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ACID SULPHATE SOIL MANAGMENT PLAN

PART PROPOSED LOT 231 BEING PART LOT 32 SECTION C IN DP5464
41 WARRIEWOOD ROAD, WARRIEWOOD

REPORT NO 13801/6-AA 27 OCTOBER 2017

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Job No: 13801/6
Our Ref: 13801/6-AA
27 October 2017

Woolwich Pty Ltd
c/ Craig & Rhodes Pty Ltd
Suite 400, Level 4, 16-18 Cambridge Street
EPPING NSW 2132
Email: fcarrozza@crhodes.com.au

Attention: Mr F Carrozza

Dear Sir

re: Proposed Creek Works
Part Proposed Lot 231 being Part Lot 32 Section C in DP5464
41 Warriewood Road, Warriewood
Acid Sulphate Management Plan

Further to our report on *Preliminary Acid Sulphate Soil Assessment (PASSA)* Report No 13801/4-AA dated 6 October 2017 prepared by Geotechnique Pty Ltd (Geotechnique), this report presents an acid sulphate soil management plan (ASSMP) for the above site.

If you have any questions relating to this report, please do not hesitate to contact the undersigned.

Yours faithfully
GEOTECHNIQUE PTY LTD

DANDA SAPKOTA
Senior Environmental Engineer

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DRAWING

Drawing No 13801/5-AA1 Borehole Locations as part of Preliminary Acid Sulfate Soil Assessment

1.0 INTRODUCTION

Further to our report on *Preliminary Acid Sulphate Soil Assessment (PASSA)* Report No 13801/4-AA dated 6 October 2017 prepared by Geotechnique Pty Ltd (Geotechnique), this report presents a Acid Sulfate Soil Management Plan (ASSMP) for the site located within the proposed Lot 231, being part of Lot 32 Section C in DP5464, 41 Warriewood Road, Warriewood, in the local government area of Northern Beaches, as indicated on the Drawing No 13801/5-AA1 (Attachment A).

The objectives of ASSMP were to consider both the potential onsite and offsite impacts of the proposed disturbance of the acid sulphate soil (ASS) and to address for the minimisation of the potential impacts on the environment.

In order to achieve the objectives, the following scope of work was conducted:

- Review of previous PASSA prepared by Geotechnique.
- Development of an appropriate ASSMP for the proposed disturbance/excavation within the Creek Work areas (the site), considering the management strategies of avoidance and/or minimisation of disturbance of ASS.

1.1 Acid Sulphate Soils and Potential Impact

As referred to the NSW Acid Sulfate Soil Manual (Stone et al., 1998), acid Sulphate soils are the common name given to sediments and soils containing iron sulfides which, when exposed to oxygen generate sulfuric acid. The majority of acid Sulphate sediments were formed by natural processes when certain conditions existed in the Holocene geological period (the last 10,000 years).

“Acid Sulphate Soils” include actual acid sulphate soils (AASS) or potential acid sulphate soils (PASS). Actual and potential acid sulphate soils are often found in the same soil profile, with actual acid sulphate soils generally overlying potential acid Sulphate soil horizons”.

“Actual Acid Sulphate Soils” are soils containing highly acidic soil horizons or layers resulting from the aeration of soil materials that are rich in iron sulfides, primarily sulfide. This oxidation produces hydrogen ions in excess of the sediment’s capacity to neutralise the acidity resulting in soils of pH of 4 or less when measured in dry season conditions. These soils can usually be identified by the presence of pale yellow mottles and coatings of jarosite”.

“Potential Acid Sulphate Soils” are soils which contain iron sulfides or sulfidic material which have not been exposed to air and oxidised. The field pH of these soils in their undisturbed state is pH 4 or more and may be neutral or slightly alkaline. However, they pose a considerable environmental risk when disturbed, as they will become severely acid when exposed to air and oxidised”.

“Not all acid soils are acid sulphate soils. It is important to note that acidic soil and water conditions can occur with other soils that do not contain iron sulfide sediments. Organic acids (for example humic acid) are common in coastal ecosystems and can produce acid water and sediments. The pH of these sediments is usually around 4.5-5.5. As they do not have the ability to generate additional acid when exposed to air, they do not exhibit the same kinds of environmental risks that are associated acid sulphate sediments.”

