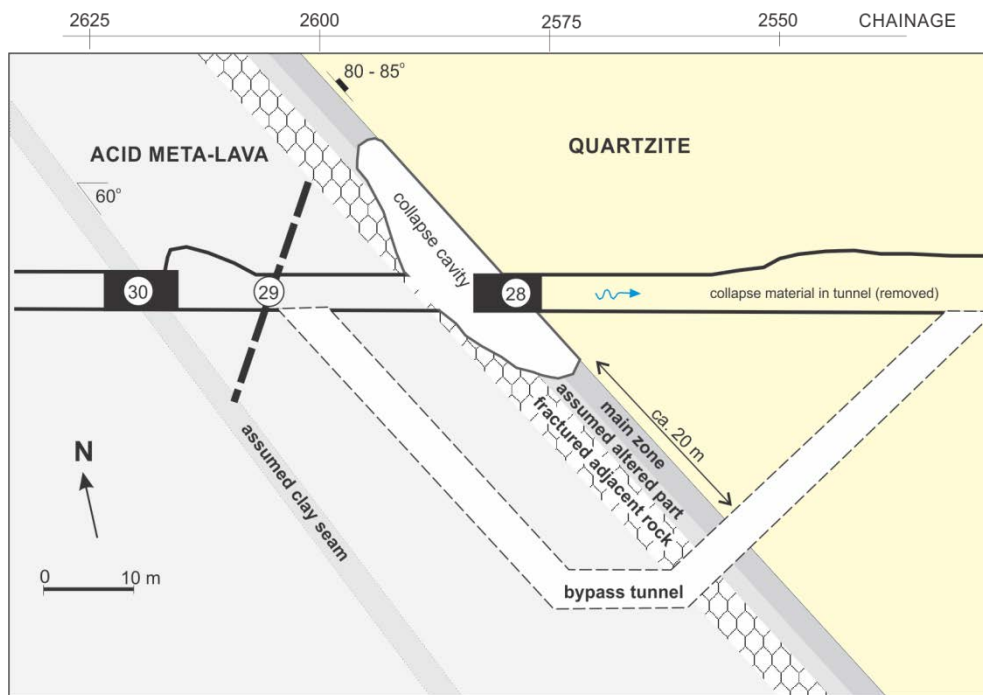


## Collapse in the transfer tunnel of Sundsbarm HEP

In 1995 after 24 years of operation the 12.1 km long transfer tunnel was blocked by a collapse 2600 m from the downstream portal. 1800 – 2500 m<sup>3</sup> of debris was spread out along 300 m of the 12 to 16 m<sup>2</sup> tunnel.



The collapse took place in a 5 – 10 m wide weakness zone which had been concrete lined. Being too short at the upstream end, the collapse started to develop here.

A 100 m long bypass tunnel was excavated. The whole job took 17 weeks.

Horizontal section of the collapse area in the transfer tunnel