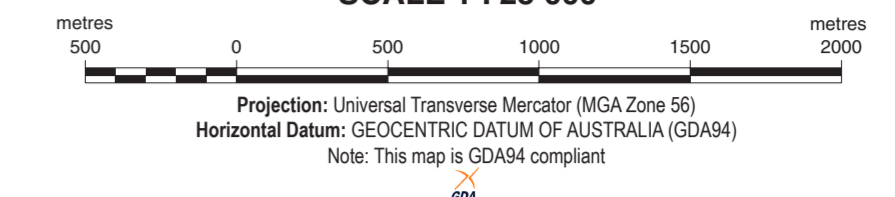


# ACID SULFATE SOILS

## MAROOCHE CALOUNDRA ACID SULFATE - SUSTAINABLE LAND MANAGEMENT PROJECT

### MAP 2

SCALE 1 : 25 000



#### REFERENCE

#### ACID SULFATE SOILS (ASS) ON RELATIVELY UNDISTURBED LAND

Depth	Depth Code	Depth to Actual Acid Sulfate Soil <sup>1</sup> (pH < 4.5)	Depth to Strongly Acidic Soil Layer <sup>2</sup> (pH < 4.5 to < 5.5)	Depth to Potential Acid Sulfate Soil <sup>3</sup>
0 - 0.5m	0	A0	a0	S0
0.5 - 1m	1	A1	a1	S1
1 - 2m	2	A2	a2	S2
2 - 3m	3	A3	a3	S3
3 - 4m	4	A4	a4	S4
4 - 5m	5	A5	a5	S5
>5m	5+	A5+	a5+	S5+

NOTE: <sup>1</sup> The depth codes above imply that a predominance of profiles in the map unit fall within the nominated depth range.

- <sup>2</sup> Actual acid sulfate soil layers (designated with an A code) often overlap potential acid sulfate soil layers (designated with an S code). Where this occurs e.g. **A1S1** the map unit is coloured according to the depth of the upper surface of the 'actual' layer (A0) and overlaid with yellow dots. An 'a' preceding the soil depth code e.g. **a0** indicates a strongly acid soil layer with field pH ranging from < 4.0 to < 5.0. This may or may not be a result of sulfide oxidation. While 'a' depth code is shown on the map, no colour is assigned to it.
- In areas where there is varying depth to an ASS layer that cannot be separately mapped at the operative scale, two colours are used to designate the dominant depths. This appears as equal width striped colours, e.g. **S1S2**.
- S<sup>2</sup>** indicates sediments of Pleistocene age<sup>4</sup>, so that **S<sup>2</sup>+** indicates pyritic sediments (of Pleistocene age) deeper than 5m.
- w** - Subscript **w** indicates areas associated with *Melaleuca* sp. wetlands and occasionally *Casuarina glauca* communities. Oxidisable sulfur % in surface layers may be highly variable and often exceeds the 'Action Criteria'. This may include sulfur from organic compounds and modern accretion of sulfides in a wet, organic rich environment. ASS typically occurs at depth. Where this occurs e.g. **A1S1w** or **S1S2w** the map is coloured as per the actual or potential depth category and is overlaid with **w** pattern.

**S** Land mapped at 1:100 000 scale where ASS occurs within 5m of the surface.

**S<sub>LA</sub>** Limited field assessment but occurs in a landscape position where there is a reasonable probability of ASS occurrence. This is usually land where the present use precludes any disturbance e.g. National Parks, Reserves etc., or land where accessibility is severely restricted.

#### ACID SULFATE ON DISTURBED LAND<sup>5</sup>

**S<sub>DL</sub>** Disturbed land, e.g. Canal estates, Marina, Aquaculture, Quarry, Urban, Industrial likely to contain ASS. (In some cases partial or full treatment may have been undertaken). Limited field investigation.

#### 5m AHD<sup>6</sup> CONTOUR - NORMAL LIMIT OF FIELD INVESTIGATION

The 5m contour line delineates the normal limit of field investigation of Holocene, estuarine pyritic sediments<sup>7</sup> which form ASS. Holocene ASS has not been found in this study on land above 5m elevation. In some cases, the limit of Holocene ASS<sup>8</sup> is at the 5m contour. In other cases, the limit is < 5m AHD. In the latter case, the land between the ASS limit and the 5m contour is designated LP (explained below).

