
TURKU REGION ARTIFICIAL
GROUNDWATER PROJECT

PROJECT FACTS AND FIGURES

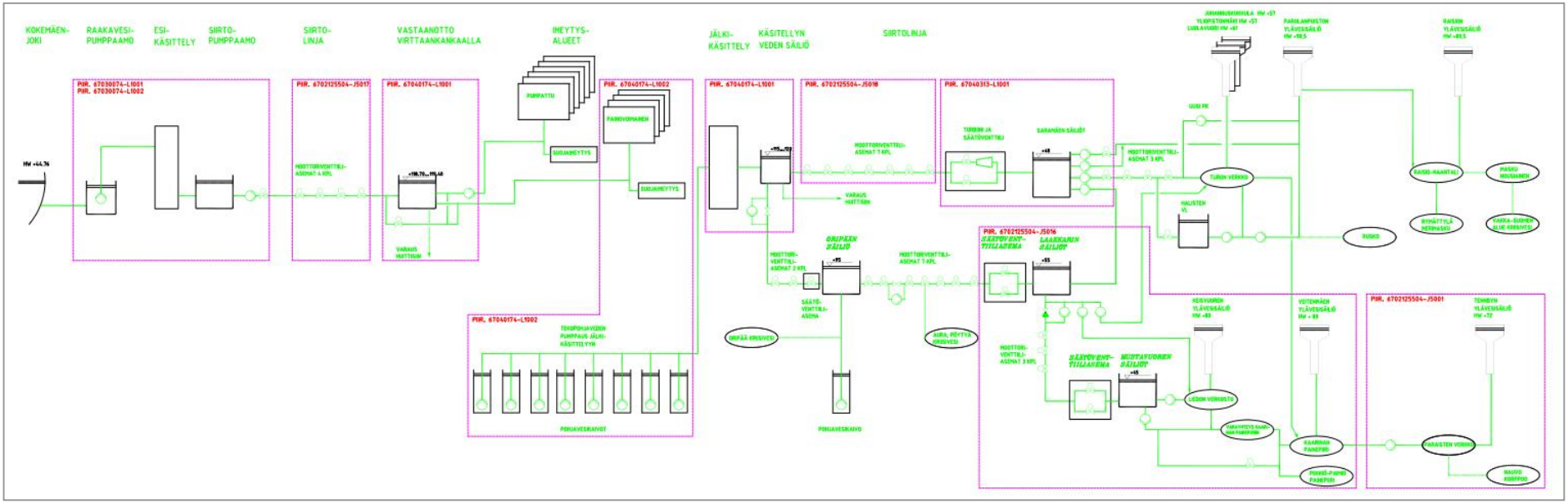
- A new water supply system was built for Turku region
- The system replaced all old raw water sources and water treatment plants
- Completely automated system able to work on its own, without human intervention

