

**ATTACHMENT 9**

**PHASE 1 CONTAMINATED LAND ASSESSMENT**



# **Douglas Partners**

*Geotechnics | Environment | Groundwater*

Report on  
Phase 1 Contamination Assessment

Proposed Rezoning of  
Lot 23 in Deposited Plan 1159704  
Berkeley Road, Fountaindale

Prepared for  
Hapido Pty Ltd

Project 75274.00  
July 2011

Integrated Practical Solutions





# Douglas Partners

Geotechnics | Environment | Groundwater

## Document History

### Document details

Project No.	75274.00	Document No.	1
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Report prepared for	Hapido Pty Ltd and TSM Pty Ltd		
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0	Brent Kerry	Lindsay Rockett	July 2011

### Distribution of copies

Revision	Electronic	Paper	Issued to
0	1	0	Optima Developments Pty Ltd (Chris Oliver)

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.

Signature	Date
Author	
Reviewer	

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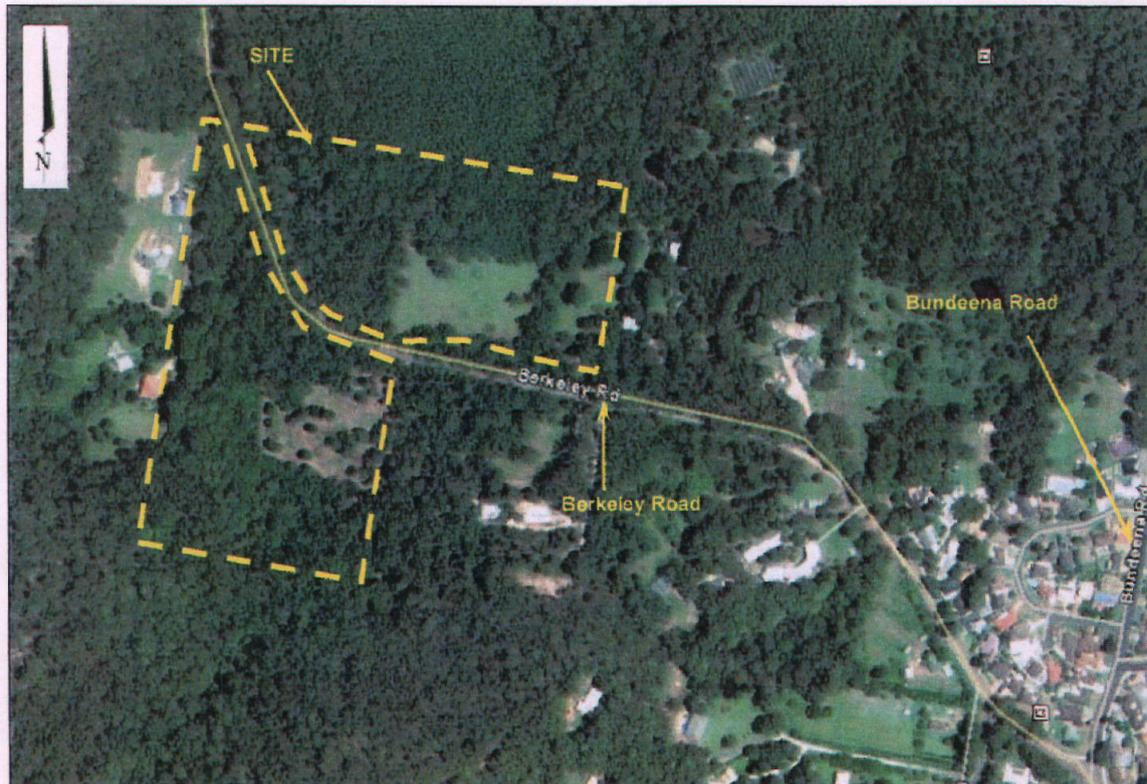
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- 7(f) – Environmental Protection.

Figure 1, below, is an aerial view of the local area and shows the site in relation to the nearest cross street.



**Figure 1: Location of the site within Fountaindale  
(image sourced from Google Earth and dated December 2010)**

At the time of the PCA, the site appeared to be mostly bushland with portions of the site fenced and used for grazing. No structures/buildings were observed.

