

Station 6 - Cistern

The cistern at 168 Elm Ave.

Cisterns are an ancient rainwater storage tool that were commonly used in the Chicago area well into the 1920's. In fact, most houses constructed before and around the turn of the century (1900) were fitted with cisterns.

It was therefore not too much of a surprise when a cistern was discovered at 168 Elm Ave. It is likely that it was built by John David Neumann, a wheel maker from Germany who also specialized in cistern construction. The cistern had been out of service for several decades. Old plumbing fixtures in the basement that were connected to the cistern are still evident today, although no longer functioning.

The cistern is a cylinder-shaped brick masonry structure with a conical top and a 2 feet diameter riser. The riser was in pretty bad shape and was replaced with a precast concrete unit (see image below). The cistern dimensions are six feet in diameter and six feet deep, with a volume of 160 cubic feet (or 1,200 gallons). A little clean-up and repair on the riser put the cistern back into use.

The cistern plumbing

The cistern is filled by rainwater runoff from the north roof (780.5 square feet). Both downspouts (east and west) are connected to barrels from which the water eventually flows into the cistern. The purpose of the barrels is not to hold water, but to provide temporary storage and bounce: The downspout pipe into the barrel is bigger than the pipe at the bottom of the barrel. In other words, more water may flow from the roof into the barrel than can flow out of the barrel toward the cistern. The barrel will store

that surplus water until the smaller pipe to the cistern can catch up. Both barrels are fitted with filters (like the rain barrels) to keep debris out of the pipes and cistern. With an average annual precipitation of 36 inches in Elmhurst, the cistern has the potential to collect up to 17,500 gallons in the course of one year. The collected water is used to irrigate the vegetable garden.

How to get water out of the cistern?

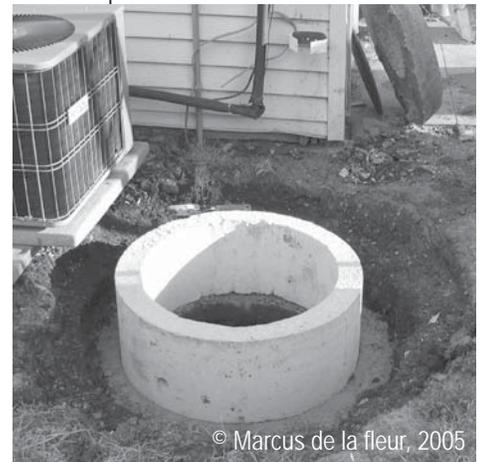
There is an electrical outlet at the corner of the house near the cistern. A simple utility or sump pump accesses the stored rain water for irrigation. In most cases rainwater is better suited to irrigate plants than tap or well water, because it is not chlorinated, fluoridated or loaded with dissolved salts.

What to do with the cistern in the winter?

