

WELL WATER VS. CITY WATER COST COMPARISON



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Which is more expensive, city water or private well water?

Comparing the cost of a well water system to a city water connection is not straightforward, because there are different types of costs incurred at different times throughout the life cycle of the water system. This fact sheet discusses the differences and compares the cost of each system for a typical household in North Pole, Alaska. For comparison, costs are based on a three person household.

In a private well water system: the upfront cost of installing the well, pump, and other associated components is the primary expense. However, even if you purchase a property that already has a water well, there are also maintenance costs throughout the life of the home. These maintenance costs include replacing well pumps, pressure tanks, heat trace, and the water treatment system. The pump, pressure tank and treatment system are each expected to last 15 years before needing replacement. Additionally, the well itself may eventually need replacement.

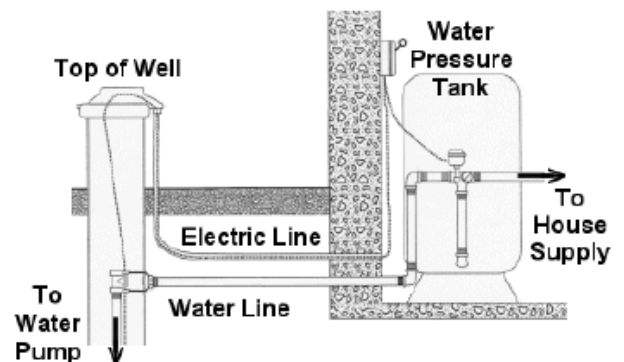
The owner of a water well system is also responsible for ensuring an uninterrupted water supply for the household. A power outage will cause an interruption in water supply, unless the owner has a backup generator. Failure and subsequent replacement of the well components can also cause an unexpected interruption in water supply.

Another consideration in a well water system is the quality of the water; natural well water is often high in iron and other minerals and may cause discoloration of clothing and appliances. It may also have an unpleasant taste. Testing well water quality to ensure there is no impact from septic systems or other potential contamination has a cost and is the responsibility of the well owner.

In a city water system, the primary expenses are the initial connection, the monthly water usage bill, and power for the circulating pump. The city water system has backup generators in case of a power outage and is tested regularly to ensure it is free of contaminants. The water quality results are available for review by the public.

What is a typical well water system?

Primary components of a well water system are the well, an electric water pump, a heat-traced water line to the house, a pressure tank, and a treatment system. A simple configuration is shown in the figure to the right. For this analysis, a typical well is assumed to be 50 to 150 feet deep, has moderate levels (greater than 7 parts per million) of iron, has hard water, uses a ½ horsepower submersible pump, has a 50 gallon pressure tank with a control system, is 50 feet from the house and has 1" copper piping lined with heat trace.



What is a typical city water connection?

The primary components of a city water system are the piping to connect the house to the city water main, the water usage meter, and the circulation pump. For this analysis, a typical connection is considered to be located 150 feet from the city water main, uses 1" copper piping, and has a ½ horsepower circulation pump that runs continuously for 6 months to prevent freezing and maintain positive pressure. The pump is expected to last 15 years before needing replacement.

What are the operation and maintenance costs?

The operation and maintenance costs over a 15-year period were estimated for both a well water system and a city water system. Table 1 summarizes annual costs for a water well system, assuming use of a water softener and iron filter, annual standard water quality testing, and some minor basic well repairs. Table 2 summarizes annual costs for water provided by a city water connection. Table 3 provides periodic maintenance costs for both types of systems; these costs would be expected to be needed approximately every 15 years.

The cost information from Tables 1 through 3 is reviewed below:

- The total estimated annual cost for a water well is approximately \$925 versus \$624 for city water.
**Note that, under the Settlement Agreement between the City of North Pole, Flint Hills Resources Alaska, and the State of Alaska, owners of non-vacant lots will be given a \$2,000 credit to assist the transition to city water. This credit should pay the water bills for approximately 3 years (based on average usage rates for the City of North Pole).*
- Over a 15-year period, and not considering the \$2,000 subsidy, the total operating and maintenance costs for a well water system are approximately \$18,000 and the costs for a city water system are approximately \$10,160.

Table 1: Annual Water Well Operation and Maintenance Costs

	Annual Cost	Basis
Electricity for water pump	\$19	50,000gal/year = 0.1gpm @ 12gpm well = 0.2hr/day, 0.5hp pump = 0.373kWh --> 0.075 kWh/day
50' of heat trace	\$288	5 watts/foot
Salt for softener system	\$128	40lb/bag, 16 bags/yr, \$8/bag
Filters to remove iron	\$240	2 filters/mo -->24 filter/yr
Water quality testing	\$150	1 sample tested for total coliforms, arsenic, nitrates
Miscellaneous Repairs	\$100	Cap on well cover, disinfection chemicals, additional testing, leak repairs, casing crack repairs, etc.
Total estimated annual costs	\$925	

Table 2: Annual City Water Operation and Maintenance Costs

	Annual Cost	Basis
Electricity use of circulation pump	\$24	Continuous operation for 6 mo, 1/25 hp= 0.03 kWh for 4320 hr
Base monthly charge	\$60	\$5/month base monthly rate * 12
Water usage rate	\$471	Average household usage of 2,300 gallons at \$0.01705/gal hr = \$39.215/month * 12
FRR (Facility repair and replacement rate)	\$69	\$5.75/month FRR
Total estimated annual costs	\$624	

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Table 3: Periodic Maintenance Costs (Approximately every 15 years)

	Cost	Description
City Water		
Circulating pump replacement - Pump	\$300	Grundfos 1/25 hp Comfort Series recirculation pump
Circulating pump replacement - Labor	\$500	4 hr @ \$125
Total Periodic Maintenance Cost (every 15 years) – City Water	\$800	
Water Well		
Pump replacement - Pump	\$700	Myers Predator series, 0.5 hp, 12gpm, submersible, 230V
Pump replacement - Labor	\$250	2 hr @ \$125/hr
Pump replacement - Drop pipe	\$75	50' @ \$1.5/ft
Pressure tank	\$600	Myers 50 gal, steel, vertical
Tank replacement-Labor	\$500	4 hr @ \$125/hr
Filter and softener system replacement with installation	\$2000	treat >7ppm iron, medium flow
Total Periodic Maintenance Cost (every 15 years) – Water Well	\$4,125	

Source of Information

Cost information that was used to complete this analysis was gathered from local sources. The water well costs came from a 2011 Fact Sheet that compiled information from the following sources: Northern Drilling, Inc., Mr. Electrician, EcoWater, Alaska Water Systems, Northern Lights Services, Bud Howell Excavators, Golden Valley Electric Association, and Analytica Labs. Additional information on the requirements of pumps, tanks, wiring, fittings, aquifer depths, treatment requirements, and typical well maintenance were gathered from the United States Environmental Protection Agency and the Alaska Department of Environmental Conservation data. The city water costs came from the North Pole Municipality Public Works Department.