Lot 5 Commercial Road, Rouse Hill, Supply and Demand assessment

Norlex Holdings Pty Ltd
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Final

SGS Economics & Planning

Independent insight.

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1 INTRODUCTION

Caladines Town Planning, on behalf of Norlex Holdings Pty Ltd, is undertaking the submission of a planning proposal for Lot 5 DP 30916 Commercial Road, Rouse Hill. The site is located north of Rouse Hill town centre.

FIGURE 1. STUDY SITE LOCATION

Source: Architectus, 2015

The proposal seeks a change of zoning away from its current B5 'Business Development' to allow B4 'Mixed use' development including high density residential. SGS Economics and Planning have been engaged to undertake an assessment of land use for the existing and proposed zones. Additionally, it provides a review of relevant planning policy related to land use zoning. This report assesses both the demand and supply-side factors for the current zoning and for the proposed B4 use which proposes 333 new units on site. It then assesses the merits of both land use zones in the context of the site's location and alternatives.

In order to undertake this, we have structured the reports as follows:

Chapter 2: Planning Policy Context. This section reviews key state and local policy to determine the primary drivers of development in Rouse Hill and the Hills Shire more broadly. It includes reviews of relevant current or recent planning proposals as a means of establishing precedent for such a change of land use in the subregion. This assists in the determination of value placed on B4 and B5 zoned land within the LGA.

Chapter 3: Employment Lands Assessment. This section undertakes market and population analysis of IN2, IN1, B5, B6 and B7 land uses and assesses the subregional importance of the current and proposed zoning options. This analysis determines whether a demand or supply gap exists for each of these land uses.

Chapter 4: Housing Market Assessment. Assessment of future housing demand using Bureau of Transport Statistics population and dwelling forecasts and analysis of area-specific housing supply. This analysis determines whether a demand or supply gap exists and where demand lies by dwelling type in order to gauge the relevance of the proposed residential development to the local housing market. This is supported by an assessment of housing preferences in the Sydney market.

Chapter 5: Discussion. Assesses the merits of both land uses and presents a series of findings

2 PLANNING POLICY CONTEXT

This chapter reviews key state and local policy influencing development in Rouse Hill and The Hills LGA more broadly. It includes reviews of relevant current or recent planning proposals as a means of establishing precedent for such a change of land use in the subregion.

2.1 Metropolitan policies and strategies

A Plan for Growing Sydney

A plan for Growing Sydney was released in December 2014. The Plan replaces the Draft Metropolitan Strategy for Sydney to 2031 as Sydney's long term strategic growth management plan.

The plan identifies six subregions with groupings of councils that share similar challenges for delivering the outcomes in the Plan. The subregions are based on an assessment of the population and economic catchments of council areas. The study area exists within the West Central subregion which has been identified to grow significantly by 2031.

The Plan continues the State Government's focus on centres-based planning. Rouse Hill is identified as a Strategic Centre. A strategic centre is defined as "the largest centres in the Sydney Metropolitan Area, when developed. They contain mixed-use activity of an amount of density and diversity that is of metropolitan significance, including commercial (office, business and retail), civic and cultural uses; government services; and higher density housing". (DP&E 2014, p.139).

The main difference in the varying types of centres is the number of residents, employment capacity, and potential to expand. The Plan also refers to 'strategic centres' which are defined as

The strategy sets out population, housing, and employment targets to meet by 2031. It also identifies the centres precincts within the subregions that are to be the focus on growth over the next two decades.

The Plan identifies priorities for the Rouse Hill Strategic Centre in conjunction with implementation from the Hills Shire Council. Priorities include, work with council to implement the Rouse Hill Structure Plan in the North West Rail Link Corridor Strategy to provide additional capacity around the future Rouse Hill train station for mixed-uses including offices, retail services and housing, and to plan for outward expansion of the centre and to work with council to improve walking and cycling connections to the future Rouse Hill train station.

The anticipated growth targets for the West Central subregion will be published once the Department of Planning and Environment's subregional planning process is complete.

West Central Subregion

The draft Metropolitan Plan Strategy for Sydney to 2031 was released by the former Department of Planning and Infrastructure in March 2013. The strategy plans for an additional 142,000 jobs to 2031, with 4% proposed within Rouse Hill. However, this strategy was not adopted and the Department of Planning and Environment is currently conducting subregional planning for the West Central subregion. Table 1. West central and north west growth targets highlights the breakdown of the draft targets.

TABLE 1. WEST CENTRAL AND NORTH WEST GROWTH TARGETS

Area: 779km3 2011 population density: 1,086 people/km2 2010-11 % of GRP: 16.7% ($48.5 billion)	Current	Target to 2021 (2011-2021)	Target to 2031 (2011-2031)	Rouse Hill Forecast
Population	846,000	1,039,000 (192,000)	1,201,000 (355,000)	Not Available
Housing	302,000	376,000 (74,000)	450,000 (148,000)	Not Available
Employment	389,000	464,000 (75,000)	531,000 (142,000)	6,000

Source: NSW Planning and Infrastructure 2013, p. 87

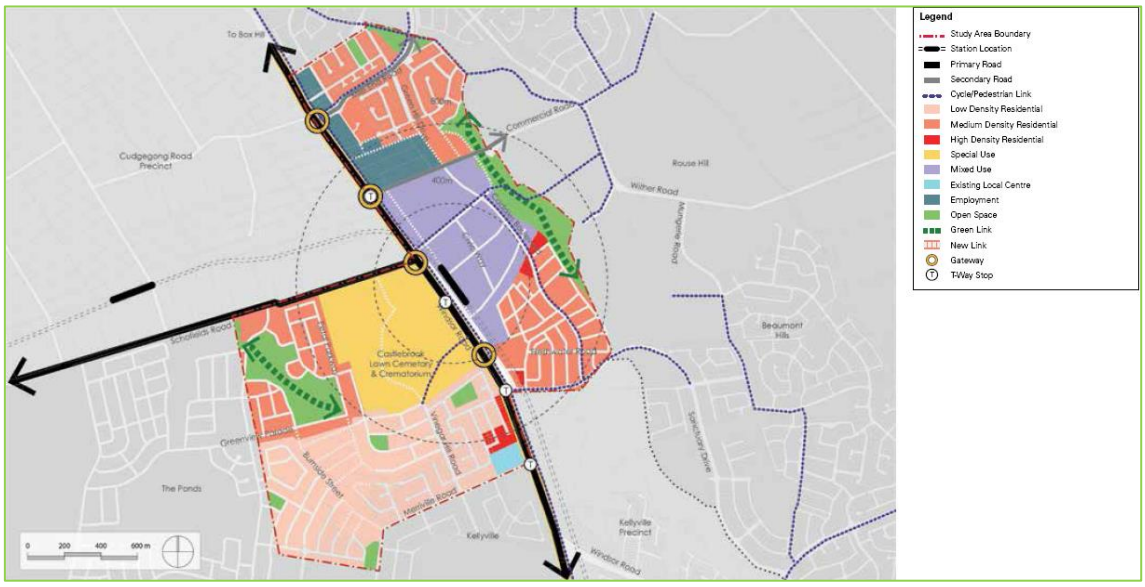
Under A Plan for Growing Sydney, Rouse Hill is identified as a proposed Strategic Centre in the West Central subregion. The West Central subregion includes Parramatta as the CBD and Rouse Hill, Marsden Park, Blacktown, Norwest, Castle Hill, Sydney Olympic Park and Bankstown as strategic centres.

North West Rail Link Corridor Strategy (Sydney Metro Northwest)

Sydney Metro Northwest, formerly known as the North West Rail Link (NWRL) Corridor, released the NWRL strategy in September 2013. It outlines the planning vision for each of the centres surrounding the eight proposed stations. The intent of the document is to facilitate community discussions around each centre's future character and includes housing and employment projections for each centre.

Within the Rouse Hill Study Area, the accompanying structure plan (Figure 2) identifies the land directly north of the mixed-use town centre and bounding Windsor road to the east as Employment land. This includes the site in question, Lot 5. This employment land is bounded to its north and east by Low Density Residential, comprising of single dwellings on small lots.

FIGURE 2. ROUSE HILL NORTH WEST RAIL LINK STRUCTURE PLAN



Source: NSW Planning and Infrastructure, North West Rail Link Corridor Strategy, 2013

The Corridor Strategy's projections for the study area foresee a growth in high-density 7-12 storey apartments from a current base of zero dwellings to 300 by 2036 and a combined growth in commercial, retail and bulky goods jobs to 7,500 in 2036 from a current base of 4,000, 57% of which is predicted to come through retail development. Table 2 provides a more detailed breakdown.

