



Pump Gate – an innovative solution to flood control in densely populated areas



The Grundfos Pump Gate solution was the most suitable for Poglar, considering the limited land area required and the flow conditions from the Angke River.



Grundfos Engineers supervise the installation.

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In Poglar, Indonesia, Grundfos has installed a new innovative solution that protects the local community from flooding without the traditional space requirements for a pumping station, floodgate and reservoir. Combining floodgates and axial flow pumps gives a 'Pump Gate' solution on an existing waterway, relieving flood pressure with very easy operation and maintenance.

Flooding is unavoidable and often unexpected, but it can be controlled to minimise losses and damages. Flooding is a common issue facing most of the low-lying areas major cities in Asia, and in Jakarta, Indonesia, this is compounded by population growth, high annual rainfall and limited space. Soil surface subsidence accompanied by industrialisation and urbanisation further aggravates the situation.

Flooding is the main problem in many areas in Jakarta, and one of them is Poglar, located at Kapuk, Cengkareng, West Jakarta. Flooding is a common issue at Poglar, where high tides frequently inundate the area. The flow conditions of the Angke River also have a major influence on the area. The low-lying geography of Poglar means that controlling the outfall of the Angke River and avoiding backflow up the river from high tides is essential for protecting the local community.

As is always the case with flood control measures in at-risk areas, flooding cannot easily be overcome, but measures can be taken to minimise losses and damages. In cooperation with the Public Works department for Jakarta, This is

what Grundfos Indonesia has done, by installing a Pump Gate.

How Pump Gate works

A Pump Gate consists of a floodgate on an existing waterway equipped with pumps. This removes the need for a separate floodgate, pumping station and reservoir, all of which take up space. Building the submersible pump directly into the floodgate means that the function of a floodgate can be combined with the function of a pumping station and reservoir.

The floodgate and screen can be opened to discharge the retained water by gravity flow. And if the water outside the floodgate gets higher, the Pump Gate can be closed to block back flow. If the retained water reaches a certain level, the pump starts operating to forcibly discharge the retained water.

This approach offers tangible benefits:

- No need for extra land with the costly process of land acquisition, legal delays and disruption to the local community
- Straight forward installation on an existing waterway and with a small construction footprint
- Simple operation, as the pumps are integrated into the floodgate
- A low maintenance solution, because the installation consists only of the floodgate with pumps and a screen; site infrastructure is significantly reduced.

The outcome – the Pump Gate installed at Poglar

For the low-lying area of Poglar and with the added problem of the Angke River flowing through the area, the Pump Gate performs the following functions in one space-saving installation:

- In situations of low tidal pressure, gravity ensures that Angke River water drains out to sea.
- When the tide is sufficiently high to cause flooding, the floodgate can be closed, until sea water levels fall and the gravity feed of river water can resume.
- If river levels are high at the same time as a high tide, the pumps can be started to force water through the floodgate to the sea, at the same time as tidal pressure is held back.

Three gates and six pumps have been installed at Poglar. The existing waterway where the Pump Gate is installed has a channel width of 12 m and a height of 4 m. Under normal conditions, water levels varied from a low of 0.6 m to a high of 2.5 m. Installed are six submersible pumps capable of 6 m³/h flow and 4.2 m head.

Grundfos Indonesia supplied:

- ▶ • Consultancy with local partners
- Supervision of installation
- Resolution of all issues prior to commissioning
- Commissioning of the Pump Gate

Grundfos supplied:

- ▶ • 3 gates with 2 pumps per Pump Gate
- Pump flow 6 m³/s and total head 4.2 m

Integrating the pumps into the floodgates means there are no requirements for other parts, such as a column pipe and separate water gate. As the pump is integrally equipped with the gate, the operation and maintenance of the Pump Gate is very simple and easy.

In the company's role as a business partner for the Jakarta Provincial Government, Grundfos Indonesia has applied the Pump Gate system at Poglar, the first such installation in Jakarta. Although there are other flood control systems that would give the same results, the Pump Gate is most suitable for Poglar, considering the limited land area required and the flow conditions from the Angke River flow.

In Indonesia, Grundfos has worked with flood control at a number of sites, and was actively involved in the first Grundfos Indonesia flood control project for the Surabaya Urban Development, which ran from 2000 to 2006. Grundfos Indonesia received an award in appreciation for its outstanding contribution to this flood control project from the local government. is satisfied.

Quotes



"Flooding is the main problem in many areas in Jakarta, and one of them is Poglar, where flooding is a common issue because of high tides," explains Toni Sudarsono, Field Supervisor, Water Resources Management, Public Works Department, Jakarta. "It is not easily overcome due to geographical conditions. Therefore, one of the strategic programmes of the Government of Indonesia is to minimise flood damage through integrated water resource management. We needed high technology and a perfect solution, so Grundfos was selected as our business partner."

"A traditional pump station requires a large scale site area for the pump station and reservoir, with high costs resulting for the purchase of land and a long time to prepare the site. By using a Pump Gate, no sump pit and pumping stations are required, with minimum space requirements. Compared with the cost of an ordinary pump station with a floodgate and reservoir, we achieved great time and cost reductions," says Supriyadi Supriyadi, Operations Manager, Grundfos Indonesia.

