Predictions of Groundwater Inflow to Sublevel Stope Mining

CIVIL • ENVIRONMENTAL • MANUFACTURING • **MINING** • OIL & GAS • POWER GENERATION

PROJECT DESCRIPTION

Guyana Goldfields

Guyana, South America

MINEDW™

This project involved simulating the proposed open pits and underground mining of the Aurora Mine in Guyana, predicting potential inflow rates into the pits and underground workings, and providing pore-pressure distributions to the geomechanical model.

ITASCA'S ROLE

A three-dimensional (3-D), finite-element groundwater flow model was constructed based on available data from various site investigations. Five open pits and one underground mine were simulated for the feasibility study. Six shear zones, which will potentially intercept either open pits or the underground mine, were located within the model. The zone of relaxation (ZOR) related to the mining provided from the geomechanical model was also simulated in the groundwater model with approximately one order of magnitude higher hydraulic conductivity than the in-situ bedrock.

PROJECT RESULTS

Predictions of expected inflows to open pits and different parts of the underground mine were made for various mine plans and designs. The simulated pore pressures from the groundwater model were exported as inputs to the geomechanical model. The model was accepted by both mine and funding agencies.

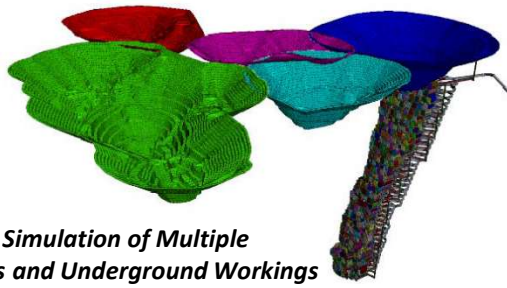

Figure 1. Simulation of Multiple Open Pits and Underground Workings

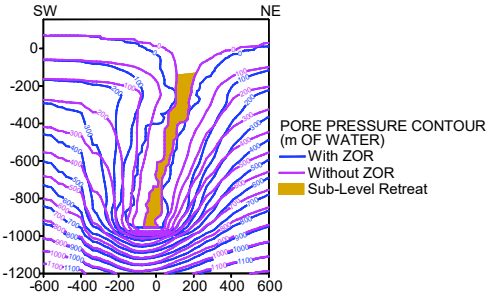

Figure 2. Pore-Pressure Distribution

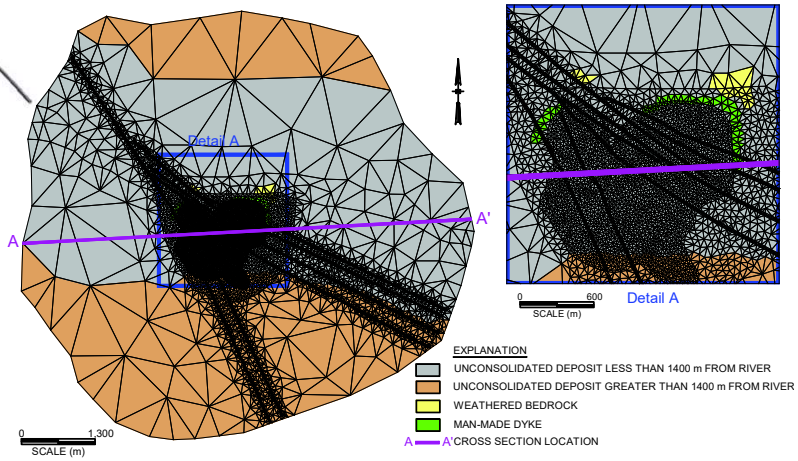

Figure 3. Plan View of Simulated Hydrogeologic Zone of Unconsolidated Deposits

REFERENCES

Liu, H. 2013. Hydrogeology Groundwater Flow Model. Aurora Gold Project Key Findings Technical Presentation, 14 January.

Severin, J., M. Telford, H. Liu, D. Noone, and C. Robinson. 2013. Hydro-mechanical analysis of a foliated rockmass for a proposed sublevel retreat mine. FLAC/DEM Symposium, 22-24 October.

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