



Douglas Partners
Geotechnics | Environment | Groundwater

Report on
Limited Preliminary Site Investigation for
Contamination

Proposed Self-contained Dwellings
Lot 1113 in Deposited Plan 752038, Frenchs Forest

Prepared for
Dukor 24 Pty Ltd

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Integrated Practical Solutions



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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Table of Contents

	Page
1. Introduction.....	1
2. Scope of Works.....	1
3. Previous Reports.....	2
3.1 GeoEnviro (2016).....	2
3.1.1 DP (2019a).....	3
3.2 DP (2019b).....	3
4. Regional Geology and Hydrogeology	4
5. Historical Aerial Photographs.....	5
6. NSW EPA Registers	5
7. Site Walkover	6
8. Preliminary Conceptual Site Model	6
8.1 Potential Sources of Contamination	7
8.2 Potential Receptors.....	7
8.3 Potential Pathways	8
8.4 Preliminary Conceptual Site Model.....	8
9. Discussion and Recommendations.....	10
10. Limitations	10
 Appendix A: Drawings and Notes About this Report	
Appendix B: Registered Groundwater Bore Search Results	
Appendix C: Aerial Photographs	
Appendix D: Site Photographs	

Report on Limited Preliminary Site Investigation for Contamination Proposed Self-contained Dwellings 1113 Oxford Falls Road, Frenchs Forest

1. Introduction

This report presents the results of a limited Preliminary Site Investigation (PSI) undertaken for proposed residential self-contained dwellings at 1113 Oxford Falls Road, Frenchs Forest. The investigation was commissioned in an email dated 8 April 2019 by Dan Maurici of Henroth Group on behalf of Dukor 24 Pty Ltd and was undertaken with reference to the proposal email dated 8 April 2019. The PSI has been requested to support a Development Application.

The site is Lot 1113 in Deposited Plan 752038 which covers approximately 3.4 ha. According to NSW Spatial Services, the site has street addresses of 3A Barnes Road, Frenchs Forest; 1111 Oxford Falls Road, Frenchs Forest; and 1113 Oxford Falls Road, Frenchs Forest. The site location is shown in Drawing 1, Appendix A. Northern Beaches Council is the local government authority.

It is understood that the proposed development includes the demolition of the existing buildings and structures, then construction of ten, 2-storey buildings (Buildings 01 to 10), with single-level car parking basements beneath Buildings 01, Buildings 04 and 05, and Buildings 07 to 09. Excavations below existing surface levels will extend to depths in the range 1.5 – 6.5 m, with excavations for Buildings 04 to 05 required on a sloping, vegetated area of the site. Other features of the proposed development include: driveway access, landscaping, a workshop/mini bus ambulance garage, a staff management cottage, a new on-site stormwater detention basin, and bushland rehabilitation of existing pasture meadows. The northern part of the site will become a wildlife corridor.

The objectives of the PSI were to:

- Identify potential sources of contamination and the potential contaminants from a review of limited history and a site walkover;
- Identify potential human and ecological receptors; and
- Provide recommendations for further work.

2. Scope of Works

The scope of work for the PSI included:

- Review of published geological, soil landscape and acid sulfate soils maps;
- Review of information presented in previous reports;
- Review of NSW EPA registers for licences and notices issued under the *Protection of the Environment Operations Act 1997* and *Contaminated Land Management Act 1997*;

- Conduct a site walkover by an environmental engineer to observe site features and activities that may indicate a potential for contamination from present or past land uses; and
- Provision of this report detailing the findings of the investigation.

3. Previous Reports

Previous reports that were reviewed and include:

- GeoEnviro Consultancy Pty Ltd (GeoEnviro), *Geotechnical Appraisal Report, Oxford Falls – Aged Care Facility, Lot 1113 DP 752038 Barnes Road Oxford Fall*, (JC03029B-r2) 5 August 2016 (GeoEnviro, 2016);
- Douglas Partners Pty Ltd (DP), *Aerial Photograph Review, Proposed Self-contained Dwellings, 1113 Oxford Falls Road, Frenches Forest*, (86678.01.R.001.Rev0) 25 February 2019 (DP, 2019a); and
- DP, *Report on Geotechnical Investigation, Self Contained Dwellings, 1113 Oxford Falls Road, Frenches Forest*, (866778.00.R.001.Rev1) 8 February 2019 (DP, 2019b).

The reports are summarised in the following subsections.

3.1 GeoEnviro (2016)

GeoEnviro (2016) presents preliminary comments and an assessment of the geotechnical issues considered relevant to a proposed age care facility at the site. The report included a review of findings from an intrusive geotechnical investigation by GeoEnviro in 2004 which covered a larger proposed development site. The test pit locations are shown in GeoEnviro Drawing 2, Appendix A. No detailed test pit logs were included in GeoEnviro (2016), however, the soil profile is noted at each test pit location on the drawing. The test pit locations are also shown on Drawing 1, Appendix A.