TABLE 2. ROUSE HILL RESIDENTIAL AND EMPLOYMENT PROJECTIONS, NORTH WEST RAIL LINK CORRIDOR STRATEGY, 2013

Column heading	Development type	2012 Total	2036 Total	Growth
Dwellings	Single Detached	1,800	2,200	400
	Townhouse	0	50	50
	3-6 Storey Apartment	200	400	200
	7-12 Storey Apartment	0	300	300
Jobs	Commercial	0	1,500	1,500
	Retail	2,000	4,000	2,000
	Bulky goods	2,000	2,000	0
	Industrial	0	0	0

Source: NSW Department of Transport & NSW Department of Planning & Infrastructure, September 2013, p26

North West Rail Link Issues Paper (September 2013)

Accompanying the NWRL (now Sydney Metro Northwest) Corridor Strategy's release was the North West Rail Link Corridor Strategy Issues Paper, which identified the issues raised during the public exhibition of the strategy's structure plans. Landowner objections and government responses address several key points relevant to the Rouse Hill study area, including:

– Although the residential land north of the town centre is zoned as medium-density, its recent development means it is unlikely to increase in density over the lifetime of the plan, irrespective of housing demand;

– Pertaining specifically to Lot 5 Commercial Road, given the location of the site, adjacent employment and residential land and its close proximity to the planned train station, mixed use is an appropriate land use, with potential to accommodate towers up to 12 storeys.

The issues paper does not discuss in any detail identified favourable employment land uses or expand on what type or how many jobs could be located on the site.

Directive 1.1, Section 117(2) of the Environmental Planning and Assessment Act 1979

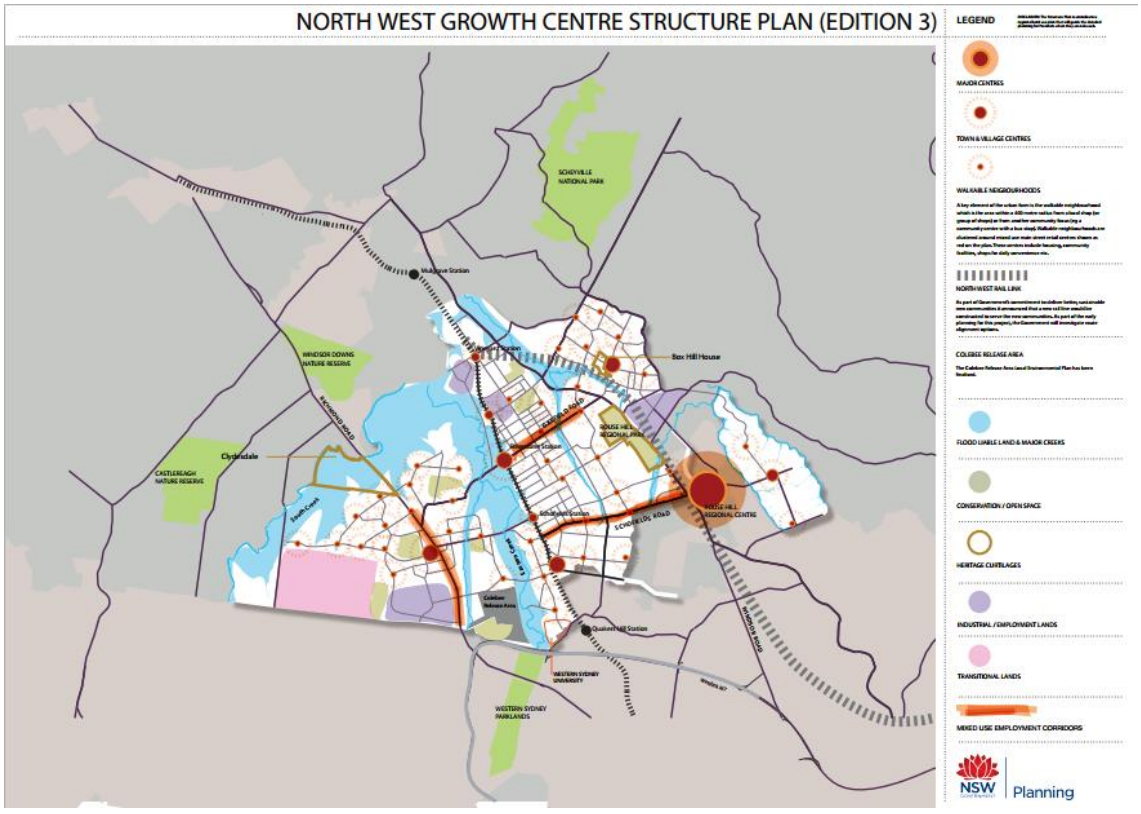
Section 117(2) Local Planning Directions, '1.1 Business and Industrial Zones' requires relevant planning proposals to retain areas and locations of existing business and to not reduce potential floor space area for employment uses and related public uses in business zones. Should a proposal not be in conformity with this direction, justification must be provided through preparation of a study in support of the planning proposal, giving consideration to the Direction's objective.

SEPP Sydney Growth Centres (2006)

The North West and South West Growth Centres were legally established by the State Environmental Planning Policy (Sydney Region Growth Centres) 2006. The Growth Centres were set up to manage the growth of Sydney in a planned, sustainable way.

The key documents that provided the broad strategic goals for the North West Growth Centre is the Structure Plans and Explanatory Notes (see Figure 3).

FIGURE 3. NORTH WEST GROWTH CENTRS STRUCTURE PLAN



Source: NSW Department of Planning and Infrastructure, 2013

The Plan identifies Rouse Hill as the major centre to service the North West Growth Centre. The plan also provides for a range of town centres and list potential retail floor space. In total, 60,000 dwellings are planned for the North West Growth Centre under the structure plan, with a range of densities from low to high. More detailed planning studies are gradually being undertaken for individual precincts within the Growth Centre as it is released for urban development. The Growth Centres represents a significant portion of the future growth of Sydney and therefore will contribute substantially to both the supply and demand of retail land in Western Sydney.

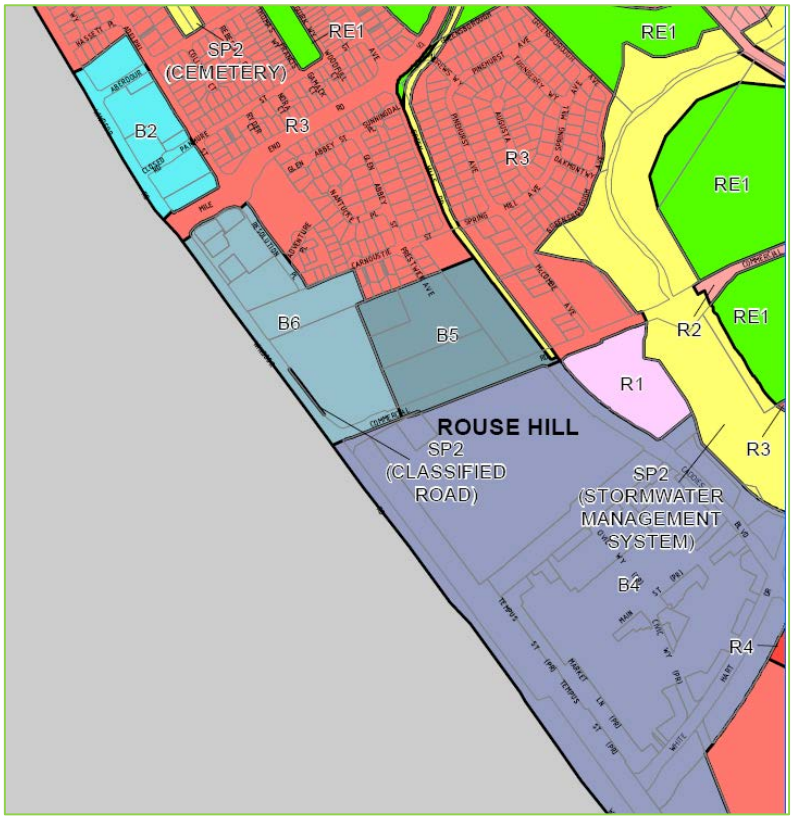
2.2 Local Strategies

Hills Shire Local Environment Plan (LEP) (2012)

The 2012 Hills Shire LEP is a statutory planning instrument governing the 'sustainable development' of the LGA, It provides strategic direction for the council's land use and drives the development of communities within the LGA, encompassing economic, social and environmental conditions. The LEP outlines each of the land use zones that fall within the LGA, the council's objectives for them and the permitted and prohibited uses within each.