#### LAND WITH A LOW PROBABILITY OF ACID SULFATE SOIL OCCURRENCE

**LP** Land between the 5m AHD contour and the outer limit<sup>8</sup> of Holocene, estuarine ASS (ie. land < 5m AHD) as mapped at this scale, with low probability of ASS occurrence. Limited field investigation.

**LPS** Land > 5m AHD with low or negligible probability of ASS occurrence. Limited field assessment.

#### LAND NOT ASSESSED

**NA** Land not assessed for ASS as part of this survey. It may include non ASS land beyond the boundary established as the limit of Holocene, estuarine, pyrite sediments<sup>7</sup> but insufficient or no field testing was carried out.

<sup>1</sup> Acid sulfate soil is the generic term used to define soils derived from estuarine sediments containing iron sulfides (pyrite) or containing the acidic products of the oxidation of sulfides. The term includes actual and potential acid sulfate soils. Unless used with the superscript P, the code 'S' implies pyritic sediments of Holocene age. The superscript P implies sediments of Pleistocene age<sup>4</sup>.

<sup>2</sup> An 'A' preceding the soil depth code indicates the probable depth to a soil layer or horizon where a field pH of < 4.5 is first encountered. A field pH of 4.0 or less is used as an indicator of an Actual Acid Sulfate Soil (AASS) which has mobile acidity in the form of ionic hydrogen, aluminum, iron or acid salts. Extensive areas with high actual acidity derived from sulfide oxidation may constitute a significant environmental hazard. Some soils with high organic matter may have low pH from organic acids. An 'a' preceding the depth code indicates the probable depth to a soil layer or horizon with field pH ranging from < 4.0 to < 5.0. This may or may not be a result of ASS oxidation.

<sup>3</sup> An 'S' preceding the soil depth code indicates the probable depth to a Potential Acid Sulfate Soil (PASS) layer or horizon. PASS are soils where the oxidisable sulfur percentage of pyritic origin exceeds the 'pre-oxidation' action criteria<sup>4</sup> in which treatment is required if disturbed. Testing for Oxidisable Sulfur (TOS) method, the Total Oxidisable Sulfur (TOS) method, the Chromium Reducible Sulfur (CRS) method or the Peroxide Oxidation - Combined Activity and Sulfate (POCAS) method.

<sup>4</sup> Oxidisable sulfur 'Action Criteria' that trigger treatment are currently: Sands, 0.03 5%; Loams to light clays, 0.06 5%; Medium to heavy clays, 0.1 5%. NOTE: For disturbance > 1000 tonnes the action criteria is 0.03% regardless of soil texture.

<sup>5</sup> Limited or no field checking has been carried out in disturbed lands.

<sup>6</sup> The reliability of elevation data is variable across the study area. AHD refers to Australian Height Datum.

<sup>7</sup> The primary focus of ASS investigation in this study was the pyritic sediments that were deposited in the Holocene epoch, that is, during the last 10 000 years. Experience in coastal stratigraphic mapping shows that sands, but much older pyritic sediments of Pleistocene age can occur, still in a reduced (nonactive) state, being buried under either converted sands or silt, consolidated alluvium. They are far less common than the Holocene equivalents, and have been found beneath land whose surface is both above and below 5m AHD. Generally, Pleistocene sediments will be found at greater depths below the surface than equivalent Holocene sediments.

<sup>8</sup> The outer boundary of Holocene estuarine ASS commonly occurs at the intersection with hard rock or other materials of non estuarine origin. It is either at the 5m contour or at lower elevation. This boundary is established using limited field checking at the boundary itself, together with the use of contour lines and geological map boundaries. There is no field assessment beyond the 5m AHD contour level. It should be noted, however, that certain lithologies on land above 5m AHD may contain sulfidic material of non estuarine/Holocene origin. Additionally, much older, estuarine, pyritic sediments may occur at depth on land > 5m AHD, as discussed in footnote 7 above.

NOTE: This map should be used in conjunction with the accompanying report covering this area.

**805** Borehole locations where profiles were described in detail and samples taken for analysis

**—** Local Authority boundary

**—** Digital Cadastral Data Base

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**ACCURACY STATEMENT:**  
Due to varying sources of data sets, spatial locations may not coincide when overlaid.

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