At the time of the assessment, the site was described to be occupied by a large house with tennis court and landscaped gardens. In the middle portion of the site, at the toe of the sandstone hill slopes, there was a small dam with a house and a workshop building with an above ground fuel tank to the south east of the house. The remaining northern portion of the site consisted of vacant land with grass cover. Surrounding properties to the east, north and west consisted of semi-rural properties, predominantly used for residential purposes. Small residential blocks fronted Barnes Road.

The topography was described as three main types:

- Terrain Type 1: Crest of a sandstone hill on the southern portion of the site with relatively gentle ground surface dipping at an average angle of about 4.5 degrees to the north and north east. Ground surface reduced levels (RL) ranged from 110 m to 100 m Australian Height Datum (AHD). Based on a previous test pit investigation noted in the report, the natural soil consisted of sandy clay and clayey sand of colluvial origin with sandstone bedrock at varying depths ranging from 0.8 m to 2.5 m below ground level (bgl). Some building rubble fill (e.g. steel, bricks and concrete) was encountered in a number of test pits with thicknesses up to 2.1 m. DP notes that fill with 'rubble' was identified at two of the three test pits in this area.

- Terrain Type 2: Hill slopes in the middle of the site where the ground surface is characterised by sandstone hills with sandstone rock outcrops on the surface and short rock ledges and cliffs. The hill slope drops to the north and north east at angles of between 10 and 18 degrees. Ground surface RL ranged from 100 m to 90 m AHD. DP notes that one test pit was located in this area and topsoil/fill, to a depth of 0.5 m bgl, was underlain by sandstone at this test pit.
- Terrain Type 3: Valley floors on the northern portion of the site where the ground surface in this area is approximately level with a slight dip to the north east at angles less than 3 degrees. Ground surface RL ranged from 90 m to 80 m AHD. Based on the previous test pit investigation, this area has been levelled in parts by fill with thickness ranging from 0.6 m to 2.0 m over natural clayey soil assessed to have variable consistency (i.e. stiff to very stiff) and moisture content (i.e. moist to wet). Sandstone bedrock was encountered at depths varying from 1.2 m bgl to in excess of 3m bgl. DP notes that fill with 'rubble' was identified in four of the eight test pits located in this area.

3.1.1 DP (2019a)

DP (2019a) included a review of previous reports and historical aerial photographs. The purpose of the review was to identify historical uses and features of the site which indicate potential sources of contamination. Findings from the review have been included in this PSI.

3.2 DP (2019b)

DP (2019b) presents the findings of a preliminary geotechnical investigation undertaken for the proposed self-contained dwellings project.

At the time of the field investigation (January 2019), the site was noted to have a single residential building, a disused tennis court, a small metal shed, an access road, sandstone outcrops, and gravity retaining structures constructed using sandstone boulders. A few piles of rubbish and demolition rubble were present near the metal shed.

Field investigations included the drilling of three boreholes (BH1 to BH3) at the locations shown on Drawing 1, Appendix A. Groundwater monitoring wells were installed at each borehole. The soil profile at BH1 comprised sand filling, to a depth of 0.29 m (beneath a brick pavement), which was underlain by sandstone. The soil profile at BH2 comprised sand filling to a depth of 0.75 m with building rubble (brick, terracotta, plastic fragments and a fibre-cement fragment) at a depth of between 0.3 m and 0.75 m bgl; underlain by clayey sand, to a depth of 1.25 m bgl, then sandstone. The soil profile at BH3 comprised sand filling, to a depth of 0.3 m bgl, underlain by sandstone.

Although free groundwater was not observed during auger drilling, it was subsequently measured in all three of the standpipes, which were screened within the sandstone. Measured groundwater levels are summarised in Table 1. The groundwater measurements suggest that the groundwater level decreases in elevation in a northerly direction.

Table 1: Groundwater levels

Borehole	Surface Elevation (RL, m AHD)	Standing Water Level Measurements 31 January 2019	
		Depth (m)	Elevation (RL)
BH1	105.4	6.70	98.7
BH2	101.0	9.86	91.1
BH3	88.7	2.44	86.3

4. Regional Geology and Hydrogeology

The topography of the site is described in Section 3.1.

The majority of rainfall at the site is likely to infiltrate soils. Some runoff would enter the local stormwater system as well as into the (unnamed) drainage channel which originates at the north east corner of the site. Groundwater at the site is anticipated to flow to the north or north-west in the direction of the drainage channel. The drainage channel meanders along a valley floor to Middle Creek (a freshwater body) approximately 1.1 km to the north west of the site.

The Sydney 1:100 000 Geological Series Sheet indicates that the site is underlain by Hawkesbury Sandstone as confirmed in the previous investigations (see Section 3).