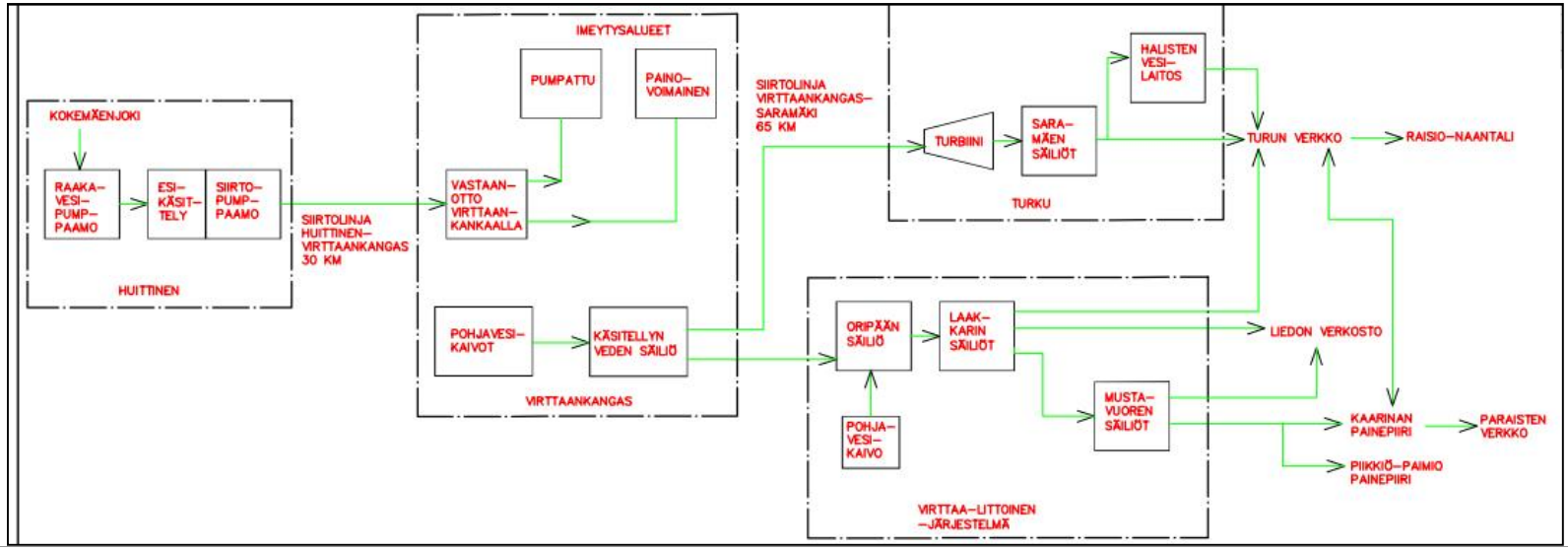
- Key facts and figures
  - Population in the supply region 250,000 people
  - Capacity 125,000 m^3/d
  - Raw water intake and pre-treatment
  - Artificial groundwater area 500 ha
  - Transfer lines more than 100 km (DN1200 and DN1000)
  - Underground reservoir 60,000 m^3
  - Investment cost EUR 170 million

SERVICES PROVIDED BY PÖYRY

- Basic design of the entire system
- Environmental impact assessment and environmental permit applications
- Hydraulic and functional design of the entire system
- Detail design of all plant facilities
- Total automation design
- Detail design of reception and distribution of water in local networks
- Consulting during construction, commissioning and operation

