



Acid Sulfate Soils Guideline Series

Preparation of acid sulfate soil management plan (ASSMP)

1.0 Introduction

An acid sulfate soil management plan (ASSMP) should outline the strategies to manage potential impacts of development works that are likely to disturb acid sulfate soils. The ASSMP needs to specify all potential environmental impacts, performance criteria, and mitigation strategies together with relevant monitoring and reporting requirements, and where an undesirable impact or unforeseen level of impact occurs, the appropriate corrective action.

The ASSMP should be structured to address the key elements of environmental management on-site and in proximity to the site for the life of the development. Performance criteria for all elements are determined in the process of formulating an acceptable plan. The plan should contain clear commitments which are auditable.

The ASSMP should be read in conjunction with the other guidelines in the series; *Identification and investigation of acid sulfate soils and groundwater* and *Treatment and management of disturbed acid sulfate soils and acidic ground and surface waters*.

Refer to Figure 1 for an outline of acid sulfate soil assessment phases and mitigation options.

2.0 Purpose of the Guidelines

The purpose of this document is to provide guidance:

- on the range of considerations to be taken into account in deciding the best management practices to minimise impact from acid sulfate soils. The guidelines are not prescriptive, but provide general advice on how to minimise impacts to the environment.
- to assist decision making on land where acid sulfate soils occur, and provide better management strategies for the proponent in carrying out activities that may disturb acid sulfate soils.

3.0 Format of the management plan

The following is a suggested format for an ASSMP, designed to ensure adequate detail has been provided to demonstrate that the proposed mitigation of potential impacts will result in appropriate management strategies.

An ASSMP must provide:

- evidence of practical and achievable plans for the management of the project to ensure that environmental impacts are minimised by producing an integrated plan for comprehensive monitoring and control of construction and operational impacts;
- a framework to confirm compliance with approval conditions stipulated by the local and State authorities; and
- the community with evidence of the management of the project in an environmentally acceptable manner.

4.0 Components of the management plan

The ASSMP component should be prepared, and implemented prior to soil drainage or disturbance and should contain the following:

- 4.1 An overview of the physical characteristics and environmental attributes of the site, including:
 - a description of the geology and hydrogeology of the site;
 - the presence of sensitive environmental receptors including surface water bodies and groundwater abstraction bores; and
 - a description of current and historical land use in the area.
- 4.2 A two dimensional diagram of the occurrence of ASS to 1 metre below the depth of disturbance. The map should identify separate areas of both actual ASS and potential ASS according to the upper depth of occurrence e.g. 0–0.5 m, 0.5–1 m, 1–1.5 m, etc. This will assist greatly in understanding the site and form the basis for ASS management;
- 4.3 A description of the occurrence of ASS on the site, including;
 - vertical and spatial distribution of ASS;
 - a map of the site distribution of ASS; and
 - results of the preliminary ASS assessment.
- 4.4 An overview of the proposed works including:
 - the dewatering and drainage strategies;
 - the soil excavation strategy;
 - delineation of any clay and peat lenses and horizons that may affect dewatering or excavation of soil;
 - temporary storage of ASS, if proposed; and
 - reuse / disposal of excavated ASS.