Under the LEP, maps and model clauses outline a range of development standards to which development within the LGA must adhere, including lot sizes, floor space ratios and building heights. The LEP is represented spatially through a number of maps covering the LGA, identifying zones and controls specific to different areas. The zoning map for Rouse Hill is shown in Figure 4.

FIGURE 4. HILLS SHIRE LEP ROUSE HILL ZONING (INCLUDING STUDY SITE)



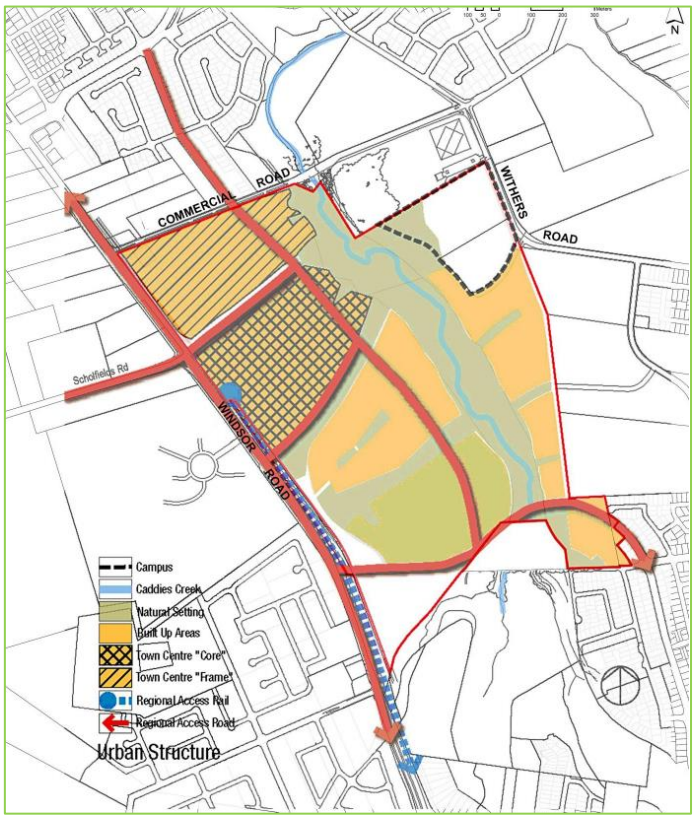
Source: Hills Shire LEP Zoning Map, 2012

Hills Shire Development Control Plan (DCP) (2012)

The Hills Shire DCP provides specific development guidance in order that developments, and the council, achieve the objectives set out in the LEP. Developments submitted to council for planning approval must be in conformance with the directives outlined in the DCP. Although the LEP governs development standards, the DCP provides specific guidance on different development types, such as residential flat buildings. This dictates building heights, setbacks, the treatment of landscape and broader urban design conditions. It also provides area-specific development principles and intended outcomes. Rouse Hills Regional Centre is one of these areas that the DCP addresses directly.

The Rouse Hill Regional Centre section articulates the Council's urban structure principles and outlines their intent for the centre's mix of functions. Figure 5 demonstrates that although the study site is outside the centre boundary, the DCP highlights the link must be made between the centre and its surrounds. This link will extend to the surrounding B5 & B6 lands to the north of the centre, as such land uses play an important role in supporting commercial centres.

FIGURE 5. ROUSE HILL REGIONAL CENTRE URBAN STRUCTURE



Source: Hills Shire Council DCP, 2012

Hills Shire Centres Direction (2009)

The Hills Shire Centres Direction was developed to guide the development of new centres and facilitate the revitalisation and redevelopment of existing centres. It identifies Norwest as a specialised centre, Castle Hill as a major centre, and Rouse Hill as a proposed major centre. It also notes Baulkham Hills, Carlingford, North Rocks, Round Corner, Wrights Road as town centres, Kellyville Station Balmoral Road Release Area Transit Centre and Box Hill as potential town centres, North Kellyville as a planned town centre and a number of smaller centres. The study is important background for a retail analysis of Western Sydney as it guides the development of centres in a particular part of western Sydney.

2.3 Relevant planning precedents

Rezoning of Rouse Hill town centre commercial precincts from B4 Mixed Use to B3 Commercial Core (Hills Shire Council - 2/2013/PLP and 3/2013/PLP)

This scheme proposed to rezone the Rouse Hill Regional Centre from its current B4 Mixed Use zone to B3 Commercial Core. The applicant, the landowner and manager of the town centre, believed that due to the nature of the town centre and its prominence in metropolitan planning, a zoning of B3 was more consistent with Department of Planning advice. The proposal was rejected by the Hills Shire Council in June 2013, thereby retaining the B4 Mixed Use zoning for Rouse Hill Town Centre.

The refusal by the council was on the following grounds:

1. *The objectives and purpose of the proposed B3 Commercial Core zone are inconsistent with the identified scale, role and purpose of the centre under The Metropolitan Plan For Sydney 2036, Draft Metropolitan Strategy for Sydney to 2031, The Draft North West Rail Link Structure Plan for Rouse Hill, Council's Local Strategy and Centres Direction and the approved Master Plan;*

2. *The application of the B3 Commercial Core zone on the subject site would be inconsistent with the usage of Standard Instrument Order zones across the Sydney Metropolitan region.*[1]

The Council's position indicates a clear vision for Rouse Hill town centre by the Hills Shire Council in line with the DCP, as being a mixed use urban environment.

Alteration to LEP 2012 & increase building height & FSR - 11-13 Solent Circuit, Baulkham Hills (Hills Shire Council 17/2013/PLP)

This scheme proposes to alter the site's current building height and FSR as well as re-zone a portion of the site away from SP2 Drainage to B2 Local Centre, in line with the rest of the site's zoning. The site is within the Norwest Business Park and currently contains the Sydney Ice Arena. The scheme's relevance to the study site is the proposal to incorporate residential development in land occupied currently solely for business use. The Hills Shire Council adopted the planning proposal on 9 December 2014. The planning proposal will facilitate a growing mixed use development, including approximately 240 residential units.

The proposal provides an example of how business land use can be retained through the redevelopment of a site with a significant residential component in an area with a primary business function to increase the mix of uses within a centre.

Alteration to LEP 2012 (Amendment No. 14) – increase height and minimum lot size for the Commercial Core at Rouse Hill Regional Centre

This scheme proposes to remove the maximum height standard that applies to the Town Centre Core (currently 36m) and the Northern Frame (currently 25m) of the Rouse Hill Regional Centre Commercial Precincts and restore flexibility relating to minimum lot sizes for dual occupancy, multi-unit dwelling housing and residential flat buildings across the Hills Shire. The Northern Frame area is largely vacant except for an energy substation and informal car parking for staff of the centre. Council proposes to amend the maximum building height map for the residential precincts of Rouse Hill Regional Centre as part of a separate Planning Proposal. The planning proposal will assist in achieving the overall dwelling target for the Rouse Hill Regional Centre of 1,800 dwellings. The proposal was determined in October 2013.

[1] Hills Shire Council, 28 June, 2013 ' Letters to advise of resolution of Council meeting 25 June 2013 2/2013/PLP & 3/2013/PLP', accessed 12 June 2014 http://apps.thehills.nsw.gov.au/DATracking/Modules/Applicationmaster/default.aspx?page=wrapper&key=745049

3 ASSESSMENT OF CURRENT LAND USE

This chapter examines the uptake trends, supply of B5 zoned lands and demand for bulky goods land uses across the LGA. It determines whether a gap exists for B5 zoned land and employment lands in The Hills LGA.

3.1 Introduction

The Hills Shire Council's Centres Direction policy, identifies bulky goods as requiring exclusive zoning to recognise their support role of centres and important economic function. 'B5 Business Development' zone is recommended for such uses. According Hill PDA retail demand studies commissioned by council, it has been forecast that by 2031, an additional 81,000sqm of bulky goods floorspace will be required to accommodate future demand.

Consistent with The Department of Planning's Centres Policy[2], business development zones are designed to offer more flexible planning controls and space for job generating uses. The B5 (Business Development) zone should be used for clusters of large floor plate bulky goods premises that cannot be accommodated in, or are not suited to, centres because of large floor space requirements or the need for direct vehicle access to load or unload goods. Councils should aim to create these clusters in accessible edge-of-centre locations.

3.2 Employment lands context

The term 'Employment Lands' is used to cover lands zoned IN1, IN2, B6 (and in some cases B7 zones). They are generally lower density employment areas containing concentrations of businesses involved in: manufacturing; transforming and warehouse of goods; services and repair trades and industries; integrated enterprises with a mix of administration, production, warehousing, research and development; and urban services and utilities.