As mentioned earlier, exposure soils to oxygen generate sulphuric acid. As acid drainage is likely to have significant environmental impacts and adverse effects on human and animal health impacts from polluted water, it is for these reasons that appropriate measures are required to avoid environmental degradation from the excavation works.

Based on the review of the PASSA, prepared by Geotechnique, it was considered that the soils likely to be disturbed during proposed Creek Works are likely to be acidic or potentially acid sulphate soil. It is therefore that the proposed excavation within the Creek Works area should be carried out, in accordance with an approved "Acid Sulphate Soils Management Plan (ASSMP)". With any changes in the proposed development, the ASSMP should be updated. Acid sulphate soils referred in this ASSMP report include the AASS and PASS.

2.0 SITE IDENTIFICATION

As shown on Drawing No 13801/5-AA1 in Attachment A, the site is irregular in shape and occupies an area of about 1,415m^2 as indicated on the Attached Drawing No 13801/5-AA1. It is understood that the proposed work is confined within the 10m width of south-western boundary and part of south-eastern boundary, which forms part of proposed Lot 231.

3.0 TOPOGRAPHY, GEOLOGY AND HYDROGEOLOGY

In general, ground surface of the site slopes moderately to gently toward the creek.

The Geological Map of Sydney (Herbert 1983) indicates that the subsurface materials across the site are anticipated to be stream alluvium and/or estuarine sand, comprising silty to peaty quartz sand, silt and clay, ferruginous and humic at places, with shell layers.

The Soil Landscape Map of Sydney (Chapman et al. 2002), indicates that the landscape at the site belongs to Warriewood Group, which is characterised by level to gently undulating swales, depressions and in filled lagoons on Quaternary sand, with local relief of less than 10m, ground slopes of less than 3%, depth to water table of less than 2.0m. Soils in this group comprise sandy humus, sand and peaty, with thickness exceeding 1.5m. This landscape has high water table and is subjected to flooding.

4.0 GROUNDWATER CONDITONS

As reported in the PASSA, groundwater/seepage was observed in boreholes ranging from 0.5m (BH7) below existing ground level (begl) to 0.7m begl in BH3 and BH5. It should be noted that the levels of groundwater/seepage might vary due to rainfall, temperature and other factors not evident during borehole drilling.

5.0 REVIEW OF ACID SULPHATE SOIL MAPS

A review of Acid Sulfate Soil Risk Map of Hornsby / Mona Vale (DLWC, 1997) indicates that the site is located within the area of no known occurrence to low probability (between 1m and 3m below the ground surface (BEGL)) and high probability (in >3m BEGL) of occurrence of acid sulfate soil materials in the proximity of Narrabeen Creek.

6.0 REVIEW OF PREVIOUS PRELIMINARY ACID SULPHATE SOIL ASSESSMENT

As mentioned earlier, Geotechnique carried out a preliminary acid sulphate soil assessment (PASSA) for the site (Report No 13801/4-AA) to ascertain if excavations within the proposed Creek Works area will disturb acid sulphate and/or potentially acid sulphate soils. The PASSA included the field observation and laboratory analysis of the recovered soil samples.

6.1 Field Observation and Laboratory Analysis during the PASSA

The following observations were made during the inspection of the site:

- Narrabeen Creek forms the eastern and south-western boundary of the site.
- On-going construction works within the distant north-eastern adjoining properties.

The site features were as indicated on Drawing No 13801/5-AA1.

In conjunction with contamination assessment, soil samples for the PASSA were recovered for laboratory analysis from four borehole locations (BH1, BH3, BH5 and BH7) to cover the site of approximately 1415m^2. Based on the NSW Acid Sulfate Soil Manual (Stone et al., 1998), four (4) sampling locations are required for an area of less than 1 hectare (ha) (i.e., 10,000m^2) in order to determine the acid sulphate soil status of the site. The borehole locations are as shown on the attached Drawing No 13801/5-AA.