Drawing 1, which is included in Appendix A, shows the existing layout of the site.

## 2. Scope of Work

In brief, DP's scope of works included:

- Collation and interpretation of data from the following sources:-
  - o Published data, including topographical, geological and hydrogeological maps;
  - o Historical aerial photographs;
  - o Office of Environment and Heritage NSW (OEH) Contaminated Land and Protection of Environment Operations databases;

- o Registered groundwater bore licence search;
- o Site plans, archives and anecdotal information;
- Site inspection to provide a visual assessment of potential contamination sources.
- Preparation of a report outlining the works undertaken and the findings of the PCA.

### 3. Physical Setting

#### 3.1 Topography

Review of the local topographic mapping and a site survey plan indicates that the site is located on the north-west face of a hill, with surface levels within the site falling from about RL 70 m in the south-west corner to approximately RL 12 m along the northern boundary of the site. Observation suggests that the natural surface levels throughout the site have not been significantly modified. The mapping indicates that two intermittent watercourses traverse the site approximately from the south-west to the north-east.

A low-lying area, mapped as a State Environmental Planning Policy No. 14 – Coastal Wetland, is located approximately 500 m north-east of the site boundary. Any surface water runoff from the site is expected to migrate off site via overland flow and intermittent watercourses to the identified wetland and then flow to the north-east into Ourimbah Creek and Tuggerah Lake.

#### 3.2 Adjacent Site Uses

Surrounding land uses include the following:

- North (down slope) – Bushland.
- West (up slope) – Rural-residential properties.
- South (up slope) – Rural-residential properties and bushland.
- East (up slope) – Rural-residential properties.

The potential for contamination migrating from the existing surrounding land uses is considered to be generally low. No specific walkover inspections of the adjacent sites were, however, undertaken as part of this assessment.

#### 3.3 Regional Geology and Soil Landscape

Reference to the Wyong 1:25 000 Geological Series Sheet indicates that the site is generally underlain by Terrigal Formation which typically comprises sandstone, siltstone, minor sedimentary breccia, claystone and conglomerate. Terrigal Formation typically weathers to form sandy clay and clayey sand residual soils. The northern boundary of the site borders an area mapped as being underlain by Quaternary Alluvium which typically comprises sand, silt, clay and gravel.

Reference to the Gosford-Lake Macquarie Soil Landscape Mapping (Ref 3) indicates that the site is located within the three different soil landscape areas. The Erina erosional soil landscape group is mapped as covering the majority of the site and has dominant soils described as sandy loam overlying clay and sandy clay soils weathered from Tuggerah Formation bedrock. The south-west portion of the site is mapped as the Watagan colluvial soil landscape group. The Watagan soil landscape group is a complex mix of sand, clay and sandstone colluvium over Terrigal formation bedrock. The central northern portion of the site is mapped as being underlain by Wyong alluvial soil landscape group. The Wyong soil landscape group is described as silty clay loam underlain by silty clay alluvial soils.

Limitations to development associated with the site are varied and depend on the topography and soil landscape group and may include very high erosion hazard, foundation hazard, flooding hazard, strongly acidic, low fertility and impermeable soils.

### **3.4 Acid Sulphate Soils**

The Soil Conservation Service of NSW Acid Sulphate Soil Risk Map for Wyong (Ref 4) indicates that the site is located within an area identified as having no known occurrence of acid sulphate soils. The acid sulphate soil risk mapping is consistent with the site surface levels (i.e. above RL 5 m – above which acid sulphate soil are generally not encountered). It is noted that an area to the north of the site is mapped as having a low probability of acid sulphate soils at depths greater than 3 m. Based on the proposed site development an assessment for acid sulphate soils was not considered to be warranted. It was also understood that communications received by the Planning Consultant from Wyong Shire Council (WSC) indicated that assessment for acid sulphate soils was not necessary.

### **3.5 Groundwater**

Given the site's topography and geology it was considered likely that relatively shallow groundwater would be present within the lower lying portions (alluvial soils) of the site. Permanent groundwater is also possible within the areas mapped as being underlain by the Tuggerah Formation although it would typically be expected to be several metres below the existing ground surface.