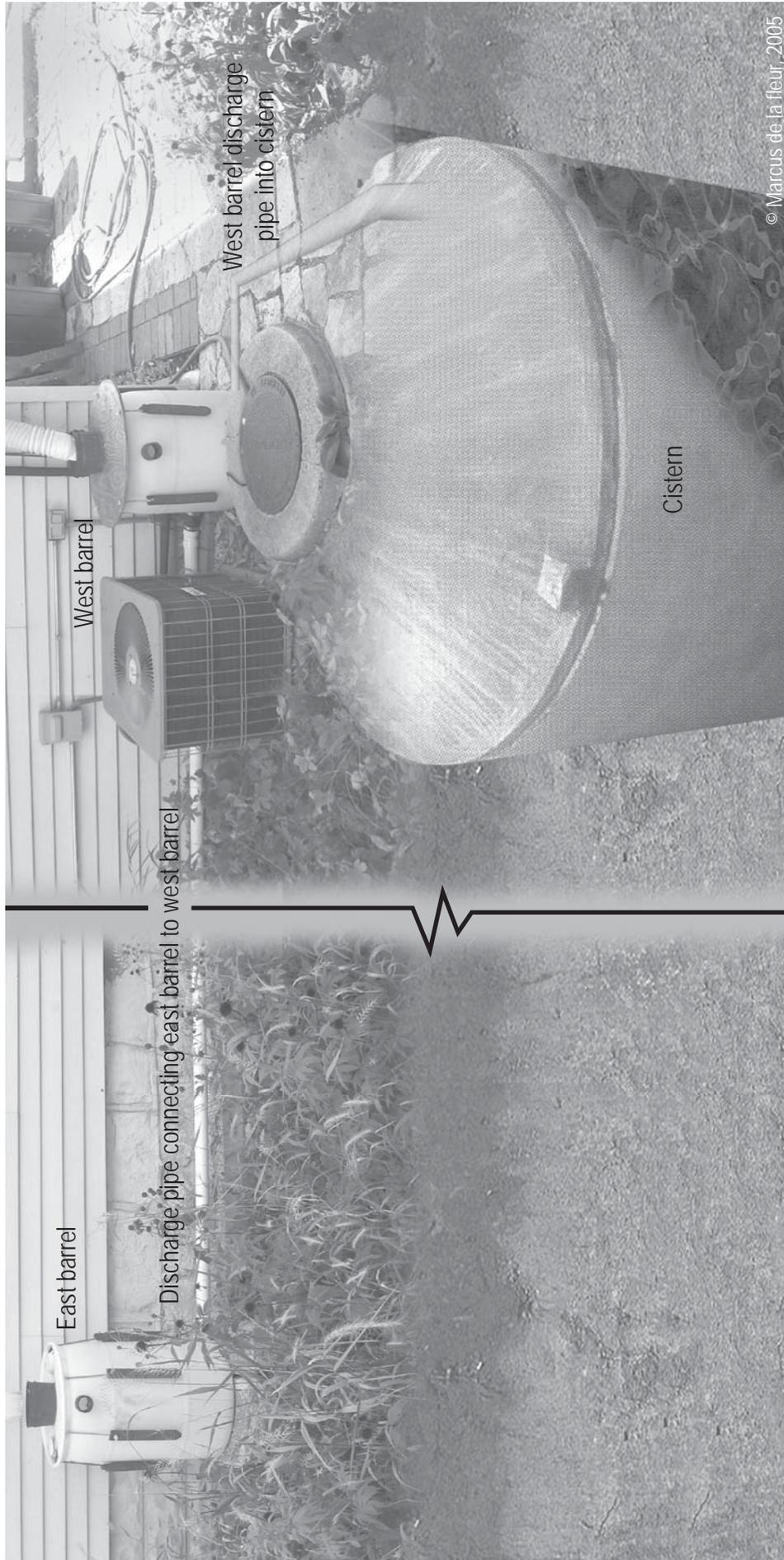
Unlike the rain barrels, the cistern is not subject to freezing. It is buried deep enough below the frost line that the water in it does not freeze. Thus no re-routing of the winter flows is needed. In fact, it is during winter and early spring when the cistern finally fills up to the top, providing sufficient water volume for the summer months.

- Station 1 - Green roof
- Station 2 - Rain barrels
- Station 3 - Porous pavement
- Station 4 - Rain garden
- Station 5 - Gravel grass
- Station 6 - Cistern**
- Station 7 - Bioswale

Cistern repair: Replacement of old cistern riser with new precast concrete unit.



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A brief cistern history
Like so many other water collection technologies, cisterns have been known and used for a long time. Archeological research has documented the extensive use of cisterns in the old Greek and Roman cultures.

The Knossos Palace on the Isle of Crete (1700 B.C.) is known to have had a extensive network of cisterns, each holding an average of 12,500 gallons. The ancient settlement of Masada (100 B.C.) had a cistern network with an estimated combined volume of 12 million gallons. Roofs on Roman houses were pitched to a roof drain from which rain water was piped to cisterns. The Byzantine culture produced another well known example, which has become a tourist attraction: The cistern of Istanbul, which had a capacity of 20 million gallons. Later examples are known from Venice, where cisterns had integrated sand filters to improve water quality.

Cisterns were also used by the first settlers in North America. These cisterns typically had no filter for the incoming water, but a filter for the water that was pumped out of the cistern. Cisterns are still in use today, particularly in parts of the country that suffer from water shortages. Typical use of cistern water is:

- Irrigation
- Water for cleaning
- Water for laundry
- Water for toilet flushing

In some places within the U.S., cistern water is used to supplement drinking water. In those cases modern filtering technology, such as an ozone system, reverse osmosis and/or ultra-violet irradiation are used to make collected rain water suitable for consumption.