The sub-surface profile within the proposed Creek Works area is anticipated to comprise; silty clay, low to medium plasticity, brown; silty sand, fine to medium grained, grey; silty sand, fine to medium grained, grey; silty sand, fine to medium grained, grey mottled orange as detailed in the Attachment B of the PASSA.

It is understood that excavation for Creek Work will extend to depths of about 0.5 to 1.0m below the existing ground level.

Laboratory analysis as part of the PASSA to confirm the presence or otherwise of acid sulphate soils consisted of testing representative soil samples to determine **pH_{KCl}, pH_{ox}, TPA** (Total Peroxide Acidity), **TAA** (Titratable Actual Acidity), **TSA** (Titratable Sulphidic Acidity), **S_{POS}%** (Percent Peroxide Oxidisable Sulphur) and **S_{SCR}%** (Chromium Reducible Sulphur). Laboratory tests were carried out by SGS Australia Pty Ltd (NATA accredited), in accordance with SPOCAS (Suspension Peroxide Oxidation Combined Acidity & Sulphate) / SCR (Chromium Reducible Sulphur) methods recommended in the Queensland Department of Natural Resources, Mines and Energy (QLD NRM&E 2004).

The test results of laboratory analysis carried out during the PASSA are summarised in Table 6.2 below.

Table 6.2 Summary of Acid Sulfate Soil Laboratory Results

Test Pit / Borehole	Depth (m)	Material Description	pH_F, Unit	pH_{FOX}, Unit	Reaction Rate	Drop in pH	pH_{KCl}, Unit	pH_{ox}, Unit	TPA (pH6.5), mole H^+/t	TAA (pH6.5), mole H+/t	S_{POS} %w/w	S_{SCR} %/w	Comments	Net Acidity, without ANCE, mole H+/t	Liming rate without ANCE kgCaCO3/ tonne #
BH1	0-0.3	Silty clay	5.4	2.7	x x x	2.7	5.3	5.9	<5	32	0.087	0.010	Acidic Soil	87	6.5
BH1	0.5-0.8	Silty clay	5.2	2.2	x x x	3.0									
BH1	1.0-1.3	Silty clay	5.8	2.5	x x x	3.3									
BH3	0-0.3	Silty sand	5.9	2.2	x x x	3.7	5.3	6.7	<5	35	0.053	<0.005		15	2.6
BH3	0.5-0.8	Silty sand	5.4	2.4	x x x	3.0	4.7	3.6	344	97	0.220	0.110	Potential acid sulfate soil (PASS)	240	18.0
BH3	1.0-1.3	Silty sand	5.5	2.9	x	2.6									
BH5	0-0.3	Silty sand	5.5	3.0	x x x	2.5									
BH5	0.5-0.8	Silty sand	5.1	2.3	x	2.8	4.9	5.5	<5	47	0.048	0.010	Acidic Soil	77	6.0
BH5	1.0-1.5	Silty sand	5.2	2.9	x	2.3	5.3	4.0	<6	12	0.007	<0.005	Acidic Soil	17	
BH7	0-0.3	Silty sand	6.1	3.3	x x x	2.8									
BH7	0.5-0.8	Silty sand	5.3	3.2	x x	2.1									
BH7	1.0-1.3	Silty sand	4.4	2.8	x x	1.6	5.4	3.5	37	10	0.020	<0.005	Acidic Soil	22	2.8

Notes

X	Slight
XX:	Moderate
XXX:	Strong/High
XXXX:	Extreme/Vigorous (gas evolution and heat generation)
pH_{KCl}:	pH in a 1:40 (W/V) suspension of soil in a solution of 1M K_{Cl} extract
pH_{ox} :	pH in a suspension of soil in a solution after peroxide digestion in SPOCAS method
TPA :	Titratable Peroxide Acidity (moles H^+/tonne)
TAA :	Titratable Actual Acidity (moles H^+/tonne)
$S_{POS:}$	Peroxide Oxidisable Sulphur (% w/w)
$S_{SCR:}$:	Chromium Reducible Sulphur (% w/w)
#=	Liming rate calculated based on the assumed density of 1.0 t/ cubic metres (m^3)

Based on the material description, the soils likely to be disturbed during the proposed works are assessed to be of fine texture. The total volume of soils to be disturbed is considered to be in excess of 1000 tonnes.