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- 4.5 Details of the potential on-site and off-site effects of the disturbance of the soil and/or the groundwater levels;
- 4.6 A description of the management strategies to minimise impacts from the site works including:
- strategies for preventing the oxidation of iron sulfides (including avoiding the disturbance of ASS by redesigning layout of the excavations and/or re-flooding of potential ASS to limit oxidation);
 - treatment strategies for ASS (including neutralisation of ASS, use of lime/limestone barriers, burial of potential ASS);
 - strategies for management of the watertable level on and off-site both during and post construction; and
 - containment strategies to ensure that all contaminated stormwater and acidic leachate associated with the oxidation of ASS is prevented from entering the environment both in the short and long-term;
- 4.7 Timing (milestones) of environmental management initiatives;
- 4.8 Performance criteria to be used to assess the effectiveness of the ASS management and monitoring measures;
- 4.9 A comprehensive monitoring program for soils and surface and ground water quality should be designed to enable the effectiveness of the management strategy to be assessed. Depending on the type or scale of the proposal and sensitivity of the location, the following should be included:
- monitoring locations;
 - monitoring frequency;
 - sampling and analytical parameters (as a minimum requirement, parameters should include pH, electrical conductivity or Total Dissolved Solids (TDS), sulfate, chloride, iron, arsenic, aluminium, POCAS (Peroxide Oxidation Combined Acidity and Sulfate) and TOS (Total Oxidisable Sulfur); and
 - procedures to be undertaken in the event the monitoring indicates exceedance of threshold or water quality criteria.
- 4.10 Description of the pilot project or field trial (if conducted) to:
- prove the effectiveness and the feasibility of the selected management procedures to deal with ASS and their environmental impacts;
 - demonstrate that the proponent has the capability to implement those management procedures effectively; and
 - demonstrate the ability to comply with agreed standards and performance targets.
- 4.11 Description of the contingency procedures to be implemented on the site to deal with unexpected events or in the event of failure of management procedures, including a remedial action and restoration plan related to:
- any failure to implement any proposed ASS management strategies; and
 - any mitigation strategies that are ineffective so that the project fails to meet agreed standards or performance levels.

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- 4.12 Outline of reporting procedures for meeting environmental performance objectives and demonstrating quality assurance to relevant authorities and the community.

5.0 Review of management plan

The management plan should be reviewed and periodically updated to reflect knowledge gained during the course of operations and to reflect new knowledge and changed community standards (values).

Changes to the management plan should be developed and implemented in consultation with relevant authorities.

6.0 Further information

It is recommended that reference also be made to guidelines and manuals developed by the NSW and Queensland State governments, in particular;

- *Queensland Acid Sulfate Soil Technical Manual 2002, Soils Management Guidelines* Queensland Acid Sulfate Soils Management Advisory Committee
- *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998*, Queensland Acid Sulfate Soils Investigation Team
- *Queensland State Planning Policy 2002, Guideline on Acid Sulfate Soils*, Department of Natural Resources and Mines and Department of Local Government and Planning
- *New South Wales Acid Sulfate Soil Manual 1998*, Acid Sulfate Soil Advisory Committee

7.0 Acknowledgements

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NSW Acid Sulfate Soils Management Advisory Committee;

Queensland Acid Sulfate Soils Investigation Team;

Queensland Acid Sulfate Soil Management Advisory Committee; and

Queensland Government (Department of Local Government & Planning and Department of Natural Resources and Mines).

8.0 References

- Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), 2000, *National Strategy for the Management of Coastal Acid Sulfate Soils*.
- Ahern, CR, Ahern, MR and Powell B, *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998*. QASSIT, Department of Natural Resources, Resources Sciences Centre, Indooroopilly, Queensland.
- Department of Environment, Water and Catchment Protection & Environmental Protection Authority, *Draft DEWCP and EPA guidance on acid sulfate soils (2003)*.
- Dear S.E, Moore, S.K., Dobos, S.K., Watling, K.M. and Ahern, C.R., *Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines (2002)*.
- EPA Victoria, *Managing Waste Acid Sulfate Soils (2000)*, Environmental Protection Authority, Victoria
- Environmental Protection Agency, *Instructions for the Treatment and Management of Acid Sulfate Soils, 2001*. Environmental Protection Agency, Brisbane.
- Queensland Department of Local Government & Planning, Department of Natural Resources and Mines, State Planning Policy 2/02 Guideline – *Acid Sulfate Soils (2002)*.
- Stone, Y, Ahern, CR, and Blunden, B, Acid Sulfate Soils Management Guidelines. *Acid Sulfate Soil Manual (1998)*. Published by the Australian Acid Sulfate Soil Management Advisory Committee, Wollongbar, NSW, Australia.

Figure 1: Acid Sulfate Soil (ASS) Assessment Phases and Mitigation Options

