

The **objective** for this component of the environmental review is to **maintain** the **quality** of **land and soils** so that the **environmental values are protected**.

Within this assessment terrestrial environmental quality includes the chemical, physical, biological and aesthetic characteristics of soils.

INTRODUCTION

South32 Worsley Alumina is an integrated bauxite mining and alumina refining operation in the South West of Western Australia with a proud track record spanning more than 35 years.

The Worsley Mine Development is the next phase of bauxite mining near Boddington, providing access to future reserves and resources to sustain production at our Worsley Alumina refinery near Collie.

The project is a key enabler for Worsley Alumina to continue to deliver benefits to the Peel and South West regions, and Western Australia more broadly, for many years to come.

The project is currently subject to a State and Commonwealth environmental approvals process, with a comprehensive environmental review undertaken and an eight-week public review period set to commence later this year.

BACKGROUND

Extensive drilling has been undertaken across the Primary Assessment Area (PAA) over a period of over 35 years to understand the bauxite ore bodies, characterise subsurface geological materials and to install groundwater production and monitoring bores.

Six distinct soil horizons and average depth ranges are encountered in the PAA which match the expected laterite profile of the bauxite deposit across the project area.

Areas considered during the assessment of the potential impacts of the project include, soil quality and stability, soil salinity, contaminated sites, erosion and loss of general soil health, disturbance of acid sulfate soils and spread of forest disease.

POTENTIAL IMPACTS

Project activities that have the potential to impact terrestrial environmental quality include clearing of vegetation and disturbance to soils for mining activities and construction of the Hotham River crossings. The potential impacts that may occur to terrestrial environmental quality as a consequence of developing the project are:

- Erosion leading to loss of topsoil, poor soil structure, reduced water infiltration and loss of general soil health from clearing and excavation activities;
- Salinisation of soils (dryland salinity) leading to vegetation death and decreased quality of water resources;
- Contamination of land and soils from fuel and chemical storage leaks, waste products being released into the receiving environment; and
- Disturbance of acid sulfate soils (ASS), because of disturbance for river crossings, leading to contamination of land and soils.

MITIGATION

Potential impacts to terrestrial environmental quality associated with mining activities in the PAA are proposed to be managed by Worsley Alumina's current environmental management practices.

The Biodiversity and Forest Management Plan including the Topsoil and Overburden procedure, which outlines the prescription for topsoil and overburden management, and the continued implementation of the Worsley Alumina Rehabilitation Specifications which stipulate maximum rehabilitated slope angles, backfill practices, minimum requirements for drainage and surface water management. These robust rehabilitation practices have been refined by Worsley Alumina over the last 30 plus years of operations. The management rules and guiding principles minimise the risk of dilution or loss of biological values of identified terrestrial environments.

Worsley Alumina employs an existing robust management framework with regards to hydrocarbon and chemical management, which consists of several Procedures, Standard Work Instructions, Specifications and Standards for the BBM, regional exploration, conveyors and the refinery. The appropriate handling and storage of hydrocarbons and chemicals minimise the risk of spills and accidents that have the potential to cause environmental harm. Existing infrastructure and procedures are utilised on site to identify, control and clean up any spills as a result of Worsley Alumina's operations.

To avoid and minimise potential risks, Worsley Alumina commits to avoid storage of chemical and hydrocarbons in the P1 and P2 Public Drinking Water Source Area (PDWSA) of the South Dandalup Dam Catchment Area. Furthermore, the mining footprint will avoid low-lying topographical areas in the vicinity of rivers and creeks. Management buffers around streams and riparian zones will be applied in accordance with the Protected Areas Plan (with the exception of essential infrastructure crossings to access new mining areas).

Based on the likelihood of encountering ASS during the construction of river crossings, Worsley Alumina will develop an Acid Sulfate Soils Management Plan to form part of the Construction Environmental Management Plan, specifically focusing on the construction of the river crossings. As the precise layout and design of these proposed river crossings are refined, detailed engineering studies will be undertaken to ensure appropriate designs are considered to minimise environmental impacts to these river systems.

PREDICTED OUTCOME

Implementation of the project will directly impact on the soils within the PAA through excavation for mining and construction of haul roads, infrastructure footings and river crossings.

It is anticipated that the soil function will be returned through rehabilitation post-mining, as soil rehabilitation is well understood and successfully implemented within previously mined areas at the Boddington Bauxite Mine (BBM).

The potential for salinisation and contamination of soils is considered low risk and can be mitigated through the appropriate management and monitoring that is currently employed at site for existing operations. There is not expected to be any permanent or significant impact on the terrestrial environmental quality resulting from mining activities as appropriate topsoil, overburden and erosion management during operations has enabled successful progressive rehabilitation.

Existing practices employed for chemical and hydrocarbon management will continue to be implemented along with Worsley Alumina's spill management procedures to ensure impacts related to contamination of soils are adequately managed. The risk of encountering ASS through mining activities within the PAA is considered low due to the soil profile position that bauxite mineralisation occurs, and the current management buffers employed around river systems and low-lying areas.

More detailed information is provided in Section 5.4 of the Environmental Review Document.