Based on the PASSA, it was concluded that:

- The soil samples recovered from the locations, BH1 (0-0.3m), BH3 (0-0.3m, BH5 (0.5-0.8m) and BH7 (1.0-1.3m) and analysed contained no actual acid sulphate soil (AASS) or potential acid sulphate soil (PASS), but are considered as acidic soils.
- The soil sample recovered from BH3 (0.5-0.8m), comprising, silty clay, low to medium plasticity, brown contained no AASS, but is considered as PASS.

It is considered that the soils likely to be disturbed during proposed Creek Works are likely to be acidic or potentially acid sulphate soils. Therefore, the proposed excavation works should be carried out with an approved “Acid Sulphate Soils Management Plan”.

7.0 ACID SULPHATE SOILS MANAGEMENT PLAN (ASSMP)

As mentioned above, the soils likely to be disturbed during proposed Creek Works are likely to be acidic or potentially acid sulphate soil; it is therefore that the proposed excavation works should be carried out with an approved “Acid Sulphate Soils Management Plan”.

The ASSMP has been prepared in accordance with NSW Acid Sulphate Soils Manual (Stone et al., 1998), Queensland Department of Natural Resources, Mines and Energy, 2004 - Acid Sulphate Soils Laboratory Methods Guidelines (Ahern et al., 2004).

The objectives of ASSM is to avoid adverse effects on the surrounding environment as a result of the proposed disturbance/excavation of soils within the Creek Works area of about 1415m^2, and the depth of excavation ranging from 0.5 to 1.0m, below the existing ground level (BEGL). It is intended to achieve the objectives by containing and treating any potential or acidic soils that might be disturbed or excavated during the proposed works.

7.1 Management Options and Strategy

There are two options in dealing with acid sulphate soils:

Option 1 Dispose of the untreated acidic or potential acid sulphate soils at a disposal facility that accept the acid sulphate soils, in accordance applicable regulatory requirements.

Option 2 Neutralise the acid sulphate soils by mixing with pure fine lime. The amount of lime to be used to neutralise the soils depends on the concentration of acidity and amount of potential acid sulphate or acidic soils disturbed.

- Re-use the neutralised soils as controlled fill, if required, provided they meet other geotechnical and environmental requirements.
- Following neutralisation of the soils, dispose of on-site or at a licensed disposal facility.

Based on results of laboratory tests on representative soils samples, the recommended average quantities of lime required to neutralise are considered as follows:

- Soils at depth ranging from 0 to 0.5m BEGL: 6.5 kg/ tonne of acidic soil
- Soils at depth ranging from 0.5-1.0m BEGL: 18 kg/ tonne of potential acid sulphate soil

The liming rate should be adjusted for the grade of lime used for treatment.

Please note that these procedures are based on requirements for acid sulphate soils and might be overridden or added to by other contamination and/or constraints. Such issues are not dealt with in this plan.

7.2 Work Procedure-Soils

As indicated earlier, untreated acid sulphate soils or acidic soil may be disposed of in a disposal facility licensed to receive acid sulphate soils. For treatment of acid sulphate soils with lime, we recommend the following procedures:

- Material excavated should be selectively stockpiled.
- Excavated acidic or acid sulphate soils are to be kept in a bunded area to contain any leachate and/or run-off.
- Stockpiles should be limited to 1.5m in height.
- Stockpiles should be covered with plastic sheeting to prevent drying and/or wetting.

- Acidic or potential acid sulphate soil should be treated with the recommended dose of lime and tested to ascertain that acid sulphate soils are neutralised adequately. Based on the tests, lime rate should be adjusted for the stockpiled soil excavated at depth ranging from 0.5 to 1.0m BEGL.
- Acid sulphate soils neutralised with lime may be re-used or disposed off-site.