These are distinct from centre-based employment such as retail and commercial uses, which are usually zoned B1 to B4. B5 (Business development) zones often sit somewhere in between, supporting in-centre uses but not necessarily being able to locate in the centres themselves, due to floorplate size requirements or heavy vehicle access issues. They are designed to offer more flexible planning controls and space for job generating uses.

Since the Standard LEP was introduced in 2006, a trend has been observed towards rezoning a large portion of industrial zoned land to one of the business zones. Across Sydney in 2013, 223 hectares of industrially-zoned land was rezoned to a B5, B6 and/or B7 use. Of this, 150 hectares (67%) was rezoned B5 (Business Development), 41 hectares (18%) was rezoned B7 (Business Park) and 31 hectares (14%) was rezoned B6 (Enterprise Corridor).

[2] Department of Planning, Planning for Retail and Commercial Development, 2009

This illustrates that there is strong tendency for rezoning industrial lands to B5, B6 or B7 to make it more versatile for future employment uses. This study recognizes the versatility of B5 zones in servicing a range of industrial and commercial needs and takes into consideration its role in broader employment lands context.

3.3 Employment Lands Supply Assessment

The Sydney-wide Employment Lands Development Program's (ELDP) 2014 release identifies over 15,000 hectares of zoned employment lands (a 1.1% increase from 2013). The majority of employment land is located in western Sydney. This comprises of 69% of undeveloped land across the region.

In the West Central Subregion and Hills Shire in particular, there were significant employment land zone additions between January 2013 and January 2014 totalling 58.8 hectares. This is due primarily to the release of the Box Hill Industrial precinct which was rezoned in April 2013. Table 3 provides an audit of Employment Lands and B5, B6, B7 lands in The Hills LGA, their development status and overall availability attributes as of January 2014. Where data is unavailable, SGS performed a desktop audit to determine the availability of a site.

TABLE 3. B5, B6, B7 AND EMPLOYMENT ZONED LANDS (HECTARES) WITHIN THE HILLS

			Land Area (HA)			Lots			
PRECINCT	Data Source / Date	Zone	Developed Land	Vacant Land	Total Land	Occupied lots	Vacant Lots	Total Lots	Mean Lot Size
Rouse Hill**	ELDP 2012	B6	5	1	6	8	1	9	0.6
Rouse Hill B5 (Study Area)	SGS 2015	B5	4	2	6	2	1	3	1.9
Annangrove***	ELDP 2014	IN2	68	98	166	34	12	46	3.6
Castle Hill*	ELDP 2014	B5	37	0.8	38	26	1	27	1.4
Castle Hill*	ELDP 2014	IN2	84	0.8	84	58	1	59	1.4
Norwest (next to Castle Hill)	SGS 2015	B6	3	0	3	1	0	1	2.9
Norwest Business Park	SGS 2015	B7	59	0	59	71	0	71	0.8
Northmead, James Rouse Drive	ELDP 2012	B6	3	0	3	7	0	7	0.5
Caddies Creek	SGS 2015	B6	2	22	25	17	4	21	1.2
Bella Vista Business Park	SGS 2015	B7	73	16	89	57	7	64	1.4
Bella Vista	SGS 2015	B5	7	0	7	4	0	4	1.7
IBM Australia	SGS 2015	B7	26	0	26	1	0	1	25.9
Lewis Jones Drive	SGS 2015	B7	22	2	25	12	2	14	1.8
Winston Hills	ELDP 2014	IN1	15	0	15	7	0	7	2.1
North Rocks	ELDP 2014	IN1	45	0	45	28	0	28	1.6
Box Hill****	ELDP 2014		-	59	59	NA	NA	NA	NA
Total			453	202	655	333	105	438	50

Source: DPE Employment lands development program, 2014 and SGS calculations 2015
*ELDP Castle Hill as a single precinct. Vacant lands and vacant lots are distributed across B5 and IN2 zones on a pro rata basis
**ELDP Rouse Hill boundary differs from the Hills LEP boundary. Total Land Area in this table reflects the land area captured through LEP.
***ELDP Annangrove covers 11.3 ha of serviced vacant land. This is the only occurrence across the LGA therefore not shown in this table.
****The ELDP only identifies vacant land area to date. SGS is unable to identify the total lots within this new release area

In summary, there is currently almost 655 hectares of employment lands, including B5, B6, and B7 land use zones across the LGA, of which 200 hectares are vacant. Of this vacant land, however, only 2.8 hectares are currently zoned as B5.

The 2014 ELDP suggests that there is sufficient employment lands to service Sydney for at least 39 years regardless of take up levels. In The Hills Shire, new release areas such as Box Hill will play a significant role in servicing these long term needs.

Serviced *and* vacant land stock however, is expected to exhaust supply in the next 2.5 years with precincts such as Annangrove the last of serviced and undeveloped precincts in the LGA. To date, it covers approximately 11.3 hectares of serviced vacant land (not shown in table) but have remained vacant since 2012.

Generally speaking, the serviced sites are high in demand and are most likely to be taken up before unserviced lands. But this does not necessarily mean all zoned and serviced land are equally high in demand. Some less suitably located sites could remain vacant for a number of years and often, zoned and serviced land will lie in waiting for other, better located sites to 'fill up' before they see development. Zoned and serviced sites can also identify future directions of specific land uses over the medium and long term.

Table 4 highlights the current shortage of B5 zoned land in the LGA.

TABLE 4. B5, B6, B7 AND EMPLOYMENT ZONED LANDS (HECTARES) WITHIN THE HILLS

	Land Area (HA)			
Zone	**Developed Land**	**Vacant Land**	**Total Land**	**Land use distribution (%)**
B5	48	3	51	8%
B6	13	24	37	6%
B7	180	18	199	30%
IN1	60	-	60	9%
IN2	152	99	251	38%
NWGC	-	59	59	9%
Total	453	202	655	100%

Source: DPE Employment lands development program, 2014 and SGS calculations 2015

Record of Zoning Changes (2012-2014)

In order to gauge the extent of employment land rezoning, Table 5 outlines the recent rezoning history in the Hills Shire and compares it to Metropolitan Sydney. This information comes from the 2014 ELDP.

TABLE 5. RECORD OF ZONING CHANGES

	Period	**R3***	**B4***	**B5**	**B6**	**B7**
The Hills LGA	2011-12	0	0	0	0	0
	2012-13	1.9	0	37.4	3	0
	2013-14	0	0	0	0	0
	Period	**R3**	**B4**	**B5**	**B6**	**B7**
Sydney Region	2011-12	0.3	39.1	27.3	142.2	104.2
	2012-13	3.7	1.1	101	81	0
	2013-14	14.4	6.6	150	31	14

Source: DPE Employment lands development program 2012, 2013, 2014
*Only zones relevant to this study are shown in this section

2012 saw 37 hectares of Industrial land rezoned to B5 in The Hills Shire. Across the Sydney region, almost 280 hectares of B5 zones were produced as a result of rezoning. This rezoning suggests that B5 appeals to a variety of businesses and that the Hills Shire Council are not opposed to adding to B5 stock through rezoning.

3.4 Employment Lands Demand Assessment

SGS uses a model of employment forecasting and floorspace demand estimates to determine the additional employment areas required based on employment growth. It uses estimates of floorspace requirements for industry types to translate increases in jobs to increased floorspace demand. The necessary steps for converting jobs into floorspace demand are outlined below:

1. Use employment forecasts from the Bureau of Transport Statistics (BTS) to generate the projected growth in jobs by ANZSIC 1-digit industry from 2011 to 2031.
2. Distribute jobs by ANZSIC industry to appropriate SGS Broad Land use Categories (BLCs), which were developed in previous employment land planning investigations with the NSW Department of Planning and Infrastructure (Appendix 1 outlines these assumptions). The relevant BLCs are business/office parks, local light industrial and urban support, manufacturing, freight and logistics, and urban services[3].
3. Convert employment growth by BLC into floorspace demand using SGS benchmark floorspace to job ratios.
4. Convert floorspace by BLC to employment land demand using average floorspace ratios (FSR). Benchmark floorspace to job and land to floorspace ratios have been derived from land audits completed by SGS for LGAs across the Sydney Greater Metropolitan Region.

Employment Growth Rates By Industry

Employment forecasts by ANZSIC industry for each precinct are sourced from the Bureau of Transport Statistics (BTS). The forecasts provide an indication of the magnitude and distribution of future employment and account for future trends by industry. It is important to note that these projections are trend based and broadly speaking, assume that the historical patterns persist. They therefore do not account for any unforeseen structural changes and their applicability to the main study area in particular is limited as a result. The 20 year employment forecast for The Hills from 2011 to 2031 is shown. Coloured text in the tables shows the highest growth levels.

