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## **PRELIMINARY ASSESSMENT:** Acid Sulfate For Proposed Works at **3 Lido Avenue, North Narrabeen**

01		Trans of Mandas		
Class of land as shown on Acid		Type of Works		
Suifate Solis Planning Maps				
	1	Any works		
	0	Works below the natural ground surface.		
	Z	Works by which the water table is likely to be lowered.		
		Works beyond 1m below the natural ground surface.		
	3	Works by which the water table is likely to be lowered beyond 1m below the natural ground surface.		
		Works beyond 2m below the natural ground surface.		
	4	Works by which the water table is likely to be lowered beyond 2m below the natural ground surface.		
	5	Works on land below 5m AHD and within 500m of adjacent Class1, 2, 3 or 4 land which are likely to lower the watertable below 1m AHD on adjacent Class 1, 2, 3 or 4 land.		
The class of the site is highlighted in red, it should be noted that the classification does not mean acid sulfate soils are present				
on site but that there is a risk they could be present.				

#### 1. Proposed Development

- **1.1** Extend the N side of the existing house and add a new entryway to the garage.
- **1.2** Add a new first floor addition to the existing house.
- **1.3** Various other minor internal and external alterations to the existing house.
- **1.4** Install a new pool by excavating to a maximum depth of ~1.8m.
- 1.5 Details of the proposed development are shown on 7 drawings provided by Ukalovic Design, project number 2031, drawings numbered 1 to 7, Revision A. The drawings are not dated.

#### 2. Site Description

The site was inspected on the 17<sup>th</sup> June, 2021.

The block is located on the near level terrain W of South Creek and SW of a creek which runs from the Nareen Wetlands Reserve. The surface varies between RL1.9 and ~RL2.1. The Sydney

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1:100 000 Geological sheet indicates the site is underlain by Alluvial Stream and Estuarine Sediment (Qha). This is described as silty to peaty quartz sand, silt and clay with ferruginous and humic cementation in places and common shell layers.

The NSW Environment and Heritage mapping program (eSpade) maps the soil landscape of the property as 'Warriewood'. The ground tests indicate the upper ~0.3m of soil is a loose speckled dark brown loamy sand (wa1) that overlies bleached massive sand (wa2) with a thin ~0.2m layer of black sticky peat (wa4) encountered at a depth of ~1.0m. Their documentation indicates these soils range in pH from 4.5 to 7.0.

Ground testing indicates that sand sediments extend to a depth of at least ~5.1m. The sand sediments are Holocene in age (spanning in time from present to ~10 000 years ago).

No visible signs of acid sulfate soils such as corrosion on man-made surfaces, or unusually clear, milky, or iron-stained surface water were observed on the property.

#### 3. Earthworks

An excavation maximum depth of ~1.8m is required for the proposed pool. It will cover an area of ~17m<sup>2</sup>. Other earthworks include footing excavations for the proposed house additions. The excavations are only a risk in regards to potential acid sulfate soils while they are open. On completion of the footings, they will be sealed with the foundation, preventing access of oxygen to the soil and therefore greatly reducing the potential for acid generation.

#### 4. Watertable

The watertable was encountered at an average depth of ~1.4m (~RL0.6) below the current surface. It should be noted the watertable fluctuates with the tide and climatic changes.

#### 5. Field Testing

Four hand auger holes were put down in the locations shown on the site plan attached. Field pH and pH<sub>FOX</sub> testing was carried out on samples taken from the auger holes at regular



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intervals. The logs of the auger holes and the test results are as follows. The soil reaction rating scale for the  $pH_{FOX}$  test is shown in Appendix 1.

#### AUGER HOLE 1 (~RL2.0) – AH1 (Photo 1)

Depth (m)	Material Encountered
0.0 to 0.3	<b>TOPSOIL</b> , sandy soil, dark brown, moist, fine to medium grained with fine trace organic matter
0.3 to 1.1	SAND, with shell fragments, light brown/yellow, moist, fine to medium
1.1 to 1.2	grained. SANDY PEAT, with shell fragments, black, damp.
1.2 to 1.9	<b>SAND</b> , with shell fragments, grey, wet to very wet, fine to medium grained.

End of Hole @ 1.9m. Watertable encountered at ~1.4m.

TEST: AH1	FIELD pH & PEROXIDE RESULTS				
Sample depth (m)	pH⊧	30% Peroxide reaction	рН <sub>ғох</sub>	pH <sub>F</sub> - pH <sub>FOX</sub>	SS=Shell J=Jarosite R=Roots
0.2	7.6	L	7.2	0.4	-
0.5	8.0	М	7.7	0.3	SS
0.9	8.3	М	8.0	0.3	SS
1.2	8.0	L	7.8	0.2	SS
1.9	7.5	L	7.5	0.0	SS

AUGER HOLE 2 (~RL2.0) – AH2 (Photo 2)

#### Depth (m) Material Encountered

- 0.0 to 0.3 **TOPSOIL**, sandy soil, dark brown, moist, fine to medium grained with fine trace organic matter.
- 0.3 to 0.9 **SAND**, with shell fragments, light brown/yellow, moist, fine to medium grained.
- 0.9 to 1.1 **SANDY PEAT**, with shell fragments, black, damp.
- 1.1 to 1.8 **SAND**, with shell fragments, grey, wet to very wet, fine to medium grained.

