



Evaporation

Total annual evaporation ranges from 1,665 mm to 2,487 mm with an average of 1,976 mm.



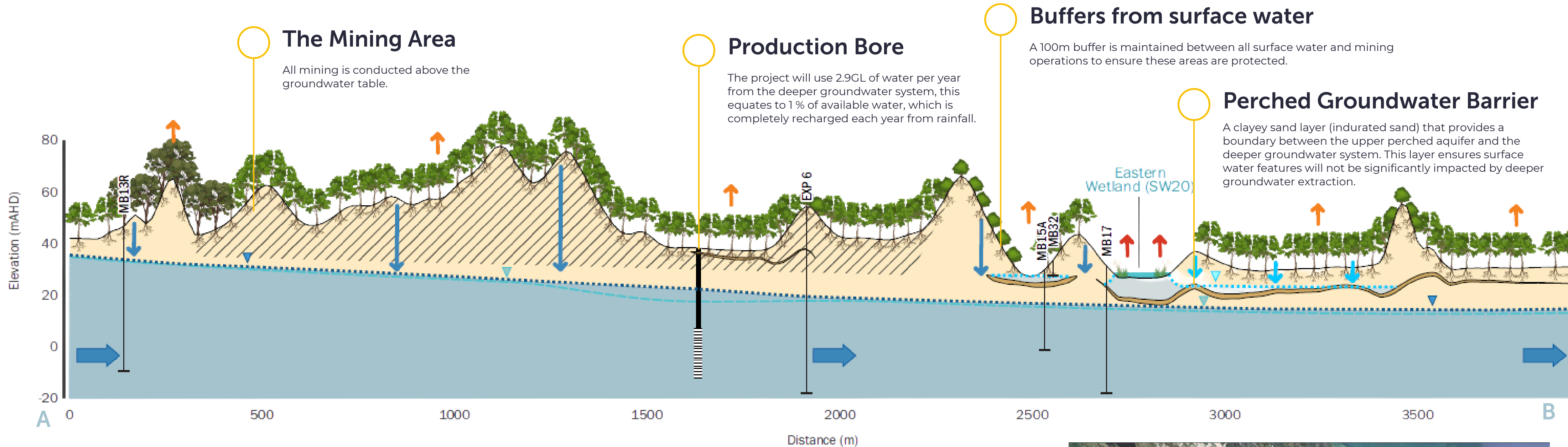
Water Cycle

Long term rainfall statistics show that the total annual rainfall ranges from 459 mm to 2,732 mm, with an average of 1,532 mm



Dune Aquifer & Coastal Discharge

The dune sand aquifer in the study area receives 230 GL per year and discharges 40 GL per year to the coast.