7.2.1 Work Procedure-Water

The pH of water is usually around neutral, approximately pH 7-8. When water has a pH of 5.5 or below, it can kill fish, restrict plant growth and reduce agricultural productivity, corrode metal and damage concrete foundations and engineering structures. Any acid leachate is to be neutralised to pH 6.5-7.5 by dosing with lime before disposal.

- Any water pumped from excavations is to be pumped into holding tanks. The water should be tested and treated as appropriate.
- Water is not to be discharged until the level of turbidity is acceptable (dose with lime to flocculate) and pH levels are acceptable.
- It is not anticipated that the works will permanently lower the water table.

The following details should be provided to the approving authority:

- The locations of bunded areas for stockpiles.
- Preferred disposal or re-use method for dealing with excavated materials.
- Duration and timing of excavation and lime treatment.
- Contact details and responsibilities of the contractor.

8.0 CONTINGENCY PLAN

The recommendations presented in this report are based on information from five recovered soil samples. Actual sub-surface conditions across the site might differ from those expected (interpreted). If such differences appear to exist or are encountered during construction, we recommend a qualified environmental / geotechnical consultant is contacted for further advice. Additional sampling and testing might be required if soils encountered during excavations differ to those encountered in the test pits excavated during the PASSA.

The sampling and testing program should be carried out in accordance with the Acid Sulphate Soil Manual (Stone et al., 1998).

The assessment criteria will include ‘Action Criteria ‘based on the laboratory analysis of acid sulphate soil material as specified in the Acid Sulphate Soil Manual. These action criteria (as indicated in Table 7.1) will be based on the soil profile (texture) with the volume of the soil to be disturbed in order to manage the material as ASS.

TABLE 8.1

Type of Material		**Action Criteria Less than 1000 tonnes of soil is disturbed**		**Action Criteria More than 1000 tonnes of soil is disturbed**	
Texture Range	**Approx Clay Content** (%<0.002mm)	**Sulphur Trail** % S oxidisable (oven dry basis) e.g. S_{TOS} or S_{POS}	**Acid Trail** mol H^+/tonne (oven dry basis) e.g. TPA or TSA	**Sulphur Trail** % S oxidisable (oven dry basis) e.g. S_{TOS} or S_{POS}	**Acid Trail** mol H^+/tonne (oven dry basis) e.g. TPA or TSA
Coarse Texture Sands to loamy sands	≤5	0.03	18	0.03	18
Medium Texture Sandy loams to light clays	5-40	0.06	36	0.03	18
Fine Texture Medium to heavy clays and silty clays	≥40	0.10	62	0.03	18

The test results are compared with the action criteria mentioned in Table 8.1 to determine whether treatment is required. The soil with the test results exceeding the action criteria should be appropriately stockpiled with soil material duly described and recorded during excavation and stockpiling.

If required, the work procedure for soil and water under section 7 of this report should be referred and the liming rate should be estimated based on the laboratory test results.

This management plan should be carried in conjunction with overall environmental management plan adopted within the site.

Final validation sampling and testing of treated soil will be carried out at the completion of lime treatment for successful or otherwise of neutralisation process.

If the initial validation sampling/testing fails the adopted validation criteria, further treatment should be carried out. The management strategy should be updated, if required, in accordance with Acid Sulphate Soil Manual (Stone et al., 1998).

9.0 LIMITATIONS

The acid sulphate soil management plan presented in this report is based on information from four borehole locations up to the depth of 1.5m into the natural soil below the existing ground level (EGL). Actual sub-surface conditions across the site might differ from those expected (interpreted). If such differences appear to exist or are encountered during construction, we recommend that this office is contacted for further advice. Additional sampling and testing might be required if soils encountered during excavations differ from those encountered during this assessment.

This assessment does not cover the contamination assessment required for Waste Classification for off-site disposal at an EPA licensed landfill. The assessment for soil for Waste Classification should be carried out according the NSW EPA Waste Classification Guidelines, Part 1 Classifying Waste, 2014 (NSW EPA 2014)

References

Dear, SE, Ahern CR, O'Brien, LE, Dobos SK, McElnea, AE, Moore NG and Watling KM (2014), Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines. Brisbane: Department of Science, Information Technology, Innovation and the Arts, Queensland Government.

