



wassara

**STRAIGHT  
FORWARD  
DRILLING**



# WASSARA PUT TO THE TEST AT SLUSSEN, STOCKHOLM, SWEDEN

A busy traffic junction in central Stockholm, Sweden is under re-construction. The contractor carefully needed to choose the right drilling techniques. Wassara's newest and largest water-powered 12" hammer W280 was successfully tested in a pile-drilling application.

## Background

The Slussen project is a large ongoing infrastructural project in the Stockholm city centre with Skanska as the main contractor. The aim of the project is to rejuvenate a busy junction for traffic and pedestrians that is slowly sinking because of out-of-date foundations.

During this project, the technique that is most frequently used for foundations is pile-drilling using the Wassara water-DTH solution. Amongst many different hammer sizes being used at the site (5"-8"), Skanska also tested the newly developed 12" Wassara hammer, the so-called W280.

The W280 hammer was used when bored pile retaining walls with 406 mm OD casing needed to be set up. During drilling in 2018, RD-pile retaining walls were produced for use as foundation. The piles were drilled down through overburden and then continued 0.5 m to 4 m into competent rock. The piles drilled in 2019 however, were meant for use as temporary support structures during the building of a new pier area.



W280 in action at Slussen, Stockholm, Sweden



### Benefits of using the Wassara technology

The reason behind choosing Wassara for the project lay in the highly sensitive and water rich formation of Slussen. Moreover, the area around the project has historically been a busy junction for traffic and pedestrians and will continue to be used during the whole project, further emphasising the need for a gentle drilling method. Compared to air-DTH, when using Wassara's water-powered hammer there is no dust or cuttings contaminating the surrounding area and the risk for ground settlement is decreased.

### Project size

During the first phase of drilling with the Wassara 12" hammer, 116 RD-piles (RD 406) were drilled down to depths varying between 6 and 16 m. In total, 1 w000 m were drilled.

During the second phase, 72 piles were drilled to a depth of approximately 14 m.

The hammer delivered a total of 2 000 m of drilling without needing service.

### Water source and handling

The water source used for drilling was fresh water taken from lake Mälaren with a high-pressure pump passing it through a filter in order to remove algae and larger particles. When drilling in rock around 1 000 l/min were used.

The amount of upcoming water was not substantial therefore a water handling solution was not required.

### Drill rig and pump

A Liebherr rig was used during both drilling phases. In order to ensure enough water capacity for the hammers, the contractor used either a grout pump rated at 1 400 l/min or two WASP200 pumps used in parallel to deliver the same flow rate.

### Test results

The Wassara W280 hammer performed according to the goals set beforehand. Even after 2 000 m of drilling, judging by its performance and water consumption, the hammer did not exhibit excessive wear. Measurements to that effect made on critical performance parts, found them to be well within tolerance. A successful test!



Drilling with Wassaras water-powered hammer gives a nice and clean work environment



No water handling solution was required

Used equipment	
DTH hammer	W280
Pump	2 x WASP200 pumps
Rig	Liebherr
Drilling fluid	Fresh water from lake Mälaren
Drill rod	273 x 12,5 mm (11") Thread API 6 5/8 Reg
Casing	406 mm OD
Borehole length	6 -16 m
Scope of drilling	2 000 m
Formation	Construction aggregate, esker, oak piles and competent rock
Project time	August 2019