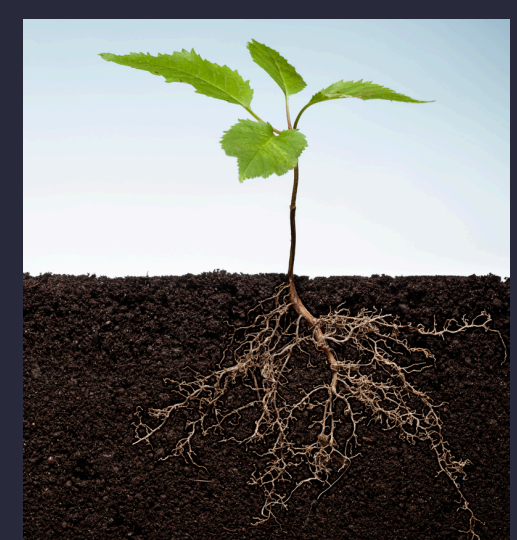
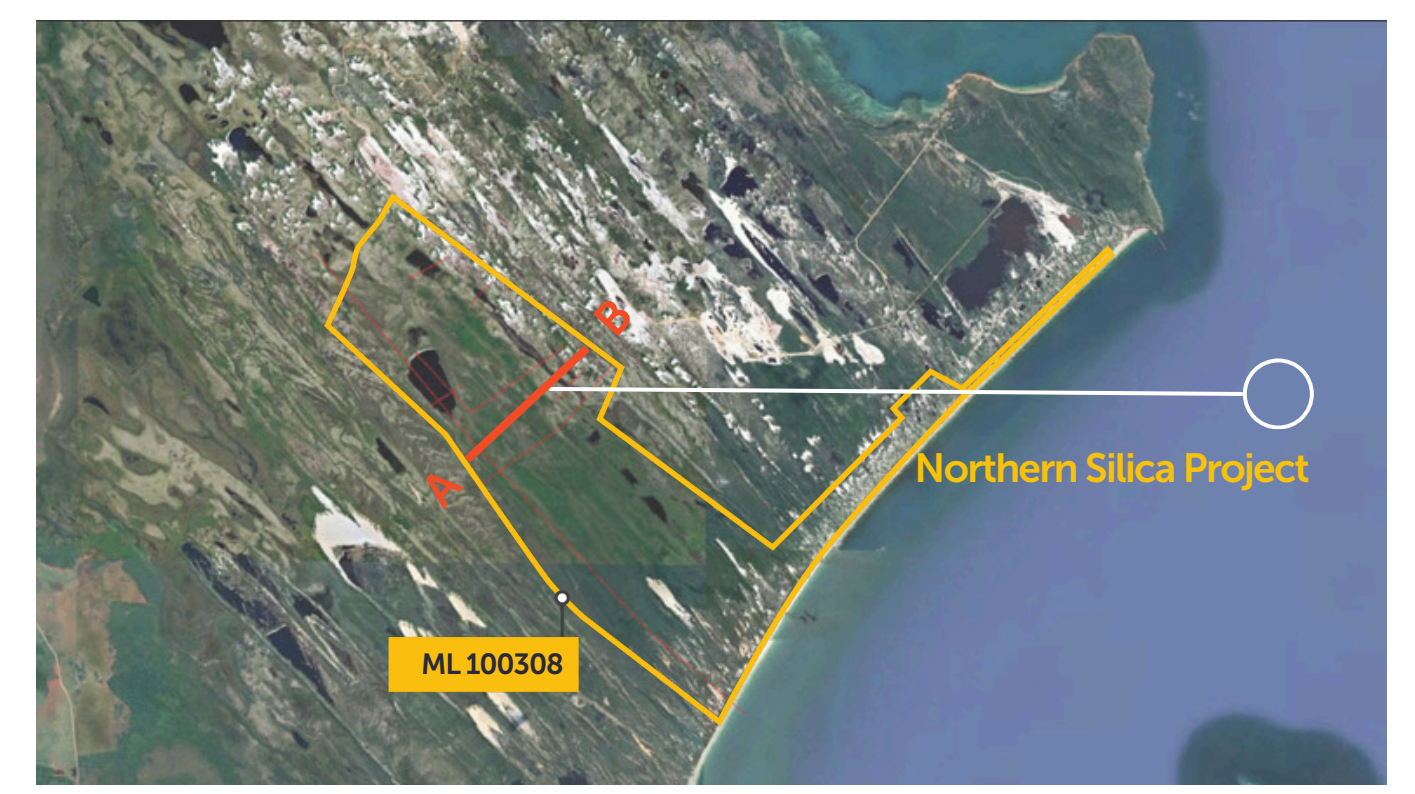
The Mining Area
All mining is conducted above the groundwater table.

Production Bore
The project will use 2.9GL of water per year from the deeper groundwater system, this equates to 1% of available water, which is completely recharged each year from rainfall.

Buffers from surface water
A 100m buffer is maintained between all surface water and mining operations to ensure these areas are protected.

Perched Groundwater Barrier
A clayey sand layer (indurated sand) that provides a boundary between the upper perched aquifer and the deeper groundwater system. This layer ensures surface water features will not be significantly impacted by deeper groundwater extraction.

- Dune sand
- Indurated sand
- Proposed mining area
- Perched aquifer
- Dune sand aquifer
- Perched groundwater level
- Dune sand groundwater level
- Drawdown during operations
- Evaporation
- Evapotranspiration
- Recharge to perched aquifer
- Recharge to dune sand aquifer
- Monitoring bore
- Production bore
- Regional groundwater flow
- Tree roots accessing seasonal soil moisture
- Low dense shrubs
- Medium height, high density
- Tall trees, high density



Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDEs) are ecosystems which require permanent or temporary access to groundwater to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services. Examples of GDE in the Cape Flattery area include some perched wetlands and lakes and nearby vegetation. Investigation of these surface waters and the root depths of vegetation on site in relation to the groundwater tables will help assess if the extraction of groundwater during the mine's operation will impact any GDEs. Analysis of the results will be included in the EIS.



Water Sampling

The physical and chemical characteristics of groundwater and surface water is monitored on-site at 28 bores (MB) and 23 surface sites (SW). The results are used to determine the baseline quality of these waters and develop water quality standards that must be complied with during the mine's operation.

The depth of groundwater levels is also being monitored across the seasons to establish the baseline levels and recharge rates. Results are added to groundwater models which calculate how the extraction of water during the mine's operation will impact groundwater levels during the life of the mine.

NORTHERN SILICA PROJECT GROUNDWATER

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