

Number, volume of Water Tanks: There are two water tanks, one fills about 500.000 gallon of water, the other about 670.000. The tanks are connected by an insulated pipe and operated by a water plant.

Raw water pumped from the river goes to the bigger water tank from where it can be treated with chlorine. The treated water then goes to the other tank. Before it is served at the pay-box-collection station it runs through a sand filter.

Owner of the water infrastructure: Owned and operated by the City of Kivalina.

Hot Water Production: The water plant has two oil-fired boilers, each with 400.000 btu

Age of the water-supply infrastructure: One water tank was installed in 1976, the second came in a couple of years later. The pipe system is 36 years old. It was not possible to find out how old the facilities in the water plant are.

Total number of inhabitants in the whole area concerned and the number of connected inhabitants: According to 2010 Census 386 people are living in Kivalina, It's recording 99 housing units in the community, 85 are occupied.¹ 112 housing units were recorded by counting the existing housing units on September 2nd, 2012, only two or three of them seemed to be un-occupied.

Public Buildings connected to the water tanks:

The school (number of pupils: 130)

The washeteria (currently providing: 2 showers, 2 toilets, 4 washing machines, 3 dryers)

Public Building with running water while not accessed to the water tanks:

Health Clinic owned and operated by Maniilaq²

Non-Connected Public Buildings:

City Office and Tribal Building (2 storey building)

Post Office

One Office Building (NANA, Maniilaq)

One commercial store

Boys and Girls Club

The Prison

The Bingo Club

The Community Building

The collecting system from the river to the tank: There is a cement block anchor in the river where water is taken upstream and about 2½ miles hard pipes which is currently lost to the river. When not used the pipeline is usually stored 2m above ground on a carrying structure along the coast line of the river:



When water is being collected the pipes a pump is taken upstream by boat. At the mouth of the Wulik river where it empties into a lagoon next to the village a 1.200 ft long flexible hose runs through the lagoon to connect to the pipe system to the water plant. The community currently uses a 2 gallon per minute pump, using this equipment the filling of the tank takes two weeks.

¹ http://www.commerce.state.ak.us/dca/commdb/CIS.cfm?Comm_Boro_Name=Kivalina

² www.maniilaq.org

Sewage: The sewage water of the washeteria goes to drain field. The sewage water of the school goes to the ocean „after running through a purification system,“ as Zoe Theoharis, School Principal told. The Local Health Clinic has a septic tank.

Mechanical, biological, physical/chemical stages in the process: The water is pumped out of the Wulik river. The water is being treated with chlorine, there is a sand-filter.

The schools sewage drains into the ocean after going through a purification system. The current system is very old, therefore the school hopes to be able to connect to the new waste water treatment plant soon (see: following point „Previous projects developed related to water supply, sewer system or waste water treatment“). The washeteria is connected to a drain field.

Previous projects developed related to water supply, sewer system or waste water treatment: Besides the current Water Plant, ANTHC³ initiated the installation of a New Wastewater Treatment Plant in 2004 to connect both the school and the washeteria. The system will be based on a biofilter and UV-desinfection. Construction work started in 2008 and completed in 2009. Still neither the washeteria nor the school is connected to this new waste water treatment system. When talking to one of the city officials, we heard that there are concerns that they won't be able to finance the new waste water treatment plant which they said will cost 200.000 US-Dollar per year on top of the current costs of 180.000 US-Dollars.

On-site in Kivalina you also find a pipe system connected to some of the housing units:



It was not possible to find any information according to these pipes.

Other important water consumers: Besides the school and the washeteria there are no other entities that take their water out of the tanks. There is no agriculture.

Source of water: The water is being collected about 2½ miles upstream Wulik river. Usually the water tanks are being refilled once a year, in July or August before school starts. That is currently not working due to a flooding after a storm that also caused part of the pipe system to fail. The pipe system are 36 years old.

Other possibilities for collecting and providing the households with water:

People tell about a well that has been in town before the water tanks came in but Glenn Gray and Associates mentions that „wells drilled near the school produced only salt water.“⁴

Groundwater protection zones (i.e. areas of restricted use and construction

³ <http://www.anthctoday.org>

⁴ http://www.commerce.state.ak.us/dca/planning/accimp/pub/Kivalina_Consensus_Building_Project_Final_Report_July_2010.pdf

possibility): Due to a report from the Alaska Department of Environmental Conservation, there is no use of groundwater in the arctic regions: „**Groundwater Availability:** Groundwater is available in most areas of Alaska, except where permafrost is very deep in the northern part of the state. Southcentral and interior Alaska have the greatest dependence on groundwater. Arctic, western, and southeastern Alaska make more frequent use of streams, rivers, lakes, and rainwater catch-ments. The largest groundwater withdrawals occur in the Anchorage and Fairbanks areas, and to a lesser extent, the Matanuska-Susitna and Kenai Peninsula Boroughs in the southcentral portion of the state.“⁵

Operating pumping stations: The community uses a 2 gallon per minute pump working on fuel and currently they are looking at using a 5 gallon a minute pump because of the closing weather window.

Amounts of water typically consumed per inhabitant and per household per day: There are no available numbers on that.

Seasonal difference in water consumption: There are no available numbers on that.

Expected demographic or industrial/agricultural consumer growth in the area: There is no large-scale growth area identified at this point.

Maintenance Costs of existing structure: appr. 180.000 US-Dollars per year

5 <http://dec.alaska.gov/eh/docs/dw/DWP/Groundwater%20fact%20sheet%202005.pdf>