A search for registered groundwater bores in the Department of Natural Resources groundwater bore database [Note: this function has been taken up by OEH] indicated that there were approximately eight registered groundwater bores within a 1 km radius of the site. Only one bore appeared to be located down-gradient and was approximately 800 m north-east of the site. The bore was installed in 1998 and water quality was reported to be fresh. This bore and other nearby registered bores had an authorised industrial purpose. A copy of the search results is provided in Appendix B.

Based on the information available it is considered that the wetland located approximately 600 m north-east of the site is the nearest groundwater receptor.

## 4. Site History

### 4.1 Regulatory Notices Search

The NSW EPA Register of Contaminated Land was searched for any Regulatory Notices that may be current on the site issued under the *Contaminated Land Management (CLM) Act 1997* and Section 55 of the *Protection of the Environment Operations (POEO) Act 1997*. The information obtained indicated that no Licences, Notices or Orders were issued for the site under the *CLM Act* or the *POEO Act*.

### 4.2 Historical Aerial Photographs

Historical aerial photographs were reviewed dating back to the earliest available record (1954) and approximately every 10 years thereafter to assess any major changes to the site and surrounding areas during this period. The following historical aerial photographs were reviewed:

- Photograph – Gosford NSW 129-5069 Run 5G, dated 18.03.1954;
- Photograph – Gosford NSW 2315-142 Run 6, dated 28.05.1975;
- Photograph – Gosford NSW 4038 Run 9, dated 20.09.1991;
- Photograph – Gosford NSW 4728 Run 9, dated 18.03.2002.

Table 1 summaries the observations made during the aerial photograph review.

**Table 1 – Historical Aerial Photograph Review**

Aerial Photograph	Observations
1954	The local area appeared to be selectively developed for mixed rural land uses (grazing and orchards). The majority of the site appeared to have been cleared with some scattered trees. Berkeley Road bisects the north-east and south-west site areas. No buildings or structures were observed within the site. No signs of an intensive agricultural land uses were observed within the site, however the adjacent property to the west appeared to be developed for as an orchard (a grid pattern of trees). Other adjacent properties appeared to have been used for grazing or be undeveloped bushland.
1975	The site appeared to have remained unchanged from the 1954 photograph, except that the density of trees within the site had increased suggesting that some regrowth had occurred. Surrounding land uses appeared to comprise rural land uses (grazing only) and bushland. No other changes from the 1954 photograph were observed.
1991	The site and local area appeared to be in a similar condition to that observed in the 1975 photograph. The cleared area within the south-west portion of the site appeared to have soils exposed suggesting that the area had either been over-grazed or disturbed.
2002	The site and local area appeared to be in a similar condition to that observed in the 1991 photograph. The only notable change was the regrowth of vegetation including the bare area identified in the south-west portion of the site.

#### 4.3 Other Historical Information

As part of the rezoning application for the site, Mr Chris Oliver (Planning Consultant) liaised with WSC. The following is a summary of the information provided to DP by the Planning Consultant:

- In regards to contaminated land, it was reported that there are no notations on the property identifying any land uses which would cause contaminated land (*sic*).
- As there are no known occurrences of acid sulphate soils on the property an assessment for acid sulphate soils would not be required.
- The known site history identified that the portions with lower elevations and the areas with the least slope constraints were originally cleared and used for grazing. Grazing has continued, although it is now constrained to the fenced paddocks of the site.
- The site was subdivided from a larger parcel of land in 2002. Information also suggested that a former dwelling was located within the other subdivided area (not the current site area) which was demolished *circa* 2002. The other subdivided portion of the larger parcel of land (located adjacent and to the south-east of the site) was later further subdivided into three rural residential lots.

## 5. Site Inspection / Observations

A site walkover was undertaken by Brent Kerry of DP on the 20 July 2011 as part of the site activities outlined in Section 2. The site features observed during the inspection are summarised below. The general site topography was consistent with that described in Section 3.1.

The site layout appears to have remained unchanged from the 2002 aerial photograph, although some clearing of regrowth in the south-west portion of the site had probably occurred. No evidence of existing or former buildings/structures, or an intensive agriculture (orchards/market gardens) were observed at the site. The cleared areas, within both the north-east and south-west portions of the site, were fenced and used for grazing. Portions of the site, beyond the fenced areas, appeared to comprise medium dense to dense bushland. There was no evidence of any fly tipped stockpiles.