The Sydney 1:100 000 Soils Landscape map indicates that the southern part of the site is in the Hawkesbury soil landscape which is a colluvial soil landscape, and the northern part of the site is in the Oxford Falls soil landscape which is a transferral soil landscape.

The 1:25 000 NSW Acid Sulfate Soil Risk map indicates that the site is in an area of no known occurrences of acid sulfate soils and is not near an area which is associated with a risk of acid sulfate soils.

A search of the Water NSW registered groundwater bore database revealed one registered groundwater bore within 500 m of the site. The bore (GW029663) was drilled approximately 150 m to the west of the site in 1974 for stock purposes. No subsurface information or water quality data is shown in the work summary. The search results are provided in Appendix B.

5. Historical Aerial Photographs

Aerial photographs from 1930, 1943, 1951, 1961, 1970, 1984 and 1994 were obtained from NSW Spatial Services and are provided in Appendix C. Aerial photographs from 2009 and 2018, also provided in Appendix A, were obtained from Nearthmap. The following is noted from a review of the aerial photographs:

- A house was present in 1943 at the central part of the site. The house appears to have been present in 1930, but this is difficult to determine from the low quality of the 1930 image. The house was demolished between 1984 and 1994;
- Numerous structures (presumably sheds or similar) were constructed at the site between 1943 and 1951. Many of these structures had been removed by 1970;
- A structure appears to have been established at the western boundary between 1951 and 1961;
- In 1930 and 1943, an area at the northern part of the site appears to have been used for market gardens. This area appears to have expanded by 1951. By 1961, this area may not have been used for market gardens as it appears to have been grass-covered. By 1984, this area appears to have been levelled or smoothed which suggests that filling could have occurred across the area, particularly where there were natural drainage channels. The area was probably used for grazing following its levelling (or smoothing);
- Neighbouring land to the south-east and north-west appears to have been used for market gardens in the 1930s to 1950s;
- An internal access road and tennis court were constructed between 1970 and 1984. A dam appears to have also been established at the western site boundary. A small structure was probably demolished to accommodate the road;
- The large house with vehicle access and parking, and surrounding landscaping was constructed at the southern part of the site between 1984 and 1994. Filling may have occurred to level (or smooth) areas for landscaping; and
- A shed (or similar) appears to have been constructed at the central part of the site, next to the access road, between 1994 and 2009.

6. NSW EPA Registers

A search of NSW EPA website on 9 April 2019 indicated that:

- Although there are numerous listings for the suburbs of Frenchs Forest and Oxford Falls, no Licences, applications, Notices, audits or pollution studies and reduction programs are listed for the site or nearby properties under the *Protection of the Environment Operations Act 1997*;
- No orders, voluntary management proposals or site audit statements are associated with the site or properties within 1 km of the site;
- The former 7-Eleven / Mobil Service Station at 312 Warringah Road, Frenchs Forest is listed as a contaminated site under Section 60 of the *Contaminated Land Management Act 1997*. The former service station is approximately 450 m to the south of the site. There are no other listed contaminated sites within 1 km of the site.

Given that the former service station at 312 Warringah Road, Frenches Forest is not in close proximity to the site, it is not considered to be a potential source of site contamination.

7. Site Walkover

A site walkover was conducted by a DP environmental scientist on 9 April 2019. Most of the site was accessible. Observed features included:

- A large brick residence at the south, surrounded by lawns and landscaping accessed by an asphalt driveway from Barnes Road (Photographs 1 and 2, Appendix D);
- A grassy paddock at the north for sheep and horse grazing (Photograph 3, Appendix D). The paddocks are accessed by a gravel driveway. A shelter was at the southern part of the paddock (Photograph 4, Appendix D);
- A cottage near the eastern site boundary which is also accessed by the gravel driveway (Photograph 5, Appendix D);
- A workshop (metal shed) at the central part of the site (Photograph 6 and 7, Appendix D). Old oil drums and paint cans were present at the workshop. The floor of the shed was soil and had some broken pavers. Waste materials such as scrap metal, car parts and old tyres were present on either side of the shed (Photographs 8 to 10, Appendix D);
- An old above ground storage tank on the western side of the workshop, presumably used to store diesel (Photograph 11, Appendix D). Exposed soil was present beneath the tank;
- A small metal shed at the central part of the site (Photograph 12, Appendix D);
- A remnant tennis court which was covered in vegetation at the south-eastern part of the site (Photograph 13, Appendix D); and
- A number of retaining walls, particularly at the central and southern parts of the site (Photographs 14 to 16, Appendix D).

Land surrounding the site was being used for residential properties and small-scale farming (grazing). An access driveway to Oxford Falls Road is adjacent to the eastern site boundary.