TABLE 6. BTS EMPLOYMENT FORECAST – THE HILLS LGA

1 Digit ANZSIC Industry	2011	2031	20 year growth	Share of growth
Agriculture, Forestry and Fishing	596	612	3%	0%
Mining	71	102	44%	0%
Manufacturing	5,912	8,050	36%	6%
Electricity, Gas, Water and Waste Services	294	800	172%	1%
Construction	5,746	9,271	61%	7%
Wholesale Trade	4,516	7,051	56%	5%
Retail Trade	13,737	25,688	87%	20%
Accommodation and Food Services	4,156	8,366	101%	6%
Transport, Postal and Warehousing	983	2,690	174%	2%
Information Media and Telecommunications	806	2,974	269%	2%
Financial and Insurance Services	2,811	5,077	81%	4%
Rental, Hiring and Real Estate Services	1,244	3,047	145%	2%
Professional, Scientific and Technical Services	7,639	16,205	112%	12%
Administrative and Support Services	1,736	4,540	162%	3%
Public Administration and Safety	1,486	4,225	184%	3%
Education and Training	6,403	10,411	63%	8%
Health Care and Social Assistance	7,158	13,054	82%	10%
Arts and Recreation Services	955	2,643	177%	2%
Other Services	3,210	5,799	81%	4%
	69,462	130,604	88%	100%

Source: BTS 2015

[3] A full description of each BLC is provided in Appendix 2.

Modelling results

By 2036, there is projected to be demand for an additional 579 hectares of employment land in the Hills Shire LGA. Most of this demand will be for Urban Services, Local Light industrial and Bulky Goods BLCs.

In total, an additional 307 hectares of industrial land are required between 2011 and 2021, and a further 376 hectares required between 2021 and 2031. This translates to uptake rates of 29ha/year for The Hills Shire over the next 20 years. Based on the current supply of vacant lands of 202 hectares, demand is likely to exhaust supply in approximately 7 years.

Results for the floorspace and land demand analysis for the Hills LGA are presented in the table below.

TABLE 7. FORECAST DEMAND FOR EMPLOYMENT LANDS (B5-B7, IN1, IN2) IN THE HILLS

	Broad Land Use Categories for Employment Lands (Hectares)						
	Business/ Office Parks	Bulky Goods Retail	Local light Ind. & urban support	Mfg. Light	Freight & Logistics	Urban Services*	Employment Lands Total*
2011							
Jobs	537	2,747	7,324	4,874	1,719	4,308	21,509
Floorspace (sqm)	26,850	329,640	585,920	389,920	171,900	861,600	2,365,830
Land (ha)	3.6	62.8	104.5	62.3	58.4	431.5	723
2021							
Jobs	811	4,106	9,915	6,037	2,440	6,283	29,592
Floorspace	40,550	492,720	793,200	482,960	244,000	1,256,600	3,310,030
Land	5.4	93.8	141.5	77.2	82.8	629.4	1,030
Increase from 2011 (ha)	1.81	31.05	36.97	14.88	24.48	197.83	307
2031							
Jobs	1,181	5,668	13,018	7,320	3,300	8,757	39,244
Floorspace	59,050	680,160	1,041,440	585,600	330,000	1,751,400	4,447,650
Land	7.1	117.4	173.9	88.6	105.6	809.7	1,302
Increase from 2021 (ha)	2.45	35.68	44.28	16.41	29.20	247.81	376
20 Year Additional Demand	3.57	54.62	69.36	26.23	47.26	378.13	579

Source: SGS calculations. 2015

3.5 Employment Gap analysis

The gap analysis compares projected demand for employment lands in the Hills Shire against the capacity of current zoned land under to assess whether there is sufficient employment land supplied for future needs. Table 8 shows the gap analysis results for employment lands in the Hills Shire LGA. Based on 20 years additional demand, it is estimated that there will be a shortage of 377 hectares of employment lands in the LGA, and 379 hectares if the site at Commercial Road were to be rezoned.

TABLE 8. 2031 EMPLOYMENT LANDS GAP ANALYSIS, HILLS SHIRE TOTAL

LGA Total	Formula	The Hills Total
Employment land demand	A	579
Employment lands capacity	B	202
Employment lands gap	B-A	-377
Employment lands gap (if site was rezoned)	(B-2ha)-A	-379

Source: SGS, 2015

B5 Zoned Lands Gap Analysis

Bulky Goods Retail is confined to B5 zoned lands and bulky goods uses laid out in the Centres Hierarchy. SGS use forecasted demand under 'Bulky Goods' category (from the employment lands model), as a proxy for demand for B5 zoned lands. According to the forecasted demand, there will be shortage of 52 hectares of B5 lands in the LGA, and 54 hectares if the site at Commercial Road were to be rezoned.

It should be noted that the demand for Bulky Goods land is the closest indication of how much B5 land is required based on its exclusivity and versatility. Alternative sites (not zoned B5) that accommodate Bulky Goods establishment should be assessed on a case by case basis and should not be used to counter predict a lesser demand for B5 zoned lands.

TABLE 9. 2031 EMPLOYMENT LANDS GAP ANALYSIS, B5 ZONED LANDS AND HILLS SHIRE TOTAL

LGA Total	Formula	The Hills Total	B5* Total
Employment land demand	A	579	55
Employment lands capacity	B	202	3
Employment lands gap	B-A	-377	-52
Employment lands gap (if 2 ha site was rezoned)	(B-2ha)-A	-379	-54

Source: SGS, 2015

*Demand for B5 zones uses bulky goods demand from the employment lands demand model

3.6 Summary

B5 zoned land has increased in recent years. In 2012-13, an additional 37 hectares of B5 land was rezoned to accommodate growth of a major bulky goods precinct in Castle Hill. Much of this has now been developed. This growth aligns with the projected future demand for both Local Light & Urban Support Services (additional 70 hectares) and Bulky Goods lands (additional 55 hectares) over the next 20 years.

The gap analysis suggests that demand for B5 zoned land exceeds supply. Although the Hills Shire has over 200 hectares of vacant employment land, only 3 hectares of this are currently zoned for B5. This includes the study site. Demand modelling suggests that a shortage of 379 hectares of employment lands and specifically, 54 hectares of B5 zoned land, will exist by 2031.

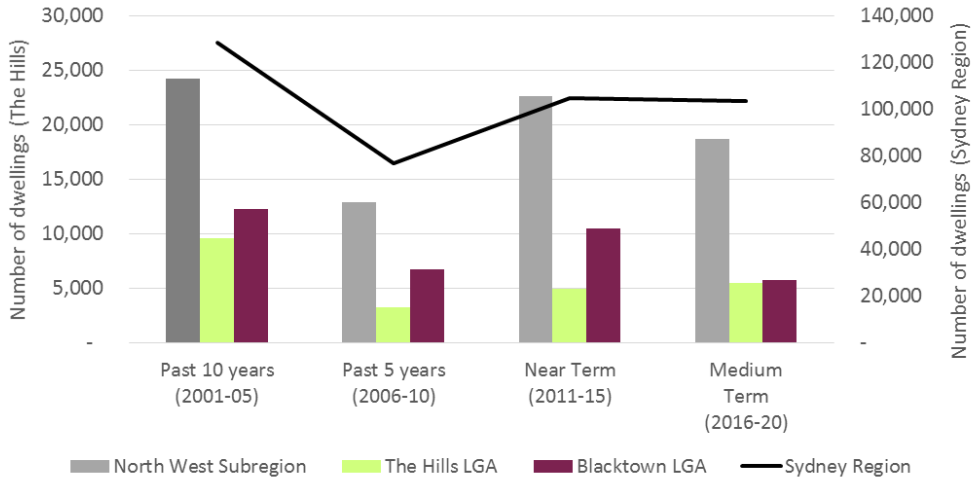
4 HOUSING MARKET ASSESSMENT

This chapter undertakes market and population analysis of residential development at a sub-regional and LGA level. This analysis determines whether a demand or supply gap exists and where demand lies by dwelling type.

4.1 Housing Supply Assessment

Metropolitan Development Program (MDP) information is used to assess housing supply across the subregion. The MDP dwelling production forecasts are not a capacity assessment, rather it shows what is expected to be constructed based upon current market conditions and developer plans. The MDP forecasts include the interpretation of economic conditions and demand by the development industry as shown in their production schedules, current dwellings under construction, development approval activity, ownership details and zoning and servicing timetables. These circumstances change from year to year resulting in different annual forecasts. Figure 6 shows dwelling-supply growth from 2011 to 2016 (near term) and from 2016 to 2020 (medium term).