GENERAL SYSTEM SCHEME



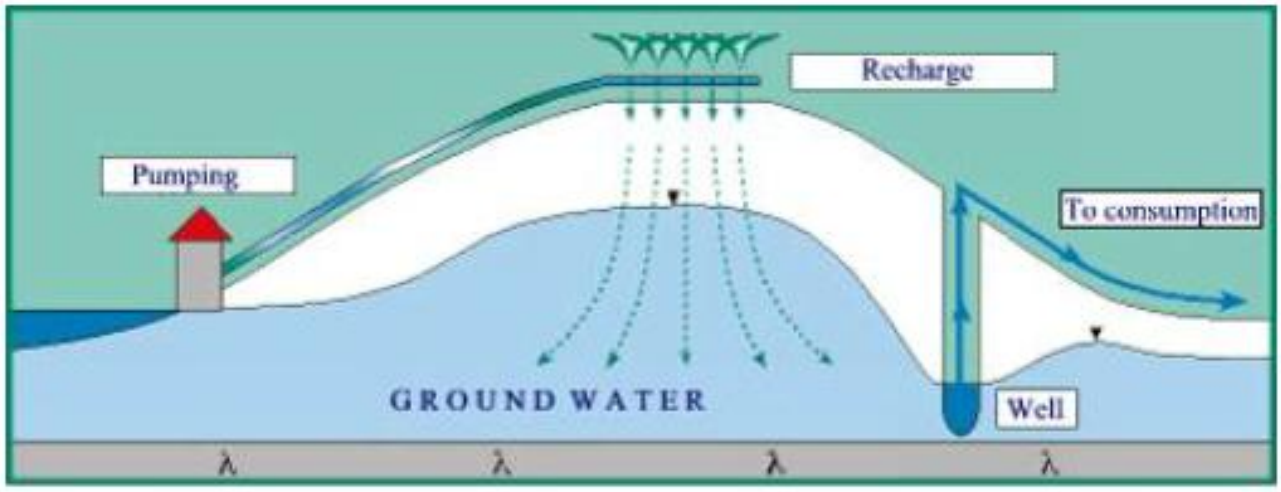


RAW WATER INTAKE AND PRE-TREATMENT

- Raw water source is a lowland river
  - Seasonal peaks of organics and clay
  - High temperature variations
- Underground pumping station in river bank
- Pre-treatment plant
  - Drum screening
  - Polyaluminium chloride addition
  - Dissolved-air flotation
  - Rapid sand filtration in two-layer sand filters
- High-pressure pumping of treated water

ARTIFICIAL GROUNDWATER PLANT

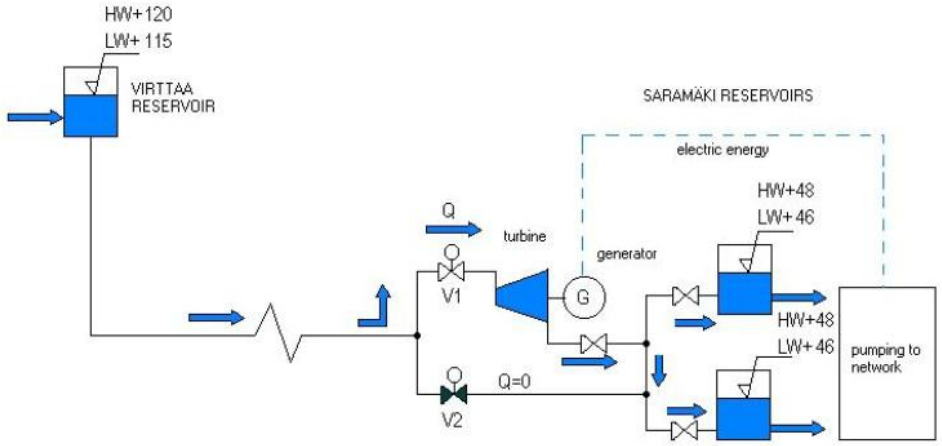
- Raw water is led into basins, from which it infiltrates into the Virttaankangas esker, forming artificial groundwater
- 3D modeling of geological zones and aquifers was used in planning
- Water is pumped up from groundwater wells and directed to transmission line
- Retention time of water in the ground is 1 month