Figure 2 – Photograph of north-east portion of the site.



Figure 3 – Photograph of south-west portion of the site.

## 6. Contaminants of Concern

### 6.1 Potential Contaminant Sources

Based on the findings of the desktop review and site walkover, DP considers that there is a very low potential for contamination given the generally rural (grazing) and bushland uses. More intensive agricultural land uses were not identified at the site, although an orchard was identified on the adjacent property to the west in the 1954 aerial photograph. The historical orchard land use on the adjacent (upslope) property was considered to have only a low the potential to adversely affect the site. No other potential current or former contaminating activities were identified.

Based on the findings of the desktop review and site walkover, the principal source of potential contamination within the site are presented in Table 2 below:

**Table 2 – Potential Contamination Source**

Potential Contamination Source/Activity	Area Affected	Potential For Contamination	Primary Potential Contaminants of Concern
Off-site orchard land use	Areas adjacent to the western site boundary and sediments within the intermittent watercourses	Low	Heavy Metals (As, Cd, Cu, Pb, Hg and Zn) Organochlorine Pesticides

**Notes:**

As = Arsenic, Cd = Cadmium, Cu = Copper, Pb = Lead, Hg = Mercury, Ni = Nickel and Zn = Zinc

It is noted that the list of primary contaminants of concern (listed in Table 2) may not include all the active chemicals used in at the adjacent former orchard. However, the primary potential contaminants of concern provide a general indication and are considered to be an adequate screen for comprehensive testing.

### 6.2 Fate of Contaminants

Based on the works undertaken, it is possible to provide some comment on the potential fate of any contaminant releases to the environment. The potential fate of contamination depends on a number of factors including: type of contamination (physical state & solubility), location of the contaminants (surface or at depth) and site factors (soil permeability, topography & groundwater regime).

Given the local topography and the potentially contaminating activity (former orchard on an adjacent property) the potential contaminants would generally not be expected to migrate a significant distance from the area of release other than through either overspray during past application of chemicals or through erosion of surface soils into the intermittent watercourse flowing onto the site.

Given the absence of potential contamination sources identified within the site it is considered unlikely any potential impact at the local registered groundwater bores would be sourced from the site. However, the need for assessment of shallow groundwater conditions should be reconsidered if any soil contamination is encountered during future investigations at the site.

## 7. Conclusions and Recommendations

Douglas Partners conducted a Phase 1 (non-intrusive) Contamination Assessment for the site identified as Lot 23 in Deposited Plan 1159704 and located at 76 Berkeley Road, Fountaindale. It is understood that the site is proposed to be rezoned to facilitate future rural-residential development. The site is identified in Drawing 1 (Appendix A).

Based on the information gathered, DP considers that the site is generally compatible with the proposed residential land use from a site contamination perspective. It is noted however the adjacent up slope property to the west was identified as a former orchard which presents a low risk potential contamination source. Furthermore, it is noted that the adjacent site has been subsequently subdivided and developed for residential land uses.

Depending on the planning approval requirements, a targeted Phase 2 Contamination Assessment may be warranted to verify the contamination status of the site. Any assessment is recommended to target the areas adjacent to the western site boundary and the sediments in the intermittent watercourse entering the site from across the western boundary. Given the site conditions and the potentially contaminating activity (historical orchard land use on adjacent property) an assessment of groundwater conditions is not considered to be necessary at this stage.

Given the site's historical rural land use there is the potential for isolated areas of filling to be encountered. These areas may need to be excavated and the waste materials generated may require disposal to landfill. There is no evidence suggesting this practice has occurred at the site although if areas of filling are identified during redevelopment of the site then advice should be sought from an environmental consultant.