FIGURE 6. MDP DWELLING PRODUCTION 2001 TO 2020



Source: MDP 2014

Due to its susceptibility to market conditions, dwelling production is highly cyclical. It shows that dwelling production has increased significantly over the 2011-2015 period from a low start in 2006-10. At the time of forecasting, overall dwelling production is expected to plateau (Blacktown, West Central Subregion and Sydney region). The Hills Shire will have approximately 5,500 new dwellings in the medium term, almost 10% higher than 2011-2015. This is not surprising given there are greater opportunities to provide new housing due to new release areas in Balmoral Road and Kellyville.

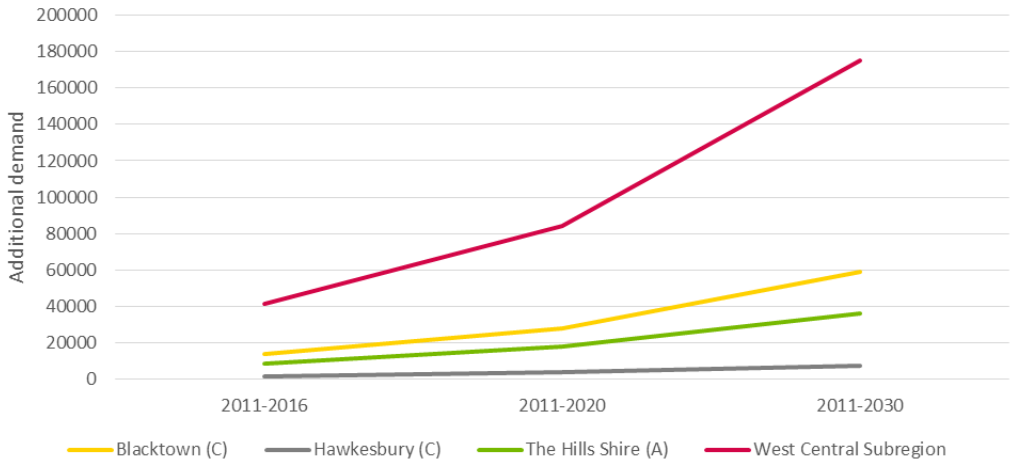
4.2 Housing Demand Assessment

Underlying latent housing[4] demand is examined at a high level across three LGAs -The Hills Shire, Blacktown, and Hawkesbury LGAs – as they are in the vicinity of the subject site. Housing demand figures are obtained from Bureau of Transport Statistics (BTS) small area population and dwelling projections.

Due to a growing population, increased local jobs and improved regional transport infrastructure, additional demand for housing in Blacktown LGA is expected to reach 28,300 by 2021, and 59,100 by 2031 - one of the highest in North West sub region. Inheriting population and employment growth in the Balmoral Road and Kellyville release areas, The Hills Shire is expected to require 17,700 and 36,000 additional dwellings over the next 10 and 20 years respectively.

Figure 7 shows projected demand growth from 2011 onwards. The demand figures shown are cumulative and are relative to 2011.

FIGURE 7. UNDERLYING ADDITIONAL DWELLING DEMAND (5 TO 20 YEARS)



Source: Bureau of Transport Statistics, 2014
Note: West Central Subregion comprise of 6 LGAS which are This Hills, Auburn, Blacktown, Bankstown, Holroyd and Parramatta

A breakdown of forecast housing demand by dwelling type in shown in Table 10. It uses household composition and age profiles to predict the type of dwellings required by residents over the next 10 to 20 years. Overall, it estimates significant increase in flats and apartments based on demographics of residents. This means that council and the state should ensure sufficient R3, R4 and B4 zones to accommodate this type of dwelling production. Demand for medium and high density houses makes up 18% of the total expected demand for Hills Shire in 2031.

TABLE 10. THE HILLS SHIRE DWELLING DEMAND FORECAST BY DWELLING TYPE

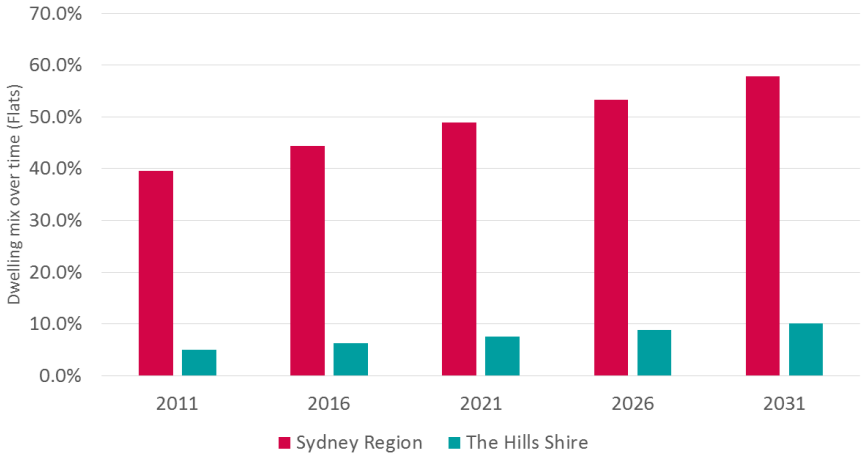
	2011	2021	2031	10 year Growth %	20 year Growth %
Separate house	47,992	59,088	68,801	23%	43%
Semi-detached / row / terrace / townhouse	5,870	9,680	14,281	65%	143%
Flat / unit / apartment	2,815	5,620	9,366	100%	233%
Other	124	163	202	31%	63%
Total Private Dwellings	56,800	74,550	92,650	31%	63%

Source: SGS 2015, on NSW Department of Planning & Environment, 2014

[4] These projections are 'latent demand' because they relate to the population growth projections for the area and because they reflect the demand *potential* associated with population growth. It should be noted that latent demand differs from 'effective demand' in that the latter is determined by market conditions and income capacities of buyers.

In comparison to housing demand in West Central Subregion and Sydney Region, the demand for medium and high density dwellings in The Hills is not particularly high. Ageing population and high level of migration of family households (3.15 persons per dwelling) are the main reasons for council to ensure sufficient supply of low density houses to accommodate this demand.

FIGURE 8. SYDNEY REGION AND THE HILLS SHIRE DWELLING MIX OVER TIME (FLATS)

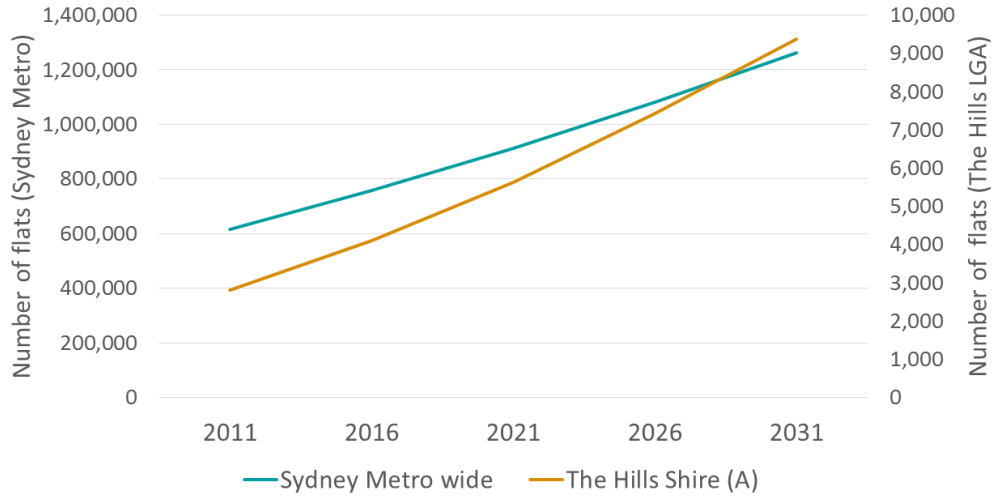


Source: SGS calculations based on DPE dwelling forecast

This does not mean that the upward trend (see Figure 9) for medium and high density dwelling demand should be overlooked particularly in strategic centres such as Rouse Hill. Locations where metropolitan infrastructure such as the Sydney Metro Northwest and city line is in the pipeline are expected to attract housing demand that reflect broader metropolitan trends rather than its municipality trend. The North West Rail Link Corridor Strategy, 2013 (produced by NSW Planning and Infrastructure) projections for the study area foresee a growth in high-density 7-12 storey apartments from a current base of zero dwellings to 300 by 2036.

In recognizing the need for suitable transitions for more intense uses, council suggests that medium and high density developments should be located in areas that are in close proximity to jobs, transport and services. Based on these criteria, it is justifiable that current and potential residential lands around Rouse Hill (including the Commercial Road site) could have strong potential in accommodating growth in high density demand.

