

## INTRODUCTION

Acid sulfate soils are generally blue-grey to greenish-grey clay or blue-grey sandy clay deposits, often mottled, occurring in low lying coastal lands or floodplains of tidal creeks. In the Wollongong area, acid sulfate soils also occur in estuarine sands. These sediments were laid down about 7500 years ago, when sea levels were higher and covered today's low lying land. Generally, the acid sulfate soil deposits are covered by a layer of alluvial soil. The layer of alluvial soil varies in thickness, depending on factors such as the frequency and intensity of floods and human disturbance.

Acid sulfate soils contain pyrite (iron sulfide). When this type of soil is disturbed and the pyrite is exposed to air and water, it generates sulfuric acid. The acidic leachate reacts with clay to release minerals/elements and/or contaminants such as aluminium and a red iron hydroxide precipitate. The drainage from acid sulfate soil lands can create conditions which are toxic to aquatic and terrestrial life and grazing animals.

The best management option for the problem of acid sulfate soils is not to disturb the soil. However, land development and agricultural activities in coastal areas will often interfere with acid sulfate soils.

The presence of potential acid sulfate soil is an important consideration when developing a site with any structures that contain steel or concrete. Without some form of management, it is likely that these structures will deteriorate over time as the acid from the soil will cause structural damage.

### How will I know if my land is in an acid sulfate soil zone?

If the land is located in an area where the AHD (height above sea level) is 0 – 5 metres, such as coastal floodplains or adjacent to a tidal creek, there is a strong chance that the land will be associated with acid sulfate soil.

Council has produced Acid Sulfate Soils Maps showing five classes of land based on the probability of acid sulfate soils being present. Council's Acid Sulfate Soils Maps are available from <http://www.wollongong.nsw.gov.au/development/maps/Pages/default.aspx> > Wollongong LEP 2009 > 2009 Acid Sulphate Soils layer/West Dapto LEP 2010 > 2010 Acid Sulfate Soils layer, or can be viewed at Council's Customer Service Centre - 41 Burelli Street, Wollongong.

The Acid Sulfate Soils Maps do not describe the actual severity of acid sulfate soils in a particular area, but provide an initial indication that acid sulfate soils could be present on the site.

Notations about mapped classes of acid sulfate soils can also be found on a Section 149 Planning Certificate issued by Council. However, it is your responsibility to ascertain if your site contains potential or actual acid sulfate soils and develop the appropriate management strategies.

### If my land is acid sulfate prone what should I do?

For each class of land on the Acid Sulfate Soils Maps, Clause 7.5 (2) of Wollongong Local Environmental Plan 2009, or Clause 7.1 (2) of Wollongong Local Environmental Plan (West Dapto) 2010 identifies the type of works likely to present an environmental risk if undertaken in the particular class of land. If these types of works are proposed, further investigation in accordance with the *Acid Sulfate Soils Manual* is required to determine if acid sulfate soils are actually present, and whether they are present in such concentrations as to pose a risk to the environment.

### *Identification and Confirmation of Acid Sulfate Soils*

If the Acid Sulfate Soils Map or Section 149 Planning Certificate suggests that your land contains potential or actual acid sulfate soils, or if your land is 0-5 m (AHD), then you must contact a suitably qualified geotechnical engineer or environmental consultant with experience in investigating and managing acid sulfate soils. The engineer/consultant will need to conduct some on-site tests and collect subsurface sediment samples which will be analysed by a NATA accredited laboratory.

### ***Determination of Net Acid Generation Potential and Acid Neutralising Capacity***

The subsurface samples collected by the engineer/consultant will be analysed by a NATA accredited laboratory to determine the acid generation and acid neutralisation capacity of the samples. Based on the results of these tests, the engineer/consultant will make appropriate recommendations. If the acid generation potential is greater than 1.5 kg of sulfuric acid per tonne in clay soils, or 0.31 kg of sulfuric acid per tonne in sandy clay soils, it is considered that any disturbance of the land will pose a significant and immediate environmental risk.

### ***What Should You Do and What Measures Should You Be Taking***

If the engineer/consultant determines the area fits within the parameters outlined above, then they can assist with the development of an appropriate management strategy.

Typically, for areas requiring minimal excavation (eg a small extension to an existing dwelling), the excavated spoil must be neutralised with commercial lime (calcium bicarbonate) by the addition of at least 10 kg of lime per cubic metre of sediment before it is lawfully disposed of. Lime must be added to any drilled piers and trenches prior to pouring concrete. You should inform the concrete company of the acidic nature of the soil, as inhibitors will be added to the concrete that will increase its resistance to the acidic conditions and thereby reduce the risk of concrete rot.

For major earthworks where the excavation of deeper trenches are required, and large scale disturbance of the soil and subsoil is likely to occur, a geotechnical engineer or environmental consultant must be engaged to assess the site and prepare an acid sulfate soils management plan that is site specific. The plan must be submitted to Council for assessment and approval prior to any works being conducted.

### **Further Information**

Wollongong Local Environmental Plan 2009 Clause 7.5:

[www.wollongong.nsw.gov.au/development/regulations/Pages/lep.aspx](http://www.wollongong.nsw.gov.au/development/regulations/Pages/lep.aspx)

Wollongong Local Environmental Plan (West Dapto) 2010 Clause 7.1:

[www.wollongong.nsw.gov.au/development/regulations/Pages/lep.aspx](http://www.wollongong.nsw.gov.au/development/regulations/Pages/lep.aspx)

Wollongong Local Environmental Plan 2009 Acid Sulfate Soils Map:

<http://www.wollongong.nsw.gov.au/development/maps/Pages/default.aspx> > Wollongong LEP 2009 > 2009 Acid Sulphate Soils layer

Wollongong Local Environmental Plan (West Dapto) 2010 Acid Sulfate Soils Map:

<http://www.wollongong.nsw.gov.au/development/maps/Pages/default.aspx> > West Dapto LEP 2010 > 2010 Acid Sulfate Soils layer

An introduction to acid sulfate soils: [www.dpi.nsw.gov.au/agriculture/resources/soils/ass/general/introduction](http://www.dpi.nsw.gov.au/agriculture/resources/soils/ass/general/introduction)

Office of Environment and Heritage's Acid Sulfate Soils webpage:

<http://www.environment.nsw.gov.au/acidsulfatesoil/index.htm>

CSIRO's Acid Sulfate Soils webpage: [www.clw.csiro.au/acidsulfatesoils/index.html](http://www.clw.csiro.au/acidsulfatesoils/index.html)

Acid Sulfate Soils Assessment Guidelines (a component of the Acid Sulfate Soils Manual):

[www.planning.nsw.gov.au/rdaguidelines/documents/NSW%20Acid%20Sulfate%20Soils%20Assessment%20Guidelines.pdf](http://www.planning.nsw.gov.au/rdaguidelines/documents/NSW%20Acid%20Sulfate%20Soils%20Assessment%20Guidelines.pdf)

Acid Sulfate Soils Management Guidelines (a component of the Acid Sulfate Soils Manual):

[www.esc.nsw.gov.au/media/340065/assmanual\\_mgmtguidelines.pdf](http://www.esc.nsw.gov.au/media/340065/assmanual_mgmtguidelines.pdf)

### **Disclaimers**

This information was believed to be correct at the date of approval.

This Fact Sheet is for general information purposes only, and should not be solely relied upon for legal advice. Not all requirements are detailed. For full details, relevant documents and contacts should be consulted.