

## Acid Sulphate Soils Preliminary Assessment

Property: 38 Parkland Rd, Mona Vale 2103

Owner: Will Townsend & Rachel Harley

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The following report has been produced in consultation with the ASSMAC Acid Sulphate Soils Manual 1998 and the planning guidelines and assessment principles described within.

### Introduction

This report has been produced specifically for the property 38 Parkland Road Mona Vale, and aims to investigate and provide advice on the potential impact of development works proposed for the site on any potential acid sulphate soils existing that may be present.

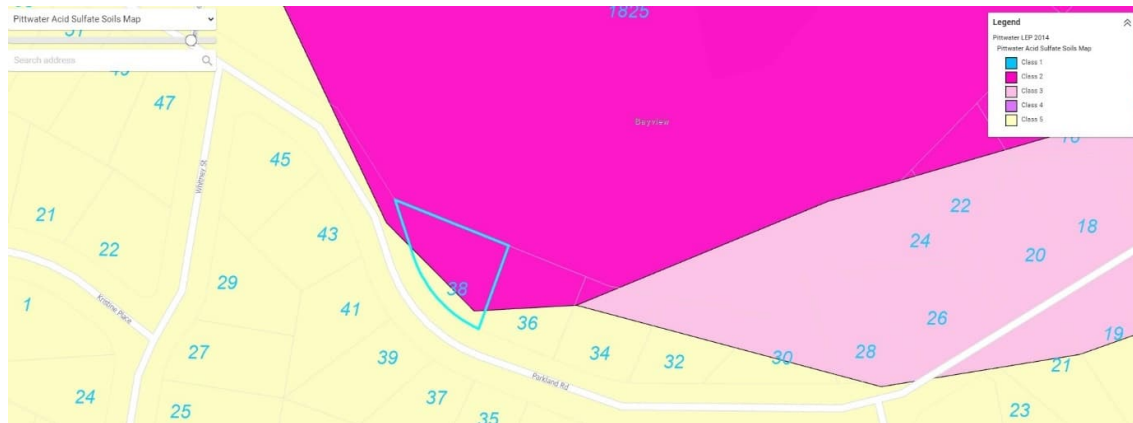
### The Site

38 Parkland Road

Situated adjacent to Bayview golf course and associated man-made stream that was once part of a natural low lying coastal floodplain/estuarine swampland that flows into nearby Winnerremmy Bay via a tidal floodgate.



The majority of the property is included in the Pittwater LEP 2014 Acid Sulphate Soils Map as a Class 2 area.



No part of the adjacent stream is included within the property boundary.

The site is characterized by a few very large native trees included or just outside the property boundaries and has a varying slope from medium to very steep on the western boundary adjacent the golf course and stream. Amongst the native trees are numerous smaller non-native trees amongst grassed and mulched garden areas. The existing house is a two storey brick veneer construction with concrete tile roof, the lower level consists of a garage, under house storage, laundry and small living space, the upper level include the main living space, kitchen bathrooms and 3 bedrooms.

### ***Expected Soil characteristics***

The published geological map covering this area indicates that the most of the site is underlain by Quaternary deposits (silty to peaty quartz sand, silt, and clay. Ferruginous and humic cementation in places. Common shell layers (Sydney 1:100 000 Geological Sheet 9130, 1<sup>st</sup> edition).

The Sydney 1:100,000 Soil Landscape Map 9130 (Soil Conservation Service of NSW) indicates the majority of the site as being part of the Erina erosional landscape, consisting of undulating to rolling rises and low hills. Soils are moderately deep to deep. The site is mapped as being part of the Deep Creek fluvial landscape, consisting of level to gently undulating alluvial floodplains draining the Hawkesbury Sandstone local relief.

PASS or ASS testing at Bayview Golf Course 1825 Pittwater Rd NSW 2104 which is a neighbouring property has confirmed the existence of PASS and ASS. The preliminary assessment testing and management plans are available for review on the Northern Beaches Council development website.

