



# SMEC Testing Services Pty Ltd

A.C.N. 101 164 792

CONSULTING GEOTECHNICAL ENGINEERS

Telephone: (02) 9756 2166 Facsimile: (02) 9756 1137

Email: smectesting@pacific.net.au

Unit 14,  
1 Cowpasture Place  
WETHERILL PARK  
NSW 2164

P.O. Box 6989  
WETHERILL PARK  
NSW 2164

July 27, 2010

Project No. 17772/8146B

Report No. 10/0859

LWI/sa

DeiCorp Pty Limited  
Shop 5, 140-152 New Canterbury Road  
PETERSHAM M NSW 2049

Attention: Mr. Greg Colbran

**SUBJECT: ACID SULFATE SOIL (ASS) ASSESSMENT  
EVELEIGH STREET, REDFERN**

Dear Sir,

## *Introduction*

This letter report presents the results of an ASS assessment for a proposed new commercial/retail/residential development to be constructed in the above area. Site development will include a 9 metre deep basement excavation as part of the site.

ASS are the common name given to sediments and soils containing iron sulfides which, when exposed to oxygen generate sulfuric acid. Natural processes formed the majority of acid sulfate sediments when certain conditions existed in the Holocene geological period (the last 10,000 years). Formation conditions require the presence of iron-rich sediments, sulfate (usually from seawater), removal of reaction products such as bicarbonate, the presence of sulfate reducing bacteria and a plentiful supply of organic matter. It should be noted that these conditions exist in mangroves, salt marsh vegetation or tidal areas, and at the bottom of coastal rivers and lakes.

The relatively specific conditions under which acid sulfate soils are formed usually limit their occurrence to low lying parts of coastal floodplains, rivers and creeks. This includes areas with saline or brackish water such as deltas, coastal flats, backswamps and seasonal or permanent freshwater swamps that were formerly brackish. Due to flooding and stormwater erosion, these sulfidic sediments may continue to be re-distributed through the sands and sediments of the estuarine floodplain region. Sulfidic sediment may be found at any depth in suitable coastal sediments – usually beneath the watertable.

Any lowering in the watertable that covers and protects potential ASS will result in their aeration and the exposure of iron sulfide sediments to oxygen. The lowering in the watertable can occur naturally due to seasonal fluctuations and drought or any human intervention, when carrying out any excavations during site development. Potential ASS can also be exposed to air during physical disturbance with the material at the disturbance face, as well as the extracted material, both potentially being oxidised. The oxidation of iron sulfide sediments in potential ASS results in ASS soils.

Successful management of areas with ASS is possible but must take into account the specific nature of the site and the environmental consequences of development. While it is preferable that sites exhibiting acid sulfate characteristics not be disturbed, management techniques have been devised to minimise and manage impacts in certain circumstances.

When works involving the disturbance of soil or the change of groundwater levels are proposed in coastal areas, a preliminary assessment should be undertaken to determine whether acid sulfate soils are present and if the proposed works are likely to disturb these soils.

### ***Geology, Fieldwork Details and Subsurface Conditions***

Reference to the Sydney geological series sheet at a scale of 1:100,000 shows Triassic Age Ashfield Shale underlies the site. Rocks within this formation comprise shale and laminite and weather to form reactive clays. The Ashfield Shale is underlain by Triassic Age Hawkesbury Sandstone. Rocks within this formation comprise medium to coarse grained quartz sandstone.

SMEC Testing Services Pty Limited has undertaken a geotechnical investigation for the site. As part of that investigation (Refer to our Report No. 10/0811) twenty boreholes were drilled to depths of between 4 to over 20 metres. The borehole locations are shown on Drawing No. 10/0859. The subsurface conditions encountered are shown on the attached borehole logs. Explanation sheets and notes relating to geotechnical reports are also attached.

When making an assessment of the subsurface conditions across a site from a limited number of boreholes, there is the possibility that variations may occur between test locations. The data derived from the site investigation programme are extrapolated across the site to form a geological model and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. The actual conditions at the site may differ from those inferred herein, since no subsurface exploration programme, no matter how comprehensive, can reveal all subsurface details and anomalies.

The subsurface conditions comprise in places some topsoil and fill to 0.3/1.4 metres depth, below which is typically sand down to 1.2/3.0 metres depth. Insitu clays were found to overly the shale at depths of 2.5 to 4.9 metres.

Groundwater was observed at depths of 3.6 to 10.5 metres.

### ***Presence of ASS***

Reference to the Botany Bay ASS Risk Map indicates the property is an area where there are no known occurrences of ASS.

The following geomorphic or site criteria have been used to determine if acid sulfate soils are likely to be present:

- ❑ sediments of recent geological age (Holocene)
- ❑ soil horizons less than 5 in AHD
- ❑ marine or estuarine sediments and tidal lakes
- ❑ in coastal wetlands or back swamp areas

### *Assessment*

The property location is underlain by Ashfield Shale and therefore is not consistent with the geomorphic criteria for the presence of ASS. The existing groundsurface has an elevation of between RL 20 and 30 metres. Based on our onsite observations and the subsurface conditions exposed in the boreholes, it is our opinion that the proposed construction will not intercept any ASS. The groundwater present appears to be located in the underlying shale horizon which is common in the Sydney area. Removal of this water during construction is likely to have minimal if any affect on the local groundwater level. As a consequence, construction will not result in any significant lowering of any groundwater that may be present in the ASS some 600 metres to the north of the site.

Our assessment is the proposed construction will not require the preparation of an Acid Sulfate Soil Management Plan.

We trust this meets with your requirements. Should you have any questions, please contact us.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Laurie Ihnativ'.

Laurie Ihnativ, BE, MEngSc, MBA, FIE Aust  
Manager, SMEC Testing Services Pty Limited