FIGURE 9. DEMAND FOR FLATS/UNITS/APARTMENTS IN THE HILLS LGA AND SYDNEY METRO WIDE



Source: SGS calculations based on DPE dwelling forecast

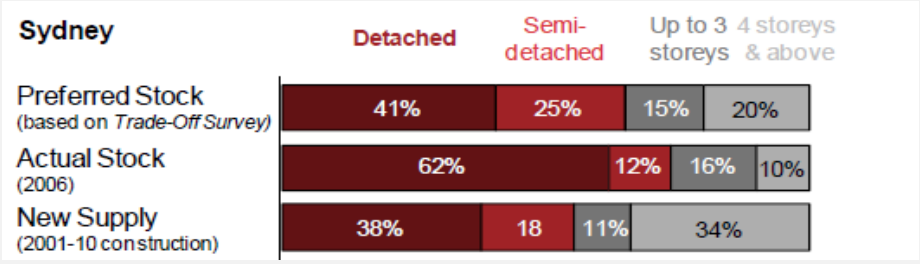
This view is supported by broader literature review and past research that SGS has conducted. The following text box provides additional support.

Housing preference

Recent studies of housing preferences in Australia have yielded some important findings that have challenged conventionally held views of the factors that motivate households when making housing choices, and preferences for detached as opposed to attached dwelling types.

A survey by The Grattan Institute (Kelly et al., 2011), which focused on Sydney and Melbourne, found households are increasingly willing to make compromises in dwelling type, as a consequence of economic and lifestyle trade-offs under tightened housing market conditions. By considering the trade-offs households are prepared to make in terms of dwelling type and location, the study found a significant shortfall in the supply of semi-detached housing in Sydney (Figure 10).

FIGURE 10. COMPARISON OF PREFERENCES, ACTUAL STOCK AND NEW SUPPLY IN SYDNEY



Source: Grattan Institute Survey, Kelly et al., 2011

This research indicates latent demand for compact, medium to higher density housing forms in Sydney.

The preferred housing stock does not mirror the actual housing stock, particularly in the case of semi-detached and 4 storey and above residential towers. New supply (2001-10 construction) has responded to the demand for high density residential with 34% of the dwellings constructed 4 storeys and above. This suggests that there is increasing market demand for high density development that is located close to public transport hubs. Therefore, in sight of the Sydney Metro Northwest development, high density residential activity may be attracted to the Rouse Hill site for convenience based living.

4.3 Housing Gap analysis

The report focuses on the Hills Shire and Blacktown as we believe that they are most relevant to the subject site's underlying market. In addition, it also reports the Sub-regional housing strategy target (2007 edition) as a means of benchmarking supply and demand from a policy perspective.

The sub-regional housing strategy was produced in 2007 (as part of the 2005 Metro strategy). Both the Hills Shire and Blacktown LGAs were assigned housing targets of 21,500 each, for the period 2011 to 2031[5]. This implies an average housing target of approximately 700 dwellings per annum.

Table 11 shows underlying housing demand from BTS and forecast housing supply from MDP. It compares projected supply with projected underlying demand to derive the gap in the market. Since MDP supply data is only available up to 2020, this assessment is conducted over three time periods – past 5 years, current, and medium term, which aligns with the time periods specified by MDP.

TABLE 11. HOUSING SUPPLY AND DEMAND GAP 2011 TO 2021

		Underlying dwelling demand (BTS)	Forecast housing supply (dwelling production)	Gap in supply (supply less demand)
The Hills Shire (A)	Past 5-10 years (2006-10)	4,301	3,238	-1,063
Blacktown (C)		10,612	6,771	-3,841
West Central Subregion		86,663	12,855	-73,808
The Hills Shire (A)	Near Term (2011-15)	8,705	4,982	-3,723
Blacktown (C)		13,849	10,509	-3,340
West Central Subregion		41,698	22,612	-19,086
The Hills Shire (A)	Medium Term (2016-20)	9,005	5,447	-3,558
Blacktown (C)		14,379	5,776	-8,603
West Central Subregion		42,656	18,706	-23,950

Source: BTS dwelling forecasts, August 2014, Metropolitan Development Program reports. 2010/11 Residential forecasts; and DP&I, *Sub-regional housing strategy*, 2007; and SGS calculations, 2014.

It is clear from the analysis below that there is shortage in the housing market in both the Hills Shire, Blacktown and the West Central subregion. However, the magnitude of the gap provides an indication that this gap is likely to impact upon effective demand in these two LGAs. For instance, in the short term (2011 – 2016), the Hills Shire is projected to experience a shortage of around 3,300 dwellings relative to the underlying housing demand in the LGA. This is a shortage of nearly 43 percent of the latent dwelling requirement in the near term, and around 40 percent in the medium term. The gap in Blacktown is around 10,500 dwellings and eases almost by half in the medium term (likely due to more greenfield sites being released in the North West Growth Centre). Even though dwelling supply is ahead of the housing targets (which is likely to reflect the dated nature of the targets), it is clear that there are underlying pressures in the market.

Given the magnitudes of shortage in the Hills Shire and Blacktown housing markets, it is likely that its impact on effective demand would put upward pressure on housing prices in the region. Broadly speaking, this analysis demonstrates that the housing markets in the region are tight and that shortages are likely to exist – at least in the medium to long term.

[5] DP&I, Sub-regional housing strategy, 2007

4.4 Summary

This chapter uses an assessment of residential demand to assess the need for B4 mixed use zones. This is due to the fact that the proposal seeks to provide 29,947sqm of residential and 1,684sqm of retail/commercial floorspace. Residential is therefore the dominant land use in the proposed development.

Supply of new homes in the Hills Shire and Blacktown LGAs is growing due to the availability and staged release of greenfield sites in and around the North West Growth Centre. These lands ensure that there is sufficient land capacity for ongoing dwelling production. The Hills Shire is forecast to deliver on average, an additional 1,000 new dwellings per year over the course of five to ten years.

Whilst forecast supply and land availability is good, demand in the LGA is forecast to be between 65 and 75 per cent greater than supply. This adds up to approximately 17,700 dwellings over the next five to ten years and implies a consistent shortage of dwellings of approximately 3,700 in the near term (2011-2015) and 3,500 (2016-2020) in the medium term.

Medium and high density dwellings is increasing in demand throughout the LGA and the subregion. This housing typology is particularly relevant in areas close to jobs, transport and services. The completion of the Sydney Metro Northwest and City line station in Rouse Hill town centre means that the area is well suited to accommodating an increase in higher density residential.

5 DISCUSSION

As Rouse Hill and the West Central subregion more broadly continues to experience sustained population growth, available land close to town centres such as Rouse Hill will be increasingly in demand. With the Sydney Metro Northwest line scheduled for completion in 2019, Rouse Hill will grow in stature as an important mixed use strategic centre for the north-west of Sydney.

Both B5 'Business Development' and B4 'Mixed Use' zones have merit on the study site. The role of B5 zoning to support in-centre uses can help diversify the retail and service offering of Rouse Hill with uses unsuited to locating in the heart of the retail strip. Conversely, the ability for B4 to deliver higher density residential development close to local services and heavy rail increases access to jobs and decreases reliance upon private vehicle travel on an already congested road network. This chapter reviews the relative merits of each potential land use against five criteria to assess the strengths of the current and proposed zonings.

5.1 Options assessment

Planning Policy
Local and state planning policy directives that identify the role of the site or, more broadly, that of Rouse Hill town centre.

Precedents
Identify trends in current or recent planning applications in the Rouse Hill area that reflect the study site's current and proposed rezoning.

Planning principles
Broad land use principles that guide the development of places and communities

Supply and Demand
Analysis of land use supply and demand data undertaken through analysis within the report

Alternatives
Assessment of logical alternative sites that could accommodate either the existing B5 or potential B4 development.