## Proposed Development

Development proposed includes 3 components

1. The replacement and extension of the existing timber deck. The existing and original deck main joists are failing due to timber rot, minor repairs have been made but the owner is not satisfied with the structural integrity of these repairs
2. The extension of the house on the northern elevation to utilise space to create additional kitchen storage and an ensuite bathroom for the main bedroom.
3. Render finish to all external brickwork

Components 1 and 2 have the potential to expose acid sulphate soils as they may require construction or replacement of footings

Figure 1 – Proposed Deck

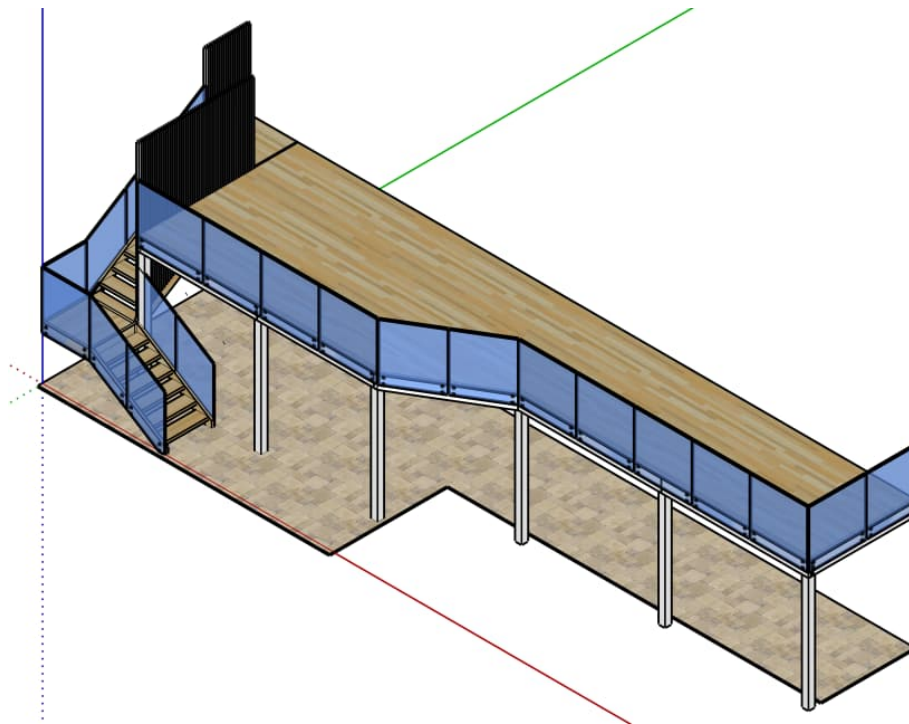
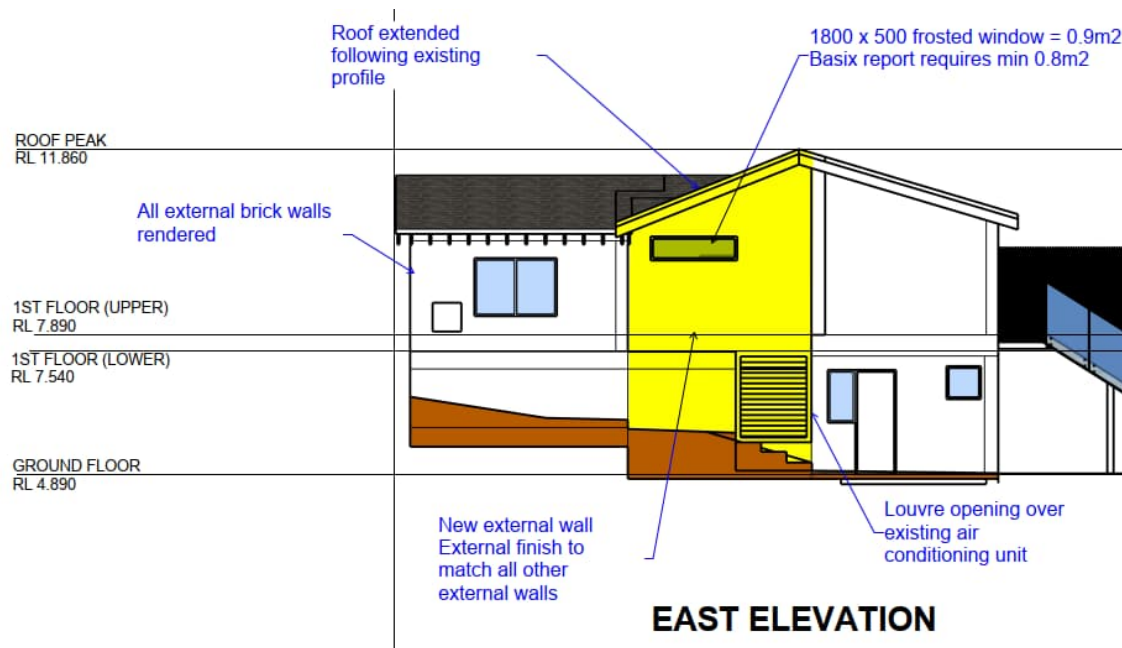