DLWC (1997). Acid Sulphate Soil Risk Map (Edition 2, 1:25,000) of Botany Bay, Sydney. Department of Land and Water Conservation, 1997.

Stone Y., Ahern C.R. and Bunden B. (1998) Acid Sulfate Soil Manual, Acid Sulfate Soil Management Advisory Committee, Wollongbar, NSW, Australia.

QDNRM & E 2004, Acid Sulfate Soils – Laboratory Methods Guidelines, Queensland, Department of Natural Resources, Mines and Energy, Indooroopilly, Queensland, Australia.

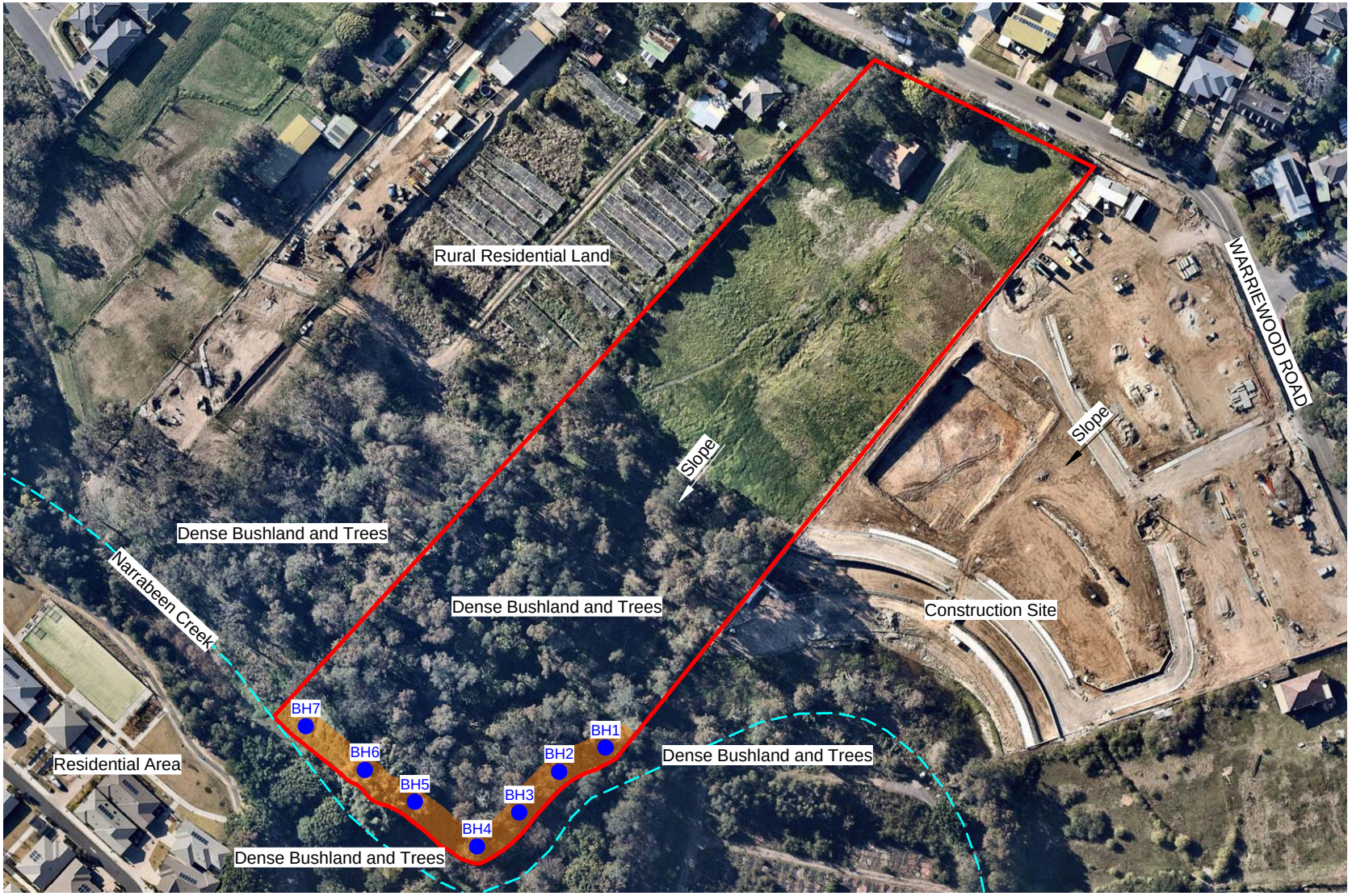
Chapman GA, Murphy CL, Tille PJ and Morse RJ 2002, Soil Landscape Series Sheet 9030, Scale 1:100,000 (Sydney), Soil Conservation Service of NSW, Sydney.