8. Preliminary Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

8.1 Potential Sources of Contamination

Based on the limited site history review, the following potential sources of contamination and associated potential contaminants have been identified:

- (S1) Spills or leaks of fuel from the above ground storage tank next to the workshop. Potential contaminants include total petroleum hydrocarbons (TPH); benzene, toluene, ethyl benzene and xylenes (BTEX); metals (such as lead); polycyclic aromatic hydrocarbons (PAH); and phenols;
- (S2) Spills or leaks of oils and/or chemicals at the workshop. Potential contaminants include TPH, BTEX, phenols, PAH, metals (such as lead) and volatile organic compounds (VOC);
- (S3) Pesticide application at previous market gardens at the north of the site (inferred from aerial photographs). Pesticides may have also been applied at (previous) structures. Potential contaminants include organochlorine pesticides (OCP), metals (such as arsenic, cadmium, copper, lead, mercury and zinc). Organophosphate, carbamate and other pesticides are not considered to be potential contaminants as the site has not been used for market gardens in recent years;
- (S4) Leaks or spills of pesticides at (previous) sheds where pesticides were stored or prepared for application. Similar to pesticide application (above), potential contaminants include OCP and metals;
- (S5) Previous structures which were demolished (inferred from aerial photographs) may have included hazardous building materials and metals. Potential contaminants include asbestos, metals (including lead and zinc), asbestos and polychlorinated biphenyls (PCB);
- (S6) Imported filling including at the northern part of the site to level/smooth the paddock area that was previously used for market gardens (inferred from aerial photographs); and at the southern part of the site where there is landscaping and retaining walls. Filling has been noted to include 'rubble' (including fibre-cement at Borehole 2) which is a sign of potential contamination. Various contaminants may be associated with imported filling including metals (such as arsenic, cadmium, copper, chromium, lead, mercury, nickel and zinc), TPH, BTEX, PAH, phenols, PCB, OCP and asbestos;
- (S7) Tipping of waste materials. Various potential contaminants may be associated with waste materials such as asbestos, metals and TPH;
- (S8) Pesticide use at previous market gardens at neighbouring land. Potential contaminants include OCP and metals (arsenic, cadmium, copper, lead, mercury and zinc).

8.2 Potential Receptors

Potential receptors of contamination for the proposed development include:

- (R1) – Future site uses (residents, visitors and staff);
- (R2) – Construction workers (for the proposed development);
- (R3) – Maintenance workers (post-development);
- (R4) – Adjacent land users (pedestrians and neighbours);

- (R5) – Surface water body (drainage channel which originates at the north-east corner, and Middle Creek);
- (R6) – Groundwater;
- (R7) – Terrestrial ecology; and
- (R8) – In ground building structures.

8.3 Potential Pathways

Potential pathways for contamination to impact receptors include the following:

- (P1) – Ingestion and dermal contact;
- (P2) – Inhalation of dust;
- (P3) – Inhalation of vapours;
- (P4) – Surface water runoff;
- (P5) – Leaching of contaminants and vertical migration into groundwater;
- (P6) – Lateral migration of groundwater;
- (P7) – Contact of contaminated ground with terrestrial ecology; and
- (P8) – Contact of contaminated ground with in ground structures.

8.4 Preliminary Conceptual Site Model

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human, water or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (complete pathways). The possible pathways between the above listed sources and receptors are provided in Table 2.

Table 2: Preliminary Conceptual Site Model

Source	Transport Pathway	Receptor
S1 – Spills or leaks of fuel from aboveground tank	P1 – Ingestion and dermal contact P2 – Inhalation of dust P3 – Inhalation of vapours	R1 – Future site uses R2 – Construction workers R3 – Maintenance workers
	P2 – Inhalation of dust P3 – Inhalation of vapours	R4 – Adjacent site users
S2 - Spills or leaks of oils and/or chemicals at the workshop	P4 – Surface water run-off P6 – Lateral migration of groundwater	R5- Surface water body
	P5 – Leaching of contaminants and vertical migration into groundwater	R6 – Groundwater
S6 – Imported filling	P7 – Contact of contaminated ground P8 – Contact of contaminated ground	R7 – Terrestrial ecology R8 – In ground structures
S3 - Pesticide application at previous on-site market gardens	P1 - Ingestion and dermal contact P2 – Inhalation of dust	R1 – Future site uses R2 – Construction workers R3 – Maintenance workers
	P2 – Inhalation of dust	R4 – Adjacent site users
S4 – Leaks of spills of pesticides at (previous) sheds	P4 – Surface water run off P5 – Leaching of contaminants and vertical migration into groundwater P6 – Lateral migration of groundwater	R5 – Surface water body
	P5 – Leaching of contaminants and vertical migration into groundwater	R6 – Groundwater
S5 – Previous structures which were demolished	P7 – Contact of contaminated ground	R7 – Terrestrial ecology
	P4 – Surface water run off P5 – Leaching of contaminants and vertical migration into groundwater P6 – Lateral migration of groundwater	R5 – Surface water body R6 – Groundwater
S8 – Pesticide use at previous market gardens at neighbouring land	P5 – Leaching of contaminants and vertical migration into groundwater P6 – Lateral migration of groundwater	R6 – Groundwater
	P5 – Leaching of contaminants and vertical migration into groundwater P6 – Lateral migration of groundwater	R6 – Groundwater