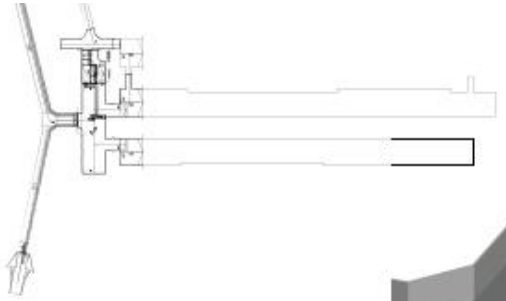
WATER TRANSMISSION LINES

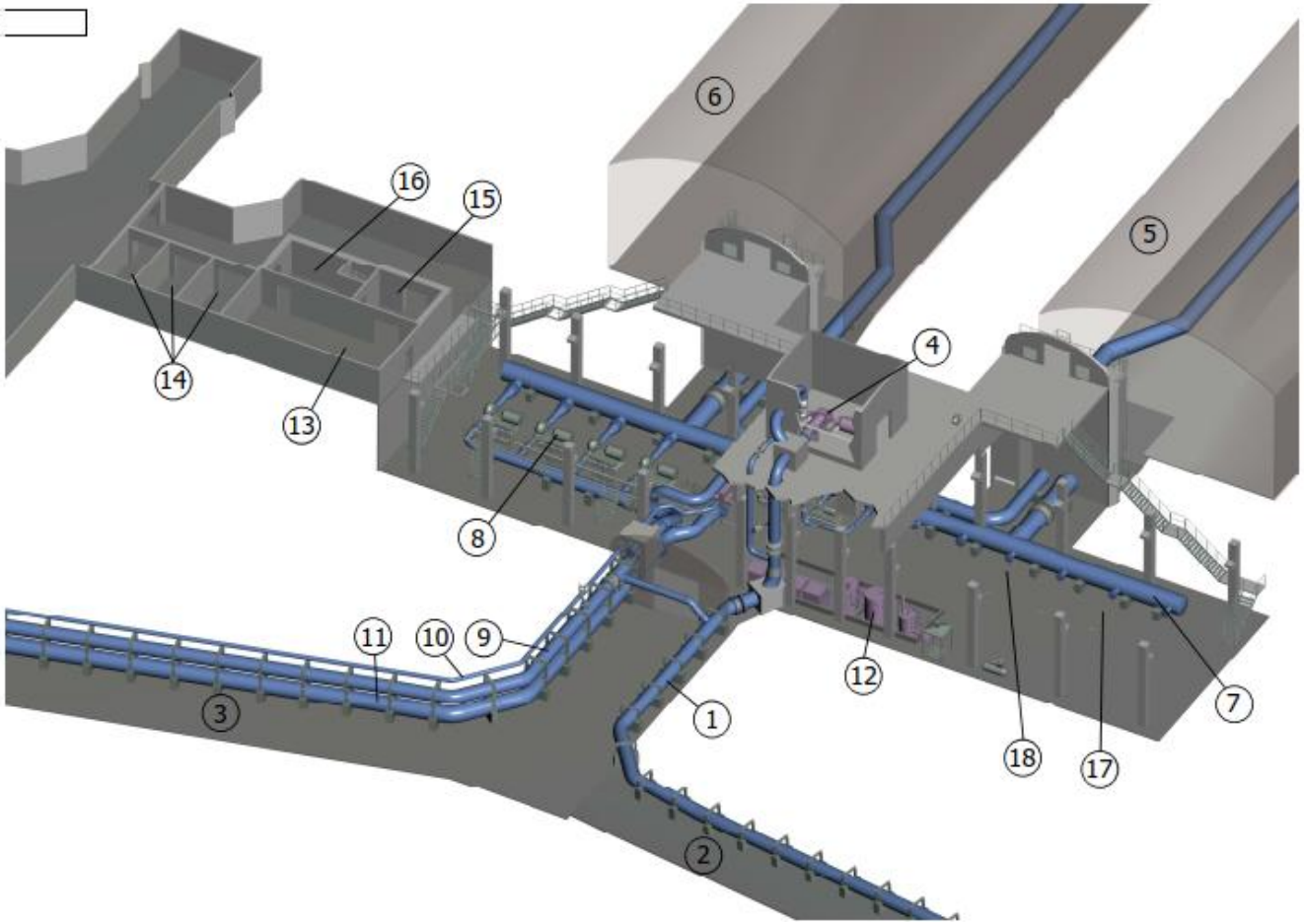
- 100 km of piping (DN1200 and DN1000)
- 11 valve stations along the lines
- Automatic leak monitoring and location system based on flow and pressure metering
- Automatic sequences for closing and opening of transmission line
  - Start and stop of pumping
  - Closing and opening of valves
- Water hammer control tanks at high-pressure pumping station
  - Max pressure 14 bar
- Electricity production by water turbine at lower end of transmission line (360 kW)

Water turbine, operational principle



UNDERGROUND RESERVOIR AND PUMPING TO DISTRIBUTION NETWORK





1. DN1000 tulolinja Virttaankankaalta
2. Tulotunneli 83 m
3. Ajotunneli 132 m
4. Turbiini
5. Kalliosäiliö 1, V = 30 000 m3, L = 238 m
6. Kalliosäiliö 2, V = 30 000 m3, L = 253 m
7. Painetukki DN1400
8. Pumppaus Halisiin
9. Linja Halisiin DN1000
10. Moision haara DN300
11. Ylivuotolinja DN1200
12. Desinfiointilaitteisto
13. Sähkötila
14. Muuntajat
15. Paikallisvalvomo
16. Automaatiotila
17. Varaus pumppaukselle Turun pohjoiseen paineputkeen
18. Varaus pumppaukselle Laakkarilla