Herbert C, 1983, Geological Series Sheet 9030, Scale 1:100,000 (Sydney), Department of Minerals and Energy, NSW, Sydney.

NSW EPA (2014), Waste Classification Guidelines Part 1 Classifying Waste, 2014, NSW EPA.

DRAWING

Drawing 13801/5-AA1	*Sample locations as part of PASSA in conjunction with Contamination Assessment (Ref Report 13801/5-AA1)*



LEGEND

- Borehole
- Investigation Area

Imagery ©2017 NearMap.com

0 20 40 60 80 100m

Scale 1:2000

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NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

Craig & Rhodes Pty Ltd
Proposed Subdivision
Lot 32 Section C in DP5464
41 Warriewood Road, Warriewood

Borehole Locations

Drawing No: 13801/5-AA1
Job No: 13801/5
Drawn By: MH
Date: 6 October 2017
Checked By: SS

File No: 13801-5
Layers: 0, AA1

ENVIRONMENTAL NOTES

IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT

These notes have been prepared by Geotechnique Pty Ltd, using guidelines prepared by the ASFE (Associated Soil and Foundation Engineers). The notes are offered to assist in the interpretation of your environmental site assessment report.

REASONS FOR AN ENVIRONMENTAL ASSESSMENT

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre-acquisition assessment on behalf of a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has changed, e.g. from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of e.g. a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible quantify the risks that unrecognised contamination poses to the ongoing proposed activity. Such risks may be financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment might not detect all contamination within a site. Contaminants could be present in areas that were not surveyed or sampled, or migrate to areas that did not show signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant that may occur; only the most likely contaminants are screened.

AN ENVIRONMENTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

In the following events and in order to avoid cost problems, you should ask your consultant to assess any changes in the conclusion and recommendations made in the assessment:

- When the nature of the proposed development is changed e.g. if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered e.g. if a basement is added
- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientists and opinions are drawn about the overall sub-surface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason site owners should retain the services of their consultants throughout the development stages of the project in order to identify variances, conduct additional tests that may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by Geotechnique Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, approval should be directly sought.

STABILITY OF SUB-SURFACE CONDITIONS

Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data that may have been affected by time. The consultant should be requested to advise if additional tests are required.

ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS

Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs of specific individuals e.g. an assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another consulting civil engineer.

An assessment should not be used by other persons for any purpose or by the client for a different purpose. No individual, other than the client, should apply an assessment, even for its intended purpose, without first conferring with the consultant. No person should apply an assessment for any purpose other than that originally contemplated, without first conferring with the consultant.

MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS

Costly problems can occur when design professionals develop plans based on misinterpretation of an environmental site assessment. In order to minimise problems, the environmental consultant should be retained to work with appropriate design professionals, to explain relevant findings and to review the adequacy of plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FROM THE REPORT

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists, based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these would not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. Should this occur, delays and disputes, or unanticipated costs may result.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of sub-surface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations, such as contractors.

READ RESPONSIBILITY CLAUSES CLOSELY

An environmental site assessment is based extensively on judgement and opinion; therefore, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. In order to aid in prevention of this problem, model clauses have been developed for use in written transmittals. These are definitive clauses, designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment and you are encouraged to read them closely. Your consultant will be happy to give full and frank answers to any questions you may have.