## 8. Limitations

Douglas Partners (DP) has prepared this report for a project at 76 Berkeley Road, Fountaindale, NSW in accordance with DP's proposal WYG100164 dated 1 July 2011 and acceptance received from TSM P/L and Hapido P/L on 5 July 2011. The report is provided for the exclusive use of TSM P/L, Hapido P/L and Optima Developments P/L for this project only and for the purpose(s) described in the report. It should not be used for other projects or by a third party. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

DP's assessment is necessarily based on the result of a desktop site historical search and site inspection only and did not include surface or subsurface sample screening and/or chemical testing. DP does not assume any liability for site conditions not observed or accessible during the time of the inspection.

This report must be read in conjunction with all of the attached notes 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 given in this report.

## 9. References

1. *Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land*, 1998.
2. NSW EPA, *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*, December 1997.
3. Department of Conservation and Land Management, *Soil Landscapes of the Gosford – Lake Macquarie*, 1993.
4. *Wyong Acid Sulphate Soil Risk Map*, prepared by the Soil Conservation Service of NSW, Edition 2, December 1997.

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**Douglas Partners Pty Ltd**

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## Appendix A

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About this Report  
& Drawing 1

# 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.

## Copyright

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**

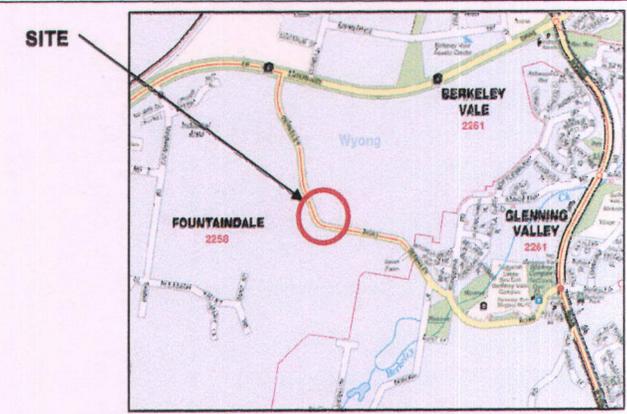
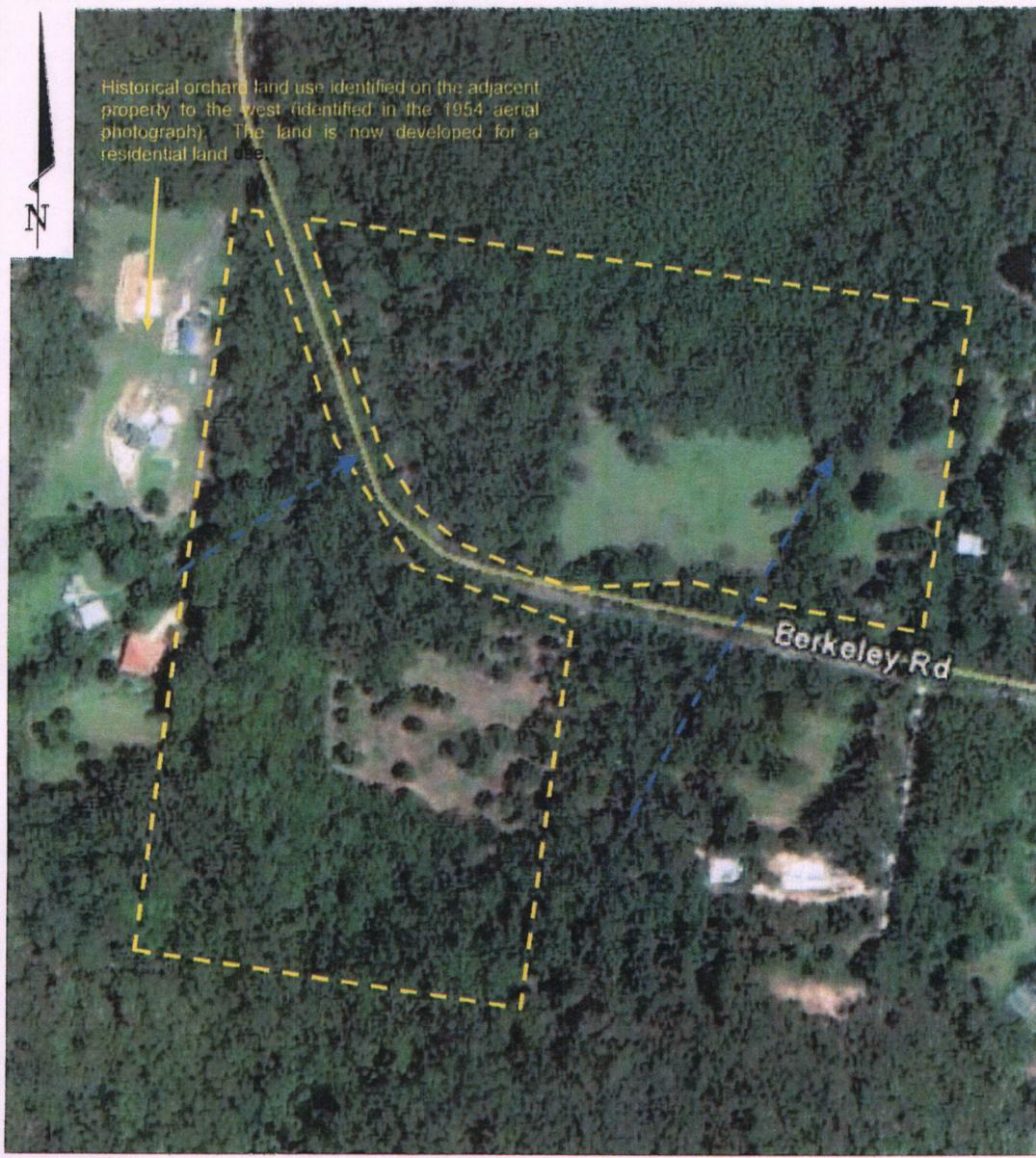
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later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



