



Acid sulfate soils

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Works that disturb acid sulfate soils (ASS) can easily lead to environmental damage, which may be difficult and expensive to remediate. Once exposed and wetted these soils form a strong acid that can attack concrete, steel and re-suspend other heavy metals leading to pollution of waterways and natural systems.

Thorough investigation is essential before starting works, to identify whether the works are appropriate. If acid sulfate soils can be avoided by relocating or redesigning the proposed project then this should always be the first option. Prevention of acid discharge is better than trying to rehabilitate degraded land and water. Indicative mapping undertaken by DPIPWE has identified potential acid sulfate soil (PASS) areas which occur commonly in coastal locations. The following guidelines are recommended when working in coastal areas and are sourced from the *Tasmanian acid sulfate soil management guidelines*, DPIPWE 2009.

Use these guidelines in conjunction with the information provided in Chapter 11 when planning works and engaging consultants and contractors to ensure the proposed works use the most effective methods and minimise the risk of causing damage to coastal values.

Indicators of acid sulfate soils

Workers should be aware of the signs and indicators of ASS and work should cease immediately if such signs are observed or if there is any doubt as to the possible occurrence of ASS and there is no management plan prepared.

- Cloudy blue-green water, milky white water, crystal clear water, or yellowish brown water
- Iron staining and reddish brown deposits in creeks or drains
- Oily looking scum floating on water
- Scalded soil
- Orange or yellow soil layers or mottled soil
- Sticky grey to bluish grey soils with orange streaks
- Goopy black sediments on bottom of drains
- Rotten egg smell from freshly exposed soils
- Etching of concrete and exposure of aggregate are typical early signs of attack by acidic water

Where are acid sulfate soils commonly found?

- Marine and estuarine areas
- Inter-dune swales
- Swamp and marine vegetation e.g. saltmarsh vegetation



Blue-green cloudy water can be evidence of acid sulfate soil disturbance.
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Potential environmental impacts of acid sulfate soils

- Groundwater and surface water pollution
- Soil degradation
- Fish kills and fish diseases, can also be an indicator
- Loss of agricultural production
- Damage to coastal developments and tourism ventures
- Corrosion of structures like water and sewer pipes, culverts, drains, bridges, aluminium boats and foundations
- Irreversible shrinkage of material
- Weakening and dissolving concrete structures
- Habitat degradation and loss of biodiversity
- Increased health risks from contamination in surface and groundwater
- Degraded stock water quality
- Oyster contamination with heavy metals

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Assessing for presence of acid sulfate soils

Check if area is likely to have PASS by location in coastal and estuarine landscapes (below 20m average height datum), and checking PASS database on the Land Information Systems Tasmania (LIST) website.

If indicators of ASS are seen in the area you are working in, STOP work and advise your supervisor.

Specialist advice may be needed or an ASS management plan may need to be prepared before further work can continue.

Obtain specialist advice from an experienced coastal geomorphologist or soil scientist, before works in PASS are planned.

Contact the Land Conservation Branch of DPIPWE for advice on soil testing and ASS and PASS.

Minimising impacts of acid sulfate soils

Avoid disturbing Potential Acid Sulfate Soils (PASS) – relocate the development activity.

If avoidance is not feasible consider options for minimising disturbance.

Minimise the impacts where disturbing acid sulfate soils is unavoidable (e.g. dig shallow, wide drains instead of deep, narrow drains).

Reduce the depth of excavation so that ASS layers are not disturbed.

Determine presence, depth and extent of ASS materials.

Cover in situ soil so that subsequent excavations do not disturb ASS layers.

Identify the potential impacts on the natural and built environment (e.g. polluting nearby watercourses).

Ensure there is no increase in acid water discharge into streams and waterways.

Neutralisation of ASS materials may be necessary where disturbance is unavoidable. Sufficient neutralising agents need to be used to neutralise all existing and potential acid generation.

Disturbed acid sulfate soils and acid drainage require rehabilitation. Obtain specialist advice.

Excavated materials that may contain sulfidic materials need to be disposed of safely. Seek specialist advice and undertake soil sample collection and analysis to determine severity of acidification issue.

More information

Tasmanian coastal works manual: Chapter 11, Page & Thorp 2010

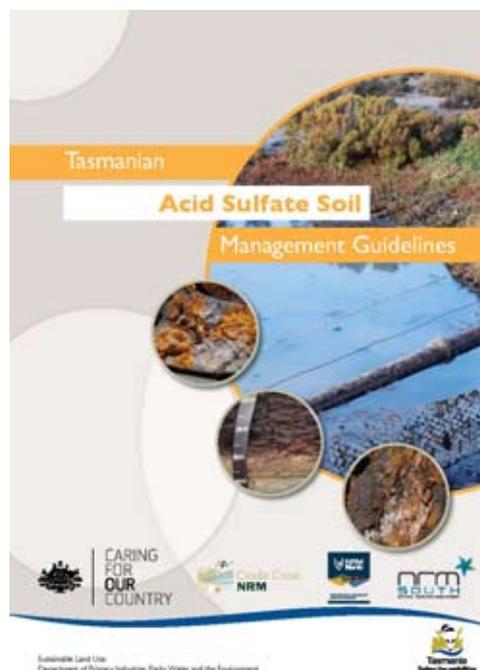
Tasmanian acid sulfate soil management guidelines DPIPWE 2009

DPIPWE Land Conservation Branch for advice on soil testing and ASS and PASS

Predictive maps of PASS occurrence in Tasmania on the LIST www.thelist.tas.gov.au

Instructions on how to use ASS maps on the LIST is available from www.dpipwe.tas.gov.au/acidsulfatesoils

Atlas of Australian Acid Sulfate soils available at: www.clw.csiro.au/acidsulfatesoils/atlas.html



Tasmanian acid sulfate soil management guidelines available from the Department of Primary Industries, Parks, Water and Environment (DPIPWE).

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