9. Discussion and Recommendations

A review of limited site history information and a site walkover has revealed potential sources of contamination to be the aboveground storage tank, leaks or spills of oils and/or chemicals at the workshop, imported filling, (previous) pesticide storage and application, waste materials and previous structures. A detailed site investigation should be undertaken to assess the contamination from these potential sources (and should be designed to target these potential sources). SafeWork NSW records pertaining to the storage of hazardous chemicals, and the Section 10.7 Planning Certificate relevant to the site should be obtained and reviewed as part of detailed site investigation.

10. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at 1113 Oxford Falls Road in accordance with DP's email proposal dated 8 April 2019 and acceptance received from Dan Maurici of Henroth Group on behalf of Dukor 24 Pty Ltd on 10 April 2019. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Dukor 24 Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Building demolition materials have been located in previous investigations in below-ground filling and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the (geotechnical / environmental / groundwater) components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

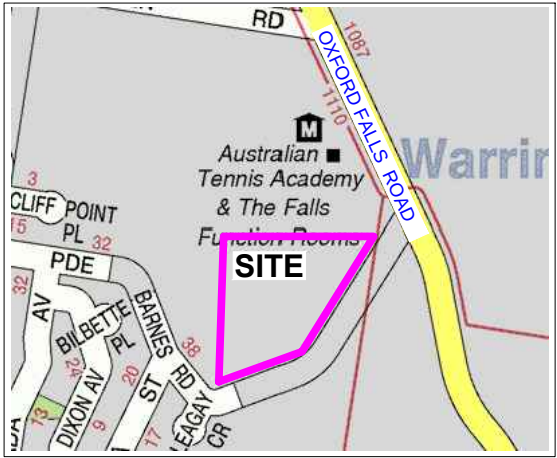
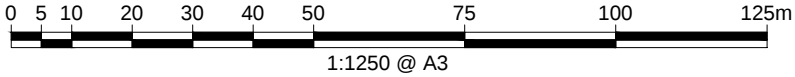
Douglas Partners Pty Ltd

Appendix A

Drawings
and Notes about this Report



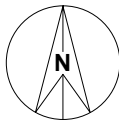
NOTE:
1: Base image from Nearmap.com
(Dated 28.12.2018)
2: Test locations are approximate only and
are shown with reference to existing features.