LOCALITY

- Notes:
1. Drawing adapted from plan provided by the client
- Site Area
  - Approximate alignment of the intermittent watercourse



CLIENT:	TSM Pty Ltd and Hapido Pty Ltd
OFFICE:	Wyong
SCALE:	Not to scale
DRAWN BY:	BJK
DATE:	July 2011

TITLE: Existing Site Layout  
 Phase 1 Contamination Assessment  
 Lot 23 in Deposited Plan 1159704 – Berkeley Road, Fountaindale

PROJECT No:	75274.00
DRAWING No:	1
REVISION:	A

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**Appendix B**

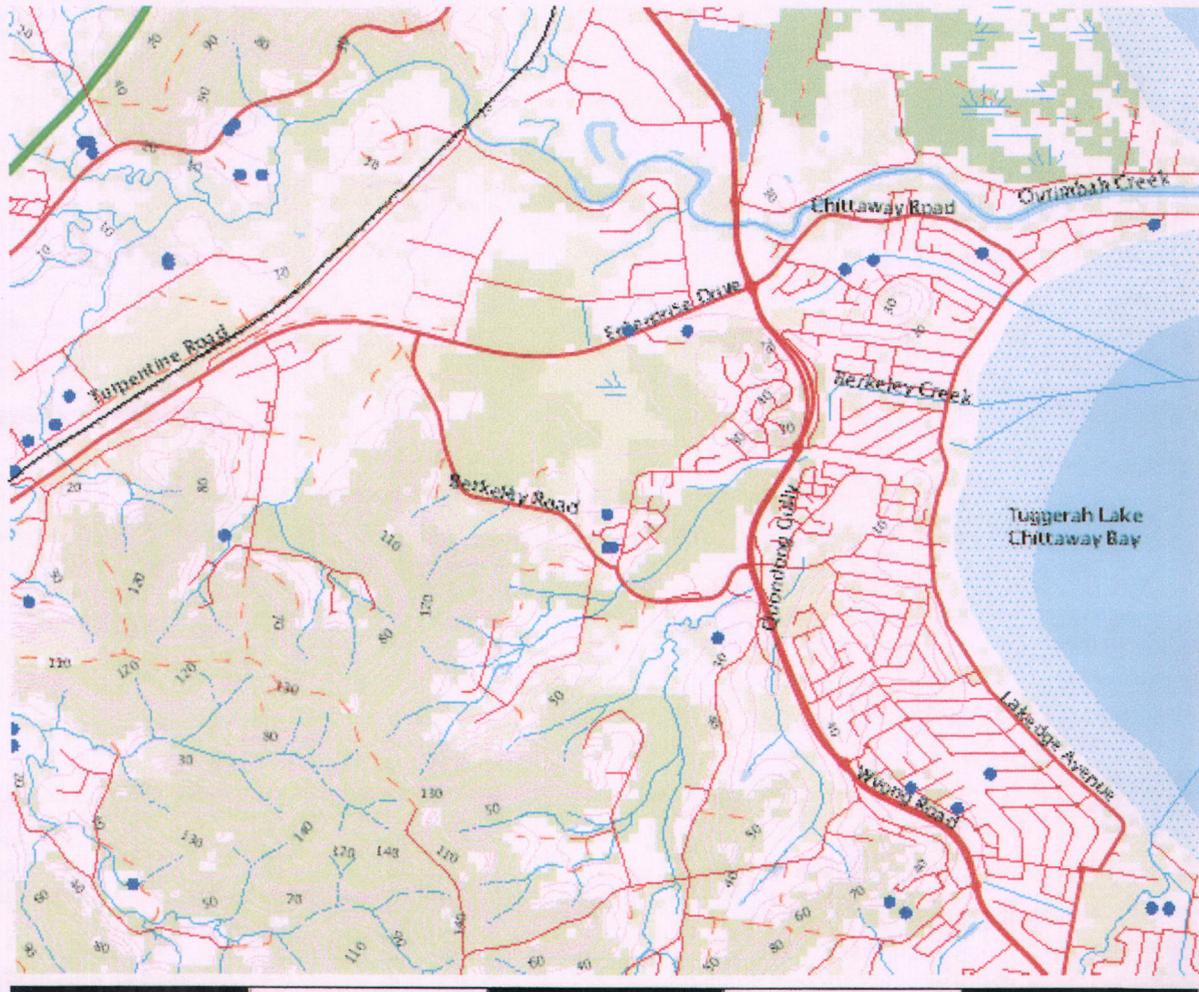
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Desktop Information