Figure 2 – Proposed Extension – East Elevation – Proposed

New Section highlighted yellow



#### Pittwater Local Environmental Plan 2014

The Pittwater LEP 2014 provides rules and regulations for the granting development consent on land included within the Acid Sulphate Soils Map.

Clause 7.1 (1) “The objective is to ensure that development does not disturb, expose or drain acid sulphate soils and cause environmental damage.”

As per Clause 7.1 (2) Class of land in this case is 2, development consent is required for “Works below the natural ground surface” and/or “Work by which the water table is likely to be lowered”

Clause 7.1 (4) allows that development consent may not be required under this clause if “(a) A preliminary assessment of the proposed works prepared in accordance with the acid sulphate soils manual indicates that an acid sulphate soils management plan is not required for the works” and “(b) the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person carrying out the works”

Clause 7.1 (6) allows that development consent may not be required if “(a) the works involve the disturbance of less than 1 tonne of soil” and “(b) the works are not likely to lower the watertable”

Following these requirements the owner has proceeded with an assessment of the proposed works with the aim to show that that either of these clauses can be satisfied and that development consent is not required.

## Acid Sulphate Assessment

As per the ASSMAC Assessment Guidelines, the guidelines must be followed if as per section 1.4 below any of the listed activities will be carried out

### 1.4 When do the Guidelines apply?

*The following activities undertaken in areas likely to affect or use coastal sediments, warrant an assessment of the risk of exposing acid sulfate soil:*

- **Excavation or disturbance of acid sulfate soil**

*For example: construction of roads, foundations, drainage works, laser levelling, land forming works, flood mitigation works, dams and aquaculture ponds, sand or gravel extraction, dredging. When acid sulfate materials are being excavated, attention must be given to the excavation site as well as the location where the excavated material is placed or used.*

- **Lowering the watertable**

*For example: new drainage works or deepening of existing drains, use of groundwater, de-watering of dams, wetlands or quarries, dredging works lowering the bed of a river*

- **Use of acid sulfate soil**

*For example: aquaculture pond walls, dams, flood mitigation works, imported fill material, reclamation or foreshore works*

