

## The Woodsmith Project Anglo American

**Location:** North Yorkshire, United Kingdom

**Date:** 2021 – Present

**Structure:** Vertical Shaft and Production Level  
Horizontal Excavation; TBM Conveyor Tunnel

**Length:** SBR Shaft: 1,600m (5,250 ft) deep  
TBM: 36.6 km (22.7 miles)

**Cross-Section:** TBM: 6 m diameter (19.7 ft)  
SBR Shaft: 8.25 – 10.5m diameter (27 ft to 34.5 ft)

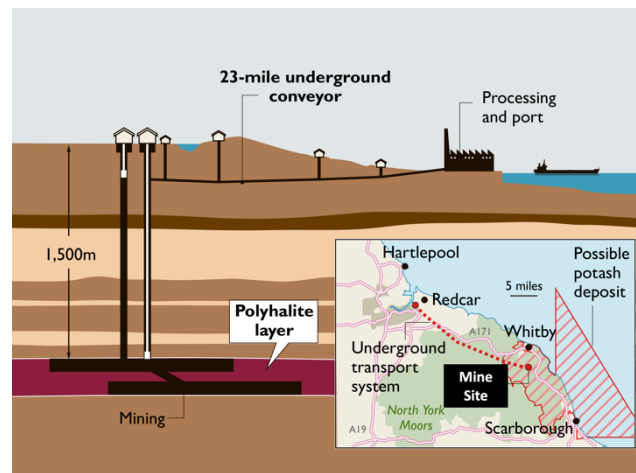
**Geology:** Sandstone, Siltstone, Claystone, Shale,  
Evaporites (e.g. Anhydrite, Halite, Polyhalite)

**Cost:** Part of a GBP 2.2b (USD 3.1b)  
construction effort

**Client:** Anglo American

**Owner:** Anglo American

analyzed the geotechnical conditions of the production level and along the TBM Conveyor Tunnel. For the production level, GZ provided an evaluation to optimize mine production with a review of conventional vs. mechanized tunneling and sequencing of production tunnels. Meanwhile, for the TBM Conveyor Tunnel, GZ performed an independent advance rate and risk assessment for the TBM drive to evaluate the duration to reach the SBR Shaft and to assess the maximum TBM drive length the TBM can achieve.



**Figure 1.** Overall diagram of the Woodsmith Mine Operation (Courtesy of The Sunday Times).

### Independent Verification and Risk Management Services:

Anglo American is developing a mine to extract some of the highest-grade polyhalite in the world. This polyhalite, when refined, will provide a low-chloride nutrient-rich fertilizer to boost crop yields and improve farming efficiency. This mine is located within the North York National Park in England, with the depth of the production layer approximately 1,600m below the ground surface. To reach this production level, numerous geologic units will be encountered, ranging from weak highly jointed material and very strong, competent rock with few discontinuities. Multiple subsurface structures are being constructed to aid production, including a 36.6km long TBM Conveyor Tunnel.

Following a detailed review of the geological and geotechnical data for the site, Gall Zeidler Consultants (GZ) provided a detailed independent verification of advance rates anticipated in the shaft sinking operation. These modeled advance rates included risk concerns brought by the Client, and GZ further analyzed the concerns raised by the Client and adjusted the inputs to address these concerns. Among these concerns were areas with very high-strength rock, abrasive rock that would wear down picks more quickly, and the lack of discontinuities for chipping. In addition, GZ



**Figure 2.** Herrenknecht shaft boring roadheader (Courtesy of DMC Mining Services).