

CONSTRUCTION OF ARTIFICIAL AQUIFER TO HARVEST RAIN WATER FROM THE RECLAIMED MINE PIT

– A NEW EXPERIMENT IN ASSOCIATION WITH GOA UNIVERSITY.

Name of the mine: Velguem- Surla Iron Ore Mine of V.M. Salgaocar & Bro. Pvt. Ltd.

Location: Velguem&Surla villages and Sonus- Vonvoiliem village of Bicholim and Sattari taluka, of North Goa district, respectively.

Mining: Operations at Velguem-Surla Iron ore mine commenced in early 1950's on manual scale, and subsequently mechanized in late 1960's. The mine is being worked systematically from N-W to S-E along the strike line. A part of the deposit in the north western end has been demineralized and the same has been taken for reclamation by backfilling.

Present demineralized area - 20.5 Ha.

Area backfilled - 16.4 Ha.

Deepest working – 21 MSL

Ground water table – 26.5 MSL (water table in the referred block)

Backfilling: As the part of progressive mine closure plan, the demineralized block is being backfilled. So far an area of 16.4 Ha has been covered and in future the same would be extended further South. The highest level backfilled in stages is 87 MSL. The lower most stage on the inactive side has been stabilized by pitching and plantation. The higher levels along the common boundary with neighbouring mine towards inactive stages are stabilized by Coco erosion Control Blanket and plantation. Different ex-situ conservation plots are being developed on the reclaimed stages.



Rehabilitation of the Reclaimed Pit Areas

Such reclamation of the pit would impair the ground water which was being pumped out for supplying to the nearby agriculture field. Hence, an artificial aquifer is being created by construction of a well in association with Dr. Chachadi, Prof. Dept of Earth Science, Goa University.

Construction of Artificial Aquifer: In the backfilled area, on the western side a small portion of ore body retained in order to construct an artificial aquifer. This is aimed to have a ground water recharge point over the backfilled area as well as to have a tapping source of the water over the backfilled area.

The construction of this artificial aquifer began with 2.5 m length concrete pipes (diameter – 1 m with perforations) being laid over each other and connected with suitable collars to maintain the verticality and stability during backfilling process starting from the ore body horizon. The peripheral portion is being raised by boulder bed which forms the permeable chamber for accumulation of the ground water as well as monsoon water flowing in to the pit. In future this arrangement will facilitate tapping of ground water. Presently in total nine concrete pipes of 2.5 m length have been placed (Total Column 22.5 m). A metal cap has also been installed for safety. Height of the well will be increased by adding more pipes as the reclamation proceeds till it reaches the surface level i.e 87 MSL. The Stages of construction of such artificial aquifer is depicted below.

Artificial Aquifer for Rainwater Harvesting in Reclaimed Mine Pit

Base point of well with rubble layer around it



Raising of rubble around the well



Inner view of well showing perforations

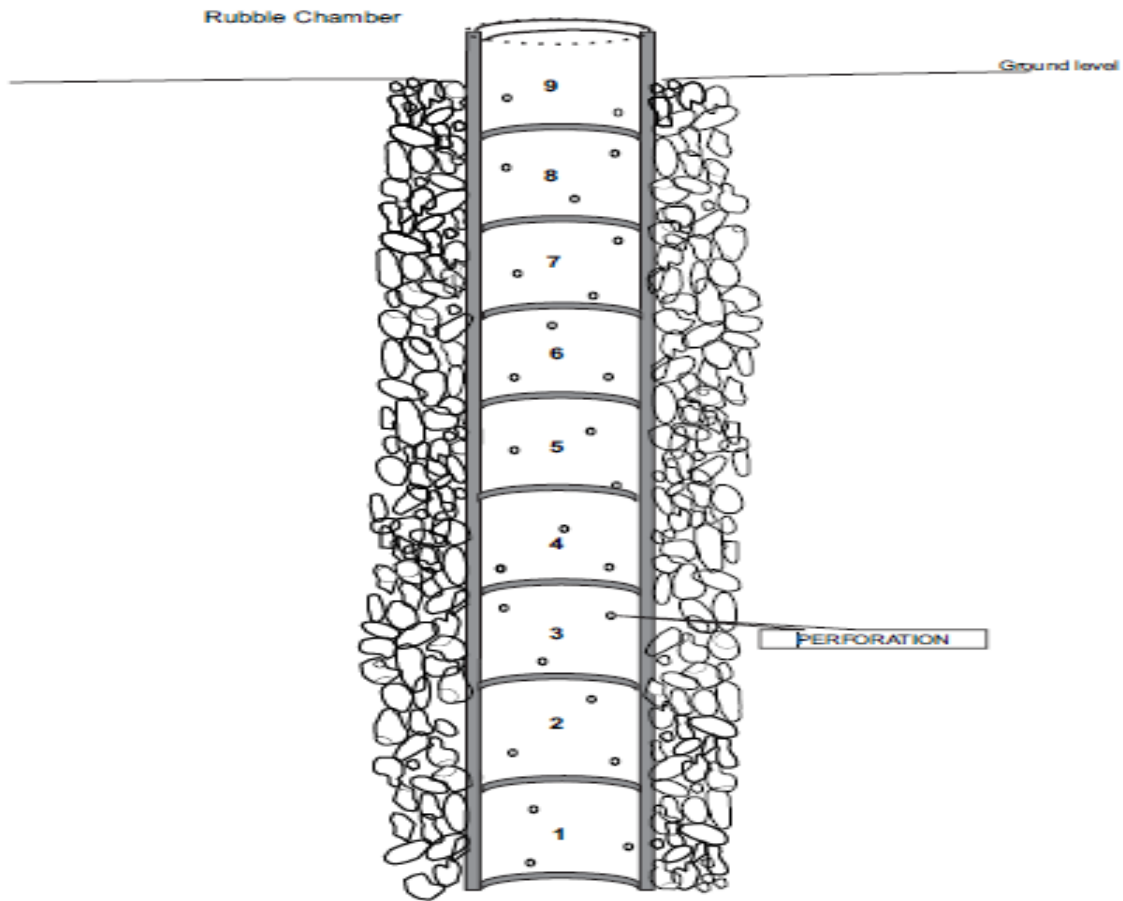


A view of the well from a distance



Well covered with metal cap for safety

Cross Section along Artificial Aquifer for Rainwater Harvesting in Redeamed Mine Pit.



The Pumping Test was carried out soon after completion during May 2012. With a pumping rate of 15M^3 per hour the steady state drawdown of 0.25m was produced after 2 hrs of pumping. The average pumping rate is computed as 360M^3 per day which can meet water demand of one village. However, the project is in experimental stage and the same could not be completed due to ban on mining.