- **Physical habitat modification for mosquito control**

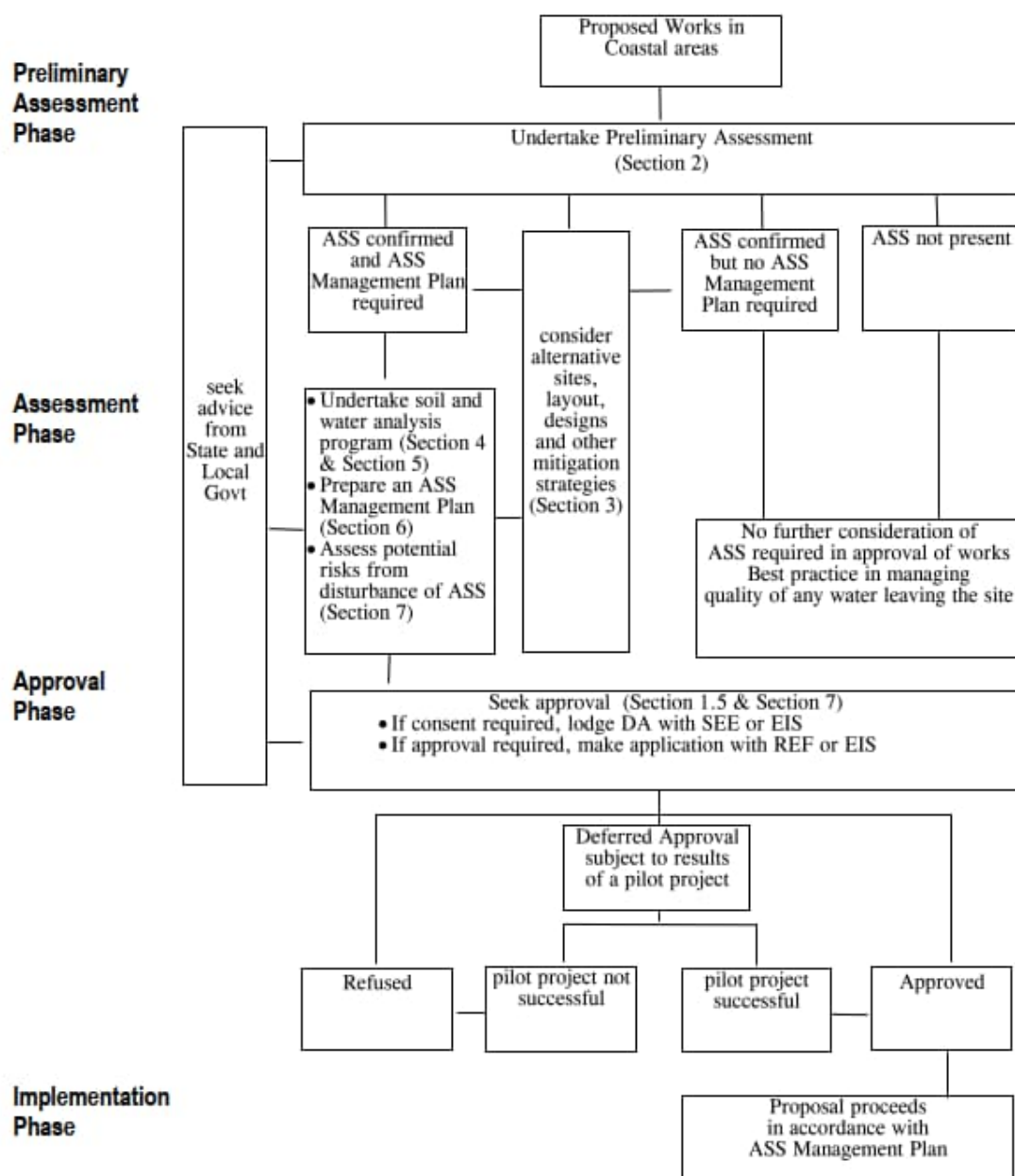
*For example: runnelling, drainage and selective ditching to remove water or allow predatory fish access to tidal pools.*

*Appropriate management procedures require an understanding of acid sulfate soils, their distribution and severity as well as the nature of the proposed activity. The procedures identified in the guidelines for the assessment and management of acid sulfate soils will be regarded as a minimum requirement for environment protection and provide a basis for the formulation of approval and licence conditions.*

The relevant information to this development has been highlighted and indicates that an assessment of the risk of exposing acid sulphate material is warranted. Given the relative level and nature of works the water table is unlikely to be effected.

Following this it is clear the assessment process should be followed, this will be carried out following the flowchart for assessment of proposal affecting Acid Sulphate Soils – Figure 1.2 of the ASSMAC guidelines

Figure 1.2 Flowchart for assessment of proposals affecting Acid Sulfate Soils



## **Preliminary Assessment**

### **Establish the general parameters of the works**

#### **Earthworks**

##### **1. Deck Construction**

The deck will require a total of 6 new columns for the main deck area and 3 smaller columns for the stair mid landing. Initial engineering assessment of the deck loading indicates that the deck columns would require a minimum of 600mm deep 300 diameter concrete footings onto minimum 100kPa subsoil. The smaller stair columns could bear directly onto the existing concrete slab and would require no excavation.