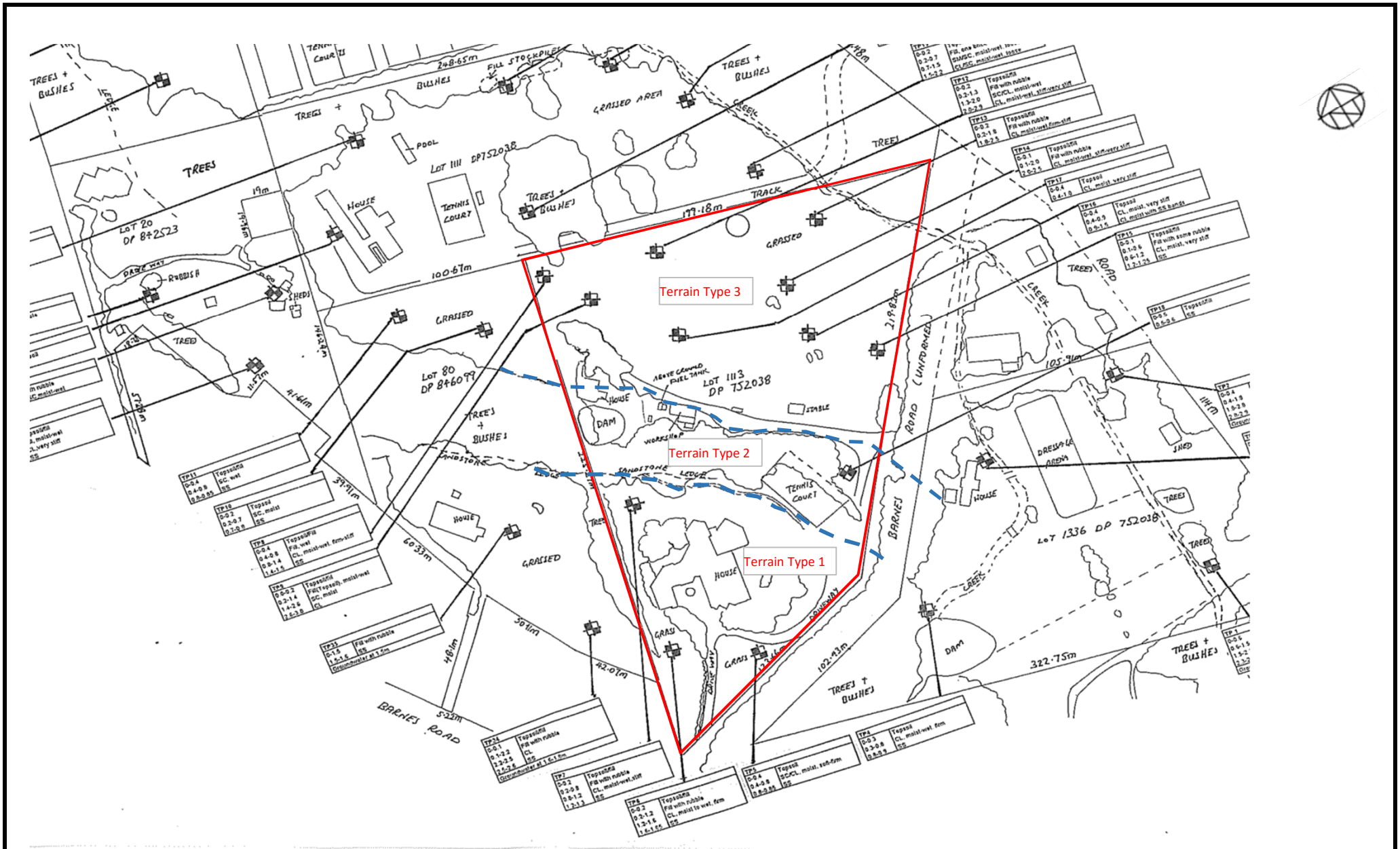


Locality Plan

LEGEND

- Historical test pit (GeoEnviro Consultancy Pty Ltd, dated 5 August 2016)
- DP geotechnical borehole location
- Proposed building and basement footprints:
 - Buildings 06-09
 - Buildings 04-05
 - Buildings 01-03 and Building 10





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Drawn By: AT Date: 5/08/2016

Checked By: SL Date: 5/8/2016

Revision By: Date:

Scale: Not to Scale

A3

DuKor 24 Pty Ltd
Lot 1113 Oxford Falls Road Frenchs Forest
Site Feature and Previous Test Pit Plan

Project No: JC03029B-r2

Drawing No: 2

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

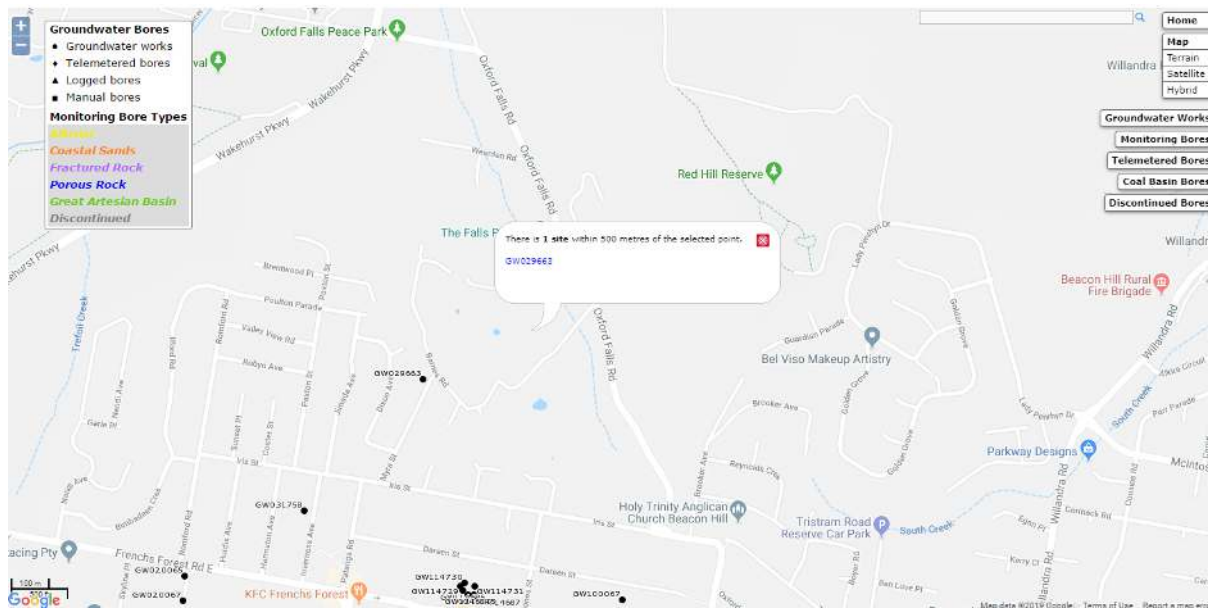
Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Registered Groundwater Bore Search Results

Results of Registered Groundwater Bore Search (9 April 2019)