# Fountaindale

Map created with NSW Natural Resource Atlas - <http://www.nratlas.nsw.gov.au>

Tuesday, July 26, 2011



0 5 Km

## Legend

Symbol	Layer	Custodian
●	Groundwater Bores	
	Primary/arterial road	
	Motorway/freeway	
	Railway	
	Runway	
	Contour	Topographic base map
	Background	

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# Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)  
Document Generated on Tuesday, July 26, 2011

[Print Report](#)

[Works Details](#) [Site Details](#) [Form A](#) [Licensed Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

## Work Requested -- GW020384

### Works Details (top)

GROUNDWATER NUMBER GW020384  
LIC-NUM 20BL013332  
AUTHORISED-PURPOSES COMMERCIAL  
INTENDED-PURPOSES GENERAL USE  
WORK-TYPE Bore  
WORK-STATUS (Unknown)  
CONSTRUCTION-METHOD Rotary Mud  
OWNER-TYPE Private  
COMMENCE-DATE  
COMPLETION-DATE 1962-12-01  
FINAL-DEPTH (metres) 9.10  
DRILLED-DEPTH (metres) 9.10  
CONTRACTOR-NAME  
DRILLER-NAME  
PROPERTY LILA  
GWMA 603 - SYDNEY BASIN  
GW-ZONE -  
STANDING-WATER-LEVEL  
SALINITY  
YIELD

### Site Details (top)

REGION 20 - HUNTER  
RIVER-BASIN 211 - MACQUARIE - TUGGERAH LAKES  
AREA-DISTRICT  
CMA-MAP 9131-2N  
GRID-ZONE 56/1  
SCALE 1:25,000  
ELEVATION  
ELEVATION-SOURCE (Unknown)  
NORTHING 6309990.00  
EASTING 353070.00  
LATITUDE 33 20' 21"  
LONGITUDE 151 25' 16"  
GS-MAP 0055B2

AMG-ZONE 56  
 COORD-SOURCE GD.,ACC.MAP  
 REMARK

**Form-A (top)**

COUNTY NORTHUMBERLAND  
 PARISH TUGGERAH  
 PORTION-LOT-DP 24

**Licensed (top)**

COUNTY NORTHUMBERLAND  
 PARISH TUGGERAH  
 PORTION-LOT-DP 451 755263

**Construction (top)**

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;  
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL DETAIL
1	1	Casing	Nil	0.00	0.00	0		(Unknown)

**Water Bearing Zones (top)**

no details

**Drillers Log (top)**

FROM	TO	THICKNESS	DESC	GEO-MATERIAL COMMENT
0.00	0.45	0.45	Loam Light	
0.45	9.14	8.69	Sandstone Some	
0.45	9.14	8.69	Clay Heavy	

**Warning To Clients:** This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources (DIPNR) by drillers, licensees and other sources. The DIPNR 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.

# Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)  
 Document Generated on Tuesday, July 26, 2011

[Print Report](#)

[Works Details](#) [Site Details](#) [Form A Licensed Construction](#) [Water Bearing Zones](#) [Drillers Log](#)

## Work Requested -- GW078134

### Works Details (top)

GROUNDWATER NUMBER GW078134  
 LIC-NUM 20BL166758  
 AUTHORISED-PURPOSES INDUSTRIAL  
 INTENDED-PURPOSES TEST BORE  
 WORK-TYPE Bore  
 WORK-STATUS (Unknown)  
 CONSTRUCTION-METHOD Rotary  
 OWNER-TYPE  
 COMMENCE-DATE  
 COMPLETION-DATE 1998-02-02  
 FINAL-DEPTH (metres) 100.00  
 DRILLED-DEPTH (metres) 100.00  
 CONTRACTOR-NAME  
 DRILLER-NAME  
 PROPERTY N/A  
 GWMA 603 - SYDNEY BASIN  
 GW-ZONE -  
 STANDING-WATER-LEVEL 6.00  
 SALINITY  
 YIELD 0.30

### Site Details (top)

REGION 20 - HUNTER  
 RIVER-BASIN  
 AREA-DISTRICT  
 CMA-MAP  
 GRID-ZONE  
 SCALE  
 ELEVATION  
 ELEVATION-SOURCE  
 NORTHING 6311008.00  
 EASTING 353158.00  
 LATITUDE 33 19' 48"  
 LONGITUDE 151 25' 20"  
 GS-MAP

AMG-ZONE 56  
 COORD-SOURCE  
 REMARK

**Form-A (top)**

COUNTY NORTHUMBERLAND  
 PARISH TUGGERAH  
 PORTION-LOT-DP LOT 612 DP 628020

**Licensed (top)**

COUNTY NORTHUMBERLAND  
 PARISH TUGGERAH  
 PORTION-LOT-DP 612 628020

**Construction (top)**

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;  
 ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	11.50	210			Down Hole Hammer
1		Hole	Hole	11.50	100.00	150			Down Hole Hammer
1	1	Casing	P.V.C.	0.60	11.50	160	150		C: .2-11.5m; Screwed and Glued; Seated on Bottom

**Water Bearing Zones (top)**

FROM- DEPTH (metres)	TO- DEPTH (metres)	THICKNESS (metres)	ROCK- CAT- DESC	S- W-L	D-D-L	YIELD	TEST- HOLE- DEPTH (metres)	DURATION	SALINITY
16.00	16.80	0.80		6.00	30.00	0.06	30.00	1.00	Fresh
62.00	64.00	2.00		6.00	70.00	0.19	70.00	2.00	Fresh
86.00	88.50	2.50		6.00	100.00	0.30	100.00	3.00	Fresh

**Drillers Log (top)**

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.40	0.40	Topsoil		
0.40	8.80	8.40	Clay Brown		
8.80	16.00	7.20	Sandstone Yellow		
16.00	16.80	0.80	Sandstone Yellow WB		

16.80	31.00	14.20	Mudstone Brown
31.00	43.50	12.50	Mudstone Grey
43.50	62.00	18.50	Mudstone Brown
62.00	64.00	2.00	Mudstone Grey WB
64.00	86.00	22.00	Mudstone Brown
86.00	88.50	2.50	Mudstone Grey WB
88.50	94.00	5.50	Mudstone Grey
94.00	100.00	6.00	Mudstone Brown

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**Warning To Clients:** This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources (DIPNR) by drillers, licensees and other sources. The DIPNR 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.