Site test excavations were completed to check subsoil conditions, one test pit in the natural ground area and three test pit/inspections in the landscaped garden area where the columns footings will be located. The eastern 3 footings are positioned over an existing concrete slab in an area that is retained by a hardwood sleeper wall that was built at the same time as the house. Test logs and photos can be found in **Appendix 1**

The water table was not found in any of the test pits and the dryness of the clay indicates that the subsoil is not very porous.

The firm and stiff clay found was of varying colours, some orange, red and pinks and some grey and bluish along with some shells. The latter being a strong indicator that this clay layer is acid sulphate soil however testing would be required to confirm

These Initial site inspections has determined that there is firm to stiff clay (>100kPa) approximately 600mm to 1.5m below the existing ground levels where the deck column footings will be located.

Given that only a 600mm deep pile is required no clay and minimal original natural material and hence there is no possibility of acid sulphate soil being disturbed. However the engineer may require a 200mm deep socket into the clay. The total soil disturbed would be  $6 * 0.6 * \pi * 0.15^2 = 0.25\text{m}^3$  of soil. Given an assumed density of 1600kg/m<sup>3</sup> this amounts to 400kg of spoil. Only 1/3 of this would be potential acid sulphate soil. The spoil will be taken to Kimbriki tip for disposal and the footings will be filled not long after excavation to limit any ASS soil exposure.

The above is based on preliminary engineering only and if more substantial footings are required it is likely that a screw pile option would be utilized which would result in the same minimal spoil exposure. Screw piles are an efficient way to transfer load into weaker soil substrates and only displace soil laterally which results in minimal spoil production during installation. The cost is comparable and sometimes cheaper than reinforced concrete piles.

## 2. External Extension

The external extension requires the construction of a new wall spanning between the existing eastern elevation walls. The area is currently occupied by reinforced concrete stairs on brick walls with strip footings below. Preliminary engineering assessment is that no new footings will be required for the construction of this wall as the existing stair footing and adjacent walls will be able to support the new wall and floor and roof loads. The only excavation will be removal of some topsoil from the small garden bed as it will not be ideal to have organic materials remaining under the new floor. There is no reason that any potential acid sulphate soils would be disturbed during these works

### Parameters of Earthworks Summary

#### 1. *What is the volume of soil to be disturbed?*

Total volume of soil to be disturbed is 6 x 600mm by 300 diameter piles = 0.252m<sup>3</sup>

Total volume of potential acid sulphate soil if 200mm socket required = 0.084m<sup>3</sup>

Total volume if screw piles used = 0m<sup>3</sup>

The total weight of excavated soil < 1T in all cases

#### 2. *What is the depth of disturbance of the soil?*

Subject to engineering but assumed to be not more than 600mm to up to 1000mm depending on ground conditions

#### 3. *Is the disturbance short term or permanent? Can the disturbance be staged so as to minimise the exposure to air*

The disturbance is will be short term with footing backfilled and spoil removed from site with a matter of a few days at most.

#### 4. *How are the disturbed are and any excavated soil to be managed in the short or long term? Do the landscape or soil characteristics make mitigation easy or difficult? Is there sufficient area to undertake mitigation treatment. Can leachate be easily contained and neutralised?*

Excavated soil will be moved to the driveway prior to removal and covered with tarpaulin to prevent runoff prior to transport via a trailer to Kimbriki resource recovery centre. Silt fencing as per the sedimentation control plan will be in place to be prevent runoff into the nearby creek

The reader should refer to the project waste management plan and sedimentation control plan for further information.