End of Hole @ 1.8m. Watertable encountered at ~1.4m.



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TEST: AH2	FIELD pH & PEROXIDE RESULTS				
Sample depth (m)	pH⊧	30% Peroxide reaction	рН <sub>ғох</sub>	pH <sub>F</sub> - pH <sub>FOX</sub>	SS=Shell J=Jarosite R=Roots
0.2	7.7	L	7.6	0.1	-
0.5	8.1	М	8.0	0.1	SS
0.8	8.2	L	8.1	0.1	SS
1.1	7.6	L	7.4	0.2	SS
1.8	7.4	L	7.4	0.0	SS

AUGER HOLE 3 (~RL2.0) – AH3 (Photo 3)

Depth (m)	Material Encountered
0.0 to 0.2	<b>TOPSOIL</b> , sandy soil, dark brown, moist, fine to medium grained with fine trace organic matter.
0.2 to 1.0	<b>SAND</b> , with shell fragments, light brown/yellow, moist, fine to medium grained.
1.0 to 1.2	SANDY PEAT, with shell fragments, black, damp.
1.2 to 1.8	SAND, with shell fragments, grey, wet to very wet, fine to medium grained.

End of Hole @ 1.8m. Watertable encountered at ~1.4m.

TEST: AH3	FIELD pH & PEROXIDE RESULTS				
Sample depth (m)	pH⊧	30% Peroxide reaction	рН <sub>ғох</sub>	pH <sub>F</sub> pH <sub>FOX</sub>	SS=Shell J=Jarosite R=Roots
0.2	7.5	L	7.4	0.1	-
0.5	7.9	L	7.8	0.1	SS
0.8	8.3	М	8.1	0.2	SS
1.2	7.6	L	7.5	0.1	SS
1.8	7.4	L	7.4	0.0	SS



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### AUGER HOLE 4 (~RL2.1) - AH4 (Photo 4)

Depth (m)	Material Encountered
0.0 to 0.1	<b>TOPSOIL</b> , sandy soil, dark brown, moist, fine to medium grained with fine trace organic matter.
0.1 to 0.4	SILTY SAND, with shell fragments, brown/grey, moist, fine to medium grained.
0.4 to 1.0	SAND, with shell fragments, light brown/yellow, moist fine to medium grained.
1.0 to 1.2	SANDY PEAT, with shell fragments, black, damp.
1.2 to 1.8	SAND, with shell fragments, grey, wet to very wet, fine to medium grained.

**TEST: AH4** FIELD pH & PEROXIDE RESULTS Sample depth 30% Peroxide pH<sub>F</sub> SS=Shell **pH**<sub>FOX</sub> pH<sub>F</sub> - pH<sub>FOX</sub> (m) reaction J=Jarosite R=Roots 0.1 7.4 Μ 7.4 0.0 -7.7 7.7 0.0 SS 0.4 L SS 0.8 8.1 Μ 8.0 0.1 1.2 7.6 L 7.5 0.1 SS 1.8 7.4 L 7.4 0.0 SS

End of Hole @ 1.8m. Watertable encountered at ~1.4m.

#### 6. Conclusions

This report was carried out in accordance with the Field pH and Peroxide Test guidelines (ASSMAC, 1998).

No Acid Sulfate Soils were identified in the test holes. The  $pH_F$  levels tested in all auger holes did not fall lower than 7.4. This is above a PH of 4 that is an indicator of acid sulfate soils. No Potential Acid Sulfate Soils were identified in the test holes. The measured  $pH_F$  levels varied up to 0.4 from the measured  $pH_{FOX}$  levels. A movement of 1 unit or more is an indicator of potential acid sulfate soils. In addition, the measured  $pH_{FOX}$  for all tests did not fall lower than

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7.2. A  $pH_{FOX}$  <3 is a strong indicator of potential acid sulfate soils. No observable colour change or sulphurous odours were identified during the peroxide testing. It is likely the weak to medium reactions to peroxide testing were due to inclusions in the soil other than sulphides as, where the reaction was strongest,  $pH_{FOX}$  changed little from  $pH_F$  as it did in most of the tests.

This preliminary assessment indicates that an Acid Sulfate Soils management plan is not required for the proposed works.

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#### **Appendix 1: Soil Reaction Rating Scale**

Rate of Reaction	Reaction Scale
Low	L
Medium	Μ
High	Н
Extreme	X
Volcanic	V
Source: DER (201Ea)	

Source: DER (2015a)



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Photo 1: AH1 – Downhole is from left to right.



Photo 2: AH2 – Downhole is from left to right.



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Photo 3: AH3 – Downhole is from left to right.



Photo 4: AH4 – Downhole is from left to right.