	CURRENT LAND USE ZONING (B5)	PROPOSED LAND USE ZONING (B4)
Planning Policy	**The Hills Shire LEP 2012** The site is zoned B5 (Business Development) to provide a mix of warehouse uses, bulky good premises that require a large floor area, in locations that are close to, and that support the viability of centres. **The Hills DCP** The Hills Shire DCP identifies the mixed use role that the Rouse Hill Regional Centre plays. The DCP highlights the link that must be made between the centre and its surrounds, extending to the surrounding B5 & B6 lands to the north of the centre, as such land uses play an important role in supporting commercial centres.	Under the NWRL structure plan, Rouse Hill will play an important role in the corridor, as a mixed use destination. The introduction of the NWRL will enable a major transport, retail and commercial hub for the surrounding suburbs centred on a new train station and a hub for the North West Growth Centre. Opportunities will also be provided to increase residential densities within walking distance of the station, involving a variety of housing types to ensure there is affordable and appropriate housing. Given proximity to the Sydney Metro Northwest, the NWRL Structure Plan has identified Commercial Road as an opportunity site for future development. The Structure Plan proposes to extend the commercial and retail area northwards to Commercial Road as well as residential development comprising of 3-6 storey. Under *A Plan for Growing Sydney*, the NSW Government's plan for the Rouse Hill Strategic Centre is to provide additional capacity around future Rouse Hill train station for mixed-uses including offices, retail, services and housing and to plan for outward expansion of the centre.
Summary	***These local policies identify the need to support a range of business uses within the town centre to give it as wide a range of uses as practical.***	***These strategic policies identify the desire to locate new residential and mixed use developments within the catchment of major transport infrastructure***
Precedents		**Rezoning of Rouse Hill town centre commercial precincts from B4 Mixed Use to B3 Commercial Core (Hills Shire Council - 2/2013/PLP and 3/2013/PLP).** The Department of Planning refused the Planning Proposal in May 2014 stating preference to maintain the B4 Mixed Use zoning given the intended mixed use focus for the Rouse Hill Town Centre. **Alteration to LEP 2012 (Amendment No. 14)** Removal of maximum height standard of Town Centre Core (currently 36m) and the Northern Frame (currently 25m) of the Rouse Hill Regional Centre Commercial Precincts. The planning proposal will assist in achieving the overall dwelling target for the Rouse Hill Regional Centre of 1,800 dwellings. The proposal was approved in October 2013. **The Hills Employment Land Direction** Discusses the gradual rezoning of Northmead Industrial Area to (low density) residential due to its good public transport accessibility.
Summary	***No relevant precedents were identified.***	***This identifies the Council's desire to maintain a mix of uses in and around the town centre and supports the broad principle of higher densities being suitable near major transport infrastructure and centres.***
Planning principles	B5 uses are considered important zones that support the functioning of centres by accommodating uses the benefit from close proximity to other retail uses but cannot locate in centres They are often more car-reliant than in-centre retail and allow for uses that can also exist in out-of-centre areas.	There is a continued need in Sydney to provide more and varied residential development to suit a growing population with a range of dwelling requirements.
	Land uses that are susceptible to re-zoning to higher value uses should be protected where there is a strategic need or shortage of that use in surrounding areas. There are limited	There is a strategic desire to locate higher density residential development in close proximity to rail lines to reduce car dependency, enable access to jobs and to make best use of

	remaining B5 lands in the LGA and the site is the last undeveloped B5 site in Rouse Hill.	metropolitan significant transport infrastructure.
Summary	***This identifies the need for town centres to be supported with complementary uses to best provide for surrounding residents and businesses.***	***This identifies the value that centres with good transport accessibility, outside of major employment centres, have as places to support higher density residential development.***
Supply/ demand	There is a significant shortage of employment lands broadly (approximately 379 hectares) and B5 lands (approximately 54 hectares) identified and more specifically forecast for the LGA 2031.	There is a shortage of 3,500 dwellings in the near term and 3,700 dwellings in the medium term (up to 2020).
	There is only 3 hectares of B5 zoned land left in the LGA and the study site is the only vacant B5 zoned land in Rouse Hill.	Current demand for medium/high density dwellings are low compared to the West Central Subregion and the broader Sydney Region, however, housing preference studies show that medium and high density dwelling demand is expected to outgrow the current trends.
	Council's retail studies also suggest there is sufficient demand to support a number of bulky good centres across the LGA.	
Summary	***Supports the need for B5 to be retained***	***Supports the need to supply more dwellings in the subregion***
Alternatives	Vacant and serviced industrially-zoned land to the north of Rouse Hill in Annangrove could support some larger-format uses such as hardware-based bulky goods and warehouses that would be appropriate on the site as it is currently zoned.	Much of the area within an 800 metre radius of the town centre that is zoned for medium or high density residential consists of detached, low-rise, recently completed dwellings. It is unlikely that these will intensify soon.
	Existing B5-zoned land is minimal in the Hills Shire and Blacktown LGAs and no remaining sites exist in Rouse Hill to support its business operations	There are therefore limited residentially-zoned areas surrounding the town centre that could accommodate the increased densities that the future Rouse hill station should be accommodating
	Record of zoning changes show there is a flexibility and popularity in rezoning employment lands to B5 lands. This is not surprising given the dual functioning nature of B5 zones in enabling job generating uses well as fulfilling out of centre commercial and retail purposes.	There is a significant parcel of already zoned B4 land between the study site and the town centre, bound by Commercial, Caddies and Windsor Roads. This could accommodate these proposed uses and is closer to the town centre. A development timeframe for this site is unclear.
	Little ability to accommodate around town centre but nearby industrial land to north provides opportunities	***Significant B4 zone between site and town centre, but few currently zoned residential areas able to accommodate higher densities due to lot sizes and recent low density development***

5.2 Conclusion

Both the current B5 zoning and proposed B4 zoning have merit on this site. In determining the most suitable land use, this report has assessed the supply and demand positions of B5 (using Bulky Goods lands as a proxy) and high density residential as a representative use for the current B4 mixed use proposal.

Both B5 and residential uses show clear future demand within the Hills Shire LGA. As Rouse Hill continues to cement its role as the strategic centre servicing north-western Sydney, supporting business uses allowed under B5 zoning (and in particular Bulky Goods Retail) would strengthen the centre's retail and service offering. However, the site's proximity to the soon-to-be-completed Sydney Metro Northwest and City station and the council's desire to retain and grow the mixed use nature of the town centre supports higher density residential development typologies.

Although less ideal due to the possibility of increased car travel from the town centre, B5 uses, including Bulky Goods Retail, could locate outside of Rouse Hill in nearby undeveloped industrial or business-zoned land (for instance Annangrove). It is acknowledged that this not only reduces the retail and service offering of Rouse Hill but also dilutes the retail clustering in the north-west. This does present the possibility of another centre growing outside of the established Strategic Centres model outlined in A Plan for Growing Sydney. Given the relatively small size of the study site however, this risk is low.

The opportunity to locate high density residential development in close proximity to the town centre can serve to increase activation in Rouse Hill. An increased density of residents in walking distance to the centre's retail offering is likely to improve its turnover.

Increased residential offering around the future train station aligns with prevailing planning principles seeking higher densities near mass transit modes. Although much of Rouse Hill's surrounding area is zoned for medium density residential, most has been recently developed as low density detached housing. Aside from the remaining B4 land between the study site and the town centre, there are few unencumbered opportunities to deliver higher density residential development.

It is noted that the site is currently adjacent a recently completed Masters Home Improvement Centre. This does lay the platform for a clustering of similar non-centre retail and local service uses to co-locate and the study site is both zoned for and suited to this use. Bulky Goods precincts anchored by a large tenant (such as Masters Home Improvement and Bunnings) tend to trade better than a disparate precincts. This is due to the draw that the anchor store provides flows on to smaller surrounding stores (although the opposite tends also to be the case with weaker performing anchor tenancies).

The current separation between the study site and the town centre is also noted, due to the lack of B4 take-up in the lots directly south of Commercial Road. Until this undeveloped B4 land is taken up, the study site's proposed high density residential and commercial use at lower levels would be at odds with surrounding building heights and adjacent land uses. An assessment of this, however, is outside the scope of this report.

This report suggests that the site's potential under current zoning and under the proposed B4 rezoning both have merit on this site. The removal of B5 from the site does provide potential future limitations with regards to the diversity of commercial uses that Rouse Hill can provide. Notwithstanding this, the value that increased residential densities around mass transit infrastructure and town centres has both on job accessibility and town centre vitality should not be underestimated. Although the removal of B5 zoning would remove the possibility of Bulky Goods Retail, its rezoning to B4 would still retain the ability to provide other commercial and retail uses that would support the town centre.

6 APPENDIX 1

Employment Lands Demand Model Assumptions

In this analysis, BLCs have been used as the preferred employment descriptor, rather than the ABS ANZSIC (Australia New Zealand Standard Industry Classification) codes. Unlike ANZSIC codes, the BLCs account for business categories that cut across land use types and zones within our study area. For example, for the manufacturing industry category, parts of a manufacturing business may be in heavy industrial areas, other parts may be in light industrial areas and jobs in head office/administrative functions in the same manufacturing firms may be in commercial areas (in offices). A detailed description of the BLC codes is provided in Appendix 1.

It assumes that each job will require a certain amount of floorspace per employee, and these will be distributed between certain floorspace types. For example, forty percent of construction jobs are assumed to be in local light industrial areas, 20 percent in light manufacturing and 35 percent in urban services. Detailed model assumptions are outlined in the table below. Only cells highlighted in green are used for this analysis.

TABLE 12. ASSUMPTