



# ACID SULFATE SOILS KEPPEL SANDS - YEPPOON

SCALE 1:50 000

Projection: Universal Transverse Mercator  
Horizontal datum: GEOCENTRIC DATUM OF AUSTRALIA (GDA94)  
Note: This map is GDA94 compliant



## REFERENCE

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

Depth	Depth Code	Depth to Actual Acid Sulfate Soil <sup>2</sup> (pH <4.0)	Depth to Strongly Acidic Soil layer <sup>2</sup> (pH >4.0 to <5.0)	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: ♦ The depth codes above imply that a predominance of profiles in the map unit fall within the nominated depth range.

- ♦ Actual acid sulfate soil layers (designated with an A code) often overlie potential acid sulfate soil layers (designated with an S code). Where this occurs e.g. **A0S2** 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 soils depth code e.g. **a1S2** indicates a strong 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 a forward slash is used e.g. **S1/S2**. The areas are coloured according to the shallowest depth of the occurrence.
- ♦ N - Subscript N indicates areas with oxidisable sulfur values that exceed the action criteria but contain varying amounts of carbonate materials that may compensate for the potential acidity. Commonly the carbonate materials are naturally occurring shell fragments, coral fragments or Foraminifera. Depth codes are as above e.g. a potential acid sulfate soil (rich in carbonate) occurring at 1 to 2m depth is designated S2<sub>N</sub>. The map unit is coloured as S2 and overlaid with green dots. Where a potential acid sulfate soil layer (rich in carbonate) overlies a potential acid sulfate soil layer with net potential acidity, the codes are combined e.g. **S2<sub>N</sub>S3**.
- ♦ S<sup>P</sup> indicates sediments of Pleistocene age<sup>1</sup>, so that S<sup>P</sup>5+ 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'<sup>4</sup>. 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. **S<sub>LA</sub>w** or **S2<sub>w</sub>** or **A1<sub>w</sub>** the map is coloured as per the actual or potential depth category and is overlaid with pattern.

**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 estate, Marina, Aquaculture, Quarry, Urban, Industrial likely to contain ASS. (In some cases partial or full treatment may have been undertaken). Limited field investigation.

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

**LP** Land predominantly <5m AHD<sup>6</sup> with low probability of ASS occurrence. Limited field investigation.

**LP5** Land predominantly >5m AHD with low probability of ASS occurrence. Limited or no field investigation.

### LAND NOT ASSESSED

**NA** Land not assessed for sulfidic materials as part of this survey. Predominantly hills and rises of country rock.

- 1 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>7</sup>.
- 2 An 'A' preceding the soil depth code indicates the probable depth to a soil layer or horizon where a field pH of <4.0 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 toxic hydrogen, aluminium, 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.
- 3 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 prescribed 'action criteria'<sup>4</sup> at which treatment is required if disturbed. Testing for Oxidisable sulfur is conducted by the Total Oxidisable Sulfur (TOS) method, the Chromium Reducible Sulfur (S<sub>CR</sub>) method or the Peroxide Oxidation - Combined Acidity and Sulfate (FOCAS) method.
- 4 Oxidisable sulfur 'Action Criteria' that trigger treatment are currently: Sands, 0.03 S%; Loams to light clays, 0.06 S%; Medium to heavy clays, 0.1 S%. NOTE: For disturbance > 1000 tonnes the action criteria is 0.03% regardless of soil texture.
- 5 Limited or no field checking has been carried out in disturbed lands.
- 6 The reliability of elevation data is variable across the study area. AHD refers to Australian Height Datum.
- 7 The primary focus of ASS investigation in this study are 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 similar, but much older pyritic sediments of Pleistocene age can occur, still in a reduced (anaerobic) state, being buried under either cemented sands or old, 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.

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

5m AHD Contour  
Digital Cadastral Data Base

SURVEY by D. J. Ross, Resource Management, Central West Region, Department of Natural Resources and Mines, Rockhampton.

CARTOGRAPHY and DATABASE INTEGRATION by J. Simpson, Central West GIS Group, Central West Region, Department of Natural Resources and Mines, Rockhampton.

LABORATORY ANALYSIS by Natural Resource Sciences Laboratories, Department of Natural Resources and Mines, Indooroopilly Sciences Centre, Brisbane.

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

Produced by, Central West GIS Group, Central West Region, Department of Natural Resources and Mines, Rockhampton.

DISCLAIMER: © The State of Queensland (Department of Natural Resources and Mines) 2002. While every care is taken to ensure the accuracy of this product, the Department of Natural Resources and Mines makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product, being inaccurate or incomplete in any way for any reason.

