
- ◆ To monitor efficiency and performance of water treatment equipment.

Before testing, make sure your well system is properly disinfected. Testing water collected from recently repaired pumping equipment or a dirty tap can lead to false positives. Your licensed well contractor can disinfect your well. In addition, the laboratory performing the water analysis can provide instructions on how to disinfect the sampling tap and provide proper sample containers. A water treatment device will often resolve any water quality issues, but it should be noted that not all water treatment systems work for every contaminant or for every water type. A water treatment professional can help you determine which device will work best on the substances you want to treat.



In the early 1900's, the cost to dig an artesian well ranged from \$1,000 to \$1,500. Left: Anton Benishek fills a stock pond from an artesian well, Atascosa County, late 1940's.







## WELL PROTECTION CHECKLIST

- ☐ Keep the area around your well free from foliage, debris, standing water, and chemicals.
- ☐ Periodically check the well cover or cap on top of the casing to ensure it's in good condition and is sealed.
- ☐ Don't allow back-siphoning; make sure the well has a back flow preventer installed. When mixing pesticides, fertilizers or other chemicals, don't put the hose inside the tank or container.
- ☐ Keep the top of your well at least one foot above the ground, with the ground sloping away for proper drainage.
- ☐ Be extra careful when working or mowing around your well. A damaged casing could jeopardize sanitary protection.
- ☐ Keep all your well records in a safe place.
- ☐ Be aware of changes in your well, the area around your well, and the water it provides.
- ☐ Have unused or abandoned wells properly repaired or plugged by a certified water well contractor.

Agriculture depends heavily on ground-water for irrigation. Poor or contaminated groundwater could jeopardize crops and threaten the health of livestock.

## RESOURCES

More information about responsible well ownership can be found on our website at [www.edwardsaquifer.org](http://www.edwardsaquifer.org). This includes:

- ◆ Well construction permit application
- ◆ Well plugging permit application
- ◆ A list of water well related contractors
- ◆ Well registration form

## CONTACT

You can help prevent contamination and protect our water. For more information, contact us at:

EDWARDS AQUIFER AUTHORITY  
1615 N. ST. MARY'S STREET  
SAN ANTONIO, TX 78215

PH 210.222.2204

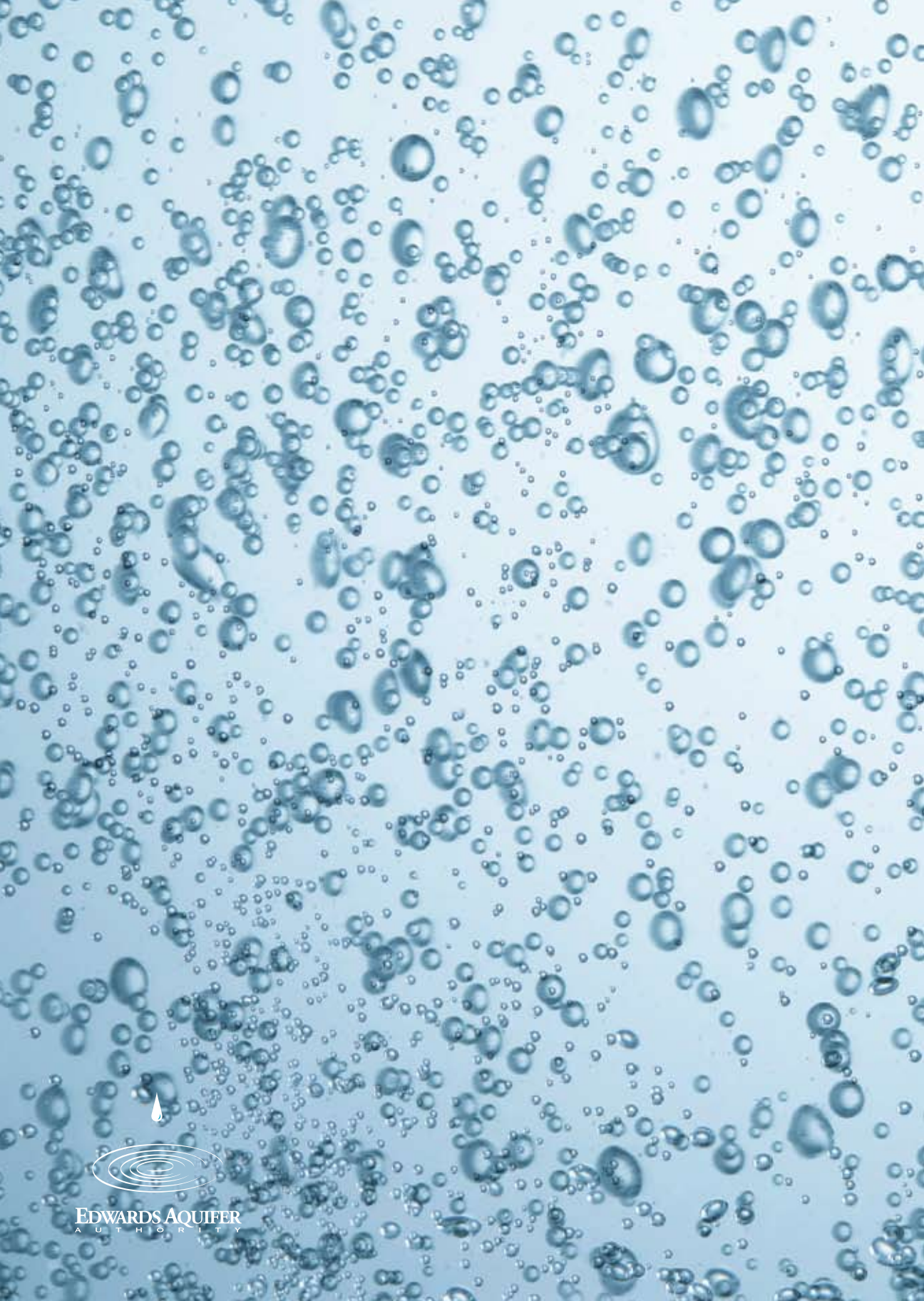
TF 800.292.1047

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