#### 5. *Is there an existing acid sulphate soil problem in the area? Will the proposed works exacerbate the problem in the short or long term? Is there information on oxidisable values from other adjoining or local areas. Will they exceed the action criteria*

There is no existing acid sulphate soil problem on the site and there will be no exacerbation of issues. Information on oxidisable values for testing completed at Bayview Golf Course is available refer to

“Acid Sulfate Soil Assessment: Stormwater Harvesting and Irrigation Works Bayview Golf Course, Cabbage Tree Road, Bayview, NSW P2108485JR02V01 – October 2021” By Martens Consulting Engineers

This is available on the northern beaches council website in the development documents section for Bayview Golf Course 1825 Pittwater Rd Bayview NSW 2104

This report found that acid sulphate soils are present and an Acid Sulphate Soils Management Plan was required for recent development on the site. It should note that the developments proposed earthworks disturbing over 1000 tonnes of soil and works below the water table

### ***Groundwater Issues***

*1. Is the ground water level likely to be lowered and if so by how much?*

No, it is highly unlikely based on all information available and site inspections that the water table will be in any way affected

## ***Discussion and Conclusion***

Is very likely that acid sulphate soil is present on the site given the proximity to confirmed acid sulphate soil test results at Bayview golf course, however given the scope of the project only very minor disturbance of potential acid sulphate is likely to occur. The scope of which falls below the requirements for an Acid sulphate soils management plan to be produced.

Pittwater LEP consideration

The following clauses have been satisfied

- Clause 7.1 (1) “The objective is to ensure that development does not disturb, expose or drain acid sulphate soils and cause environmental damage.”

The disturbance of acid sulphate soils will not cause any environmental damage

- Clause 7.1 (4) allows that development consent may not be required under this clause if “(a) *A preliminary assessment of the proposed works prepared in accordance with the acid sulphate soils manual indicates that an acid sulphate soils management plan is not required for the works*” and “(b) *the preliminary assessment has been provided to the consent authority and the consent authority has confirmed the assessment by notice in writing to the person carrying out the works*”

A preliminary assessment has been completed and provided to the consent authority

- Clause 7.1 (6) allows that development consent may not be required if “(a) *the works involve the disturbance of less than 1 tonne of soil*” and “(b) *the works are not likely to lower the watertable*”

This preliminary assessment has shown that the development will not disturb more than 1 tonne of soil and the works will not lower the watertable

The presence of Potential ASS or actual ASS should not restrict the development from proceeding.

Appendix 1

Site Soil Inspection Locations



## Soil Inspections

### 1. Test Pit 1 – Natural Landscaped Area

This 900mm deep test excavation was completed in a natural area of the garden that has been mulched only and is some distance from the house and balcony footings. The mulch layer was not included

#### Results

0mm-200mm Natural Topsoil

200-500mm Firm dry sandy soil and clay, orange, yellow and reddish colours

500-900mm firm/stiff dry clay, some silt stones, blue grey colours

Water table not found at this depth



## 2. Test Pit 2 – Planted Garden Area

This 900mm deep test excavation was completed in an improved area with a steep sloped garden bed that has been mulched and planted with low shrubbery. This is where the 3 western most deck columns will be founded.

### Results

0mm – 100mm Organic Mulch

100-600mm Improved topsoil and some sandy soil and firm clay chunks

600-900mm – stiff dry clay and some silt stones

Water table not found



### 3. Test Pit 3 – Planted Garden Area 2

This 900mm deep test excavation was completed in an improved area with a steep sloped garden bed that has been mulched and planted with low shrubbery. This is closer to where the 2 centrally located deck columns will be founded.

#### Results

0mm – 100mm - Organic Mulch

100-500mm - Improved topsoil and some sandy soil and firm clay chunks

500-900mm – stiff dry clay and some silt stones

Water table not found



#### 4. Test Pit 4 – Retained Planted Garden Area

This 1.5 m deep soil inspection was completed in an improved area with a steep garden bed retained by rotted hardwood sleepers. This is a few metres to the north of where the 3 eastern most deck and all stair columns will be founded. It may be indicative of what might be found under the existing concrete slab. Inspection required removal of some of the failing sleepers and hand digging to remove a large amount of rubble and non-natural fill. The area also includes some 2-3m high non native shrubbery and some large >8m palm trees.

##### Results

0mm – 100 Organic Mulch

100-900mm topsoil - mixed natural and unnatural fill – concrete pieces, bricks, some soil and some clay, tree roots

900-1500mm – firm and stiff dry clay and some silt stones

Water table not found at this depth – suspect it is at least another metre deeper given the level of the stream located on the golf course nearby is at least 2m lower