<https://realtime.data.waternsw.com.au/water.stm>

WaterNSW

Work Summary

GW029663

Licence:

Licence Status:

Authorised
Purpose(s):
Intended Purpose(s): STOCK

Work Type:

Work Status: Supply Obtained

Construct.Method:

Owner Type: Private

Commenced Date:

Completion Date: 07/08/1974

Final Depth:

Drilled Depth:

Contractor Name: (None)

Driller:

Assistant Driller:

Property:

GWMA:
GW Zone:

Standing Water Level
(m):

Salinity Description:
Yield (L/s): 0.400

Site Details

Site Chosen
By:

	County	Parish	Cadastre
Form A: Licensed:	CUMBERLAND	MANLY COVE	28//31106

Region: 10 - Sydney South Coast

CMA Map: 9130-4S

River Basin: 213 - SYDNEY COAST -
GEORGES RIVER

Grid Zone:

Scale:

Area/District:

Elevation: 0.00 m (A.H.D.)
Elevation (Unknown)
Source:

Northing: 6264540.000
Easting: 337516.000

Latitude: 33°44'48.3"S
Longitude: 151°14'45.0"E

GS Map: -

MGA Zone: 56

Coordinate GD.,PR. MAP
Source:

Remarks

07/08/1974: SITED OXFORD FALLS RD. 2100
04/11/2009: Updated details as per existing data.

***** End of GW029663 *****

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

Appendix C

Aerial Photographs



Legend

— Approximate site boundary

Source: NSW Spatial Services



CLIENT: Dukor 24 Pty Ltd

OFFICE: Sydney

DATE: 9 Apr 2019

1930 Aerial Photograph

Proposed Residential Development

1113 Oxford Falls Road, Frenchs Forest

PROJECT No: 86678.01

PLATE No: 1

REVISION: 0



Legend

— Approximate site boundary

Source: NSW Spatial Services



CLIENT: Dukor 24 Pty Ltd

OFFICE: Sydney

DATE: 9 Apr 2019

1943 Aerial Photograph

Proposed Residential Development

1113 Oxford Falls Road, Frenchs Forest

PROJECT No: 86678.01

PLATE No: 2

REVISION: 0



Legend

— Approximate site boundary

Source: NSW Spatial Services



CLIENT: Dukor 24 Pty Ltd

OFFICE: Sydney

DATE: 9 Apr 2019

1951 Aerial Photograph

Proposed Residential Development

1113 Oxford Falls Road, Frenchs Forest

PROJECT No: 86678.01

PLATE No: 3

REVISION: 0



Legend

— Approximate site boundary

Source: NSW Spatial Services



CLIENT: Dukor 24 Pty Ltd

OFFICE: Sydney

DATE: 9 Apr 2019

1961 Aerial Photograph

Proposed Residential Development

1113 Oxford Falls Road, Frenchs Forest

PROJECT No: 86678.01

PLATE No: 4

REVISION: 0



Legend

— Approximate site boundary

Source: NSW Spatial Services



CLIENT: Dukor 24 Pty Ltd

OFFICE: Sydney

DATE: 9 Apr 2019

1970 Aerial Photograph

Proposed Residential Development

1113 Oxford Falls Road, Frenchs Forest

PROJECT No: 86678.01

PLATE No: 5

REVISION: 0



Legend

— Approximate site boundary

Source: NSW Spatial Services



CLIENT: Dukor 24 Pty Ltd

OFFICE: Sydney

DATE: 9 Apr 2019

1984 Aerial Photograph

Proposed Residential Development

1113 Oxford Falls Road, Frenchs Forest

PROJECT No: 86678.01

PLATE No: 6

REVISION: 0



Legend

— Approximate site boundary

Source: NSW Spatial Services



CLIENT: Dukor 24 Pty Ltd

OFFICE: Sydney

DATE: 9 Apr 2019

1994 Aerial Photograph

Proposed Residential Development

1113 Oxford Falls Road, Frenchs Forest

PROJECT No: 86678.01

PLATE No: 7

REVISION: 0



Legend

— Approximate site boundary

Source: Nearmap



CLIENT: Dukor 24 Pty Ltd

OFFICE: Sydney

DATE: 9 Apr 2019

2009 Aerial Photograph

Proposed Residential Development

1113 Oxford Falls Road, Frenchs Forest

PROJECT No: 86678.01

PLATE No: 8

REVISION: 0



Legend

— Approximate site boundary

Source: Nearmap



CLIENT: Dukor 24 Pty Ltd

OFFICE: Sydney

DATE: 9 Apr 2019

2018 Aerial Photograph

Proposed Residential Development

1113 Oxford Falls Road, Frenchs Forest

PROJECT No: 86678.01

PLATE No: 9

REVISION: 0

Appendix D

Site Photographs



Photograph 1 - Existing Residence



Photo 2 - Driveway Access to Residence



Site Photographs

Proposed Self-Contained Dwellings

1113 Oxford Falls Road, Frenchs Forest

CLIENT: Dukor 24 Pty Ltd

PROJECT: 86678.01

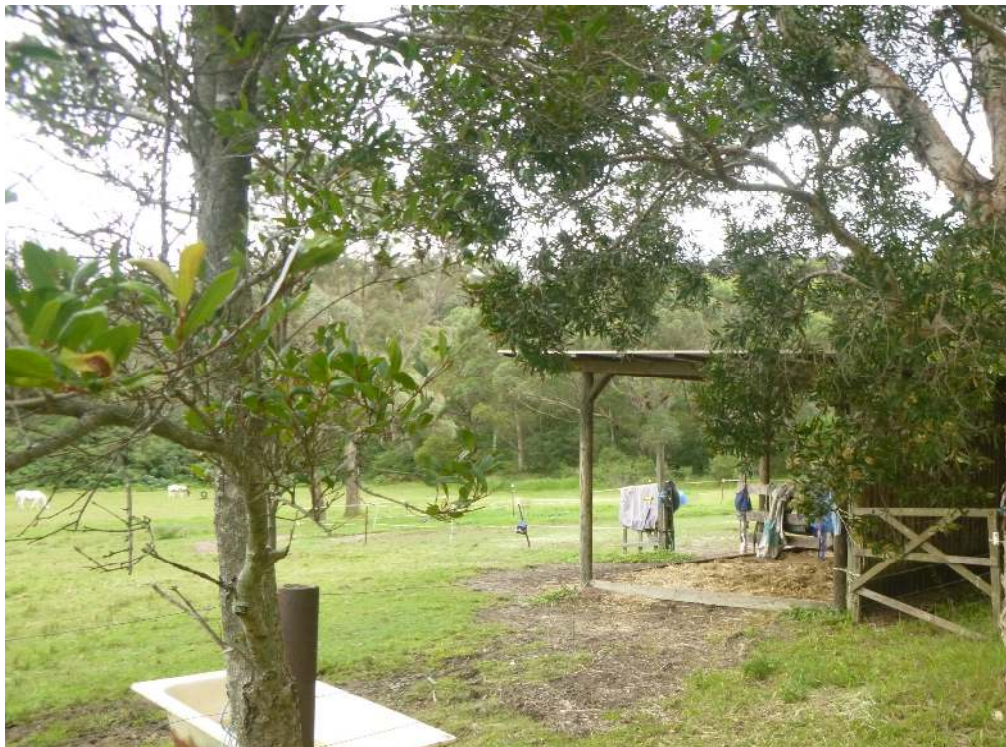
PLATE No: 1

REV: 0

DATE: 10-Apr-19



Photograph 3 - Paddock at South



Photograph 4 - Shelter at Paddock



Site Photographs

Proposed Self-Contained Dwellings

1113 Oxford Falls Road, Frenchs Forest

CLIENT: Dukor 24 Pty Ltd

PROJECT: 86678.01

PLATE No: 2

REV: 0

DATE: 10-Apr-19



Photograph 5 - Cottage



Photograph 6 - Workshop



Site Photographs

Proposed Self-Contained Dwellings

1113 Oxford Falls Road, Frenchs Forest

CLIENT: Dukor 24 Pty Ltd

PROJECT: 86678.01

PLATE No: 3

REV: 0

DATE: 10-Apr-19



Photograph 7 - Waste Materials at Workshop



Photograph 8 - Waste Materials next to Workshop



Site Photographs

Proposed Self-Contained Dwellings

1113 Oxford Falls Road, Frenchs Forest

CLIENT: Dukor 24 Pty Ltd

PROJECT: 86678.01

PLATE No: 4

REV: 0

DATE: 10-Apr-19



Photograph 9 - Waste materials



Photograph 10 - Waste materials



Site Photographs

Proposed Self-Contained Dwellings

1113 Oxford Falls Road, Frenchs Forest

CLIENT: Dukor 24 Pty Ltd

PROJECT: 86678.01

PLATE No: 5

REV: 0

DATE: 10-Apr-19



Photograph 11 - Above Ground Storage Tank



Photograph 12 - Small Metal Shed



Site Photographs

Proposed Self-Contained Dwellings

1113 Oxford Falls Road, Frenchs Forest

CLIENT: Dukor 24 Pty Ltd

PROJECT: 86678.01

PLATE No: 6

REV: 0

DATE: 10-Apr-19



Photograph 13 - Remnant Tennis Court



Photograph 14 -Retaining Wall



Site Photographs

Proposed Self-Contained Dwellings

1113 Oxford Falls Road, Frenchs Forest

CLIENT: Dukor 24 Pty Ltd

PROJECT: 86678.01

PLATE No: 7

REV: 0

DATE: 10-Apr-19



Photograph 15 - Retaining Wall



Photograph 16 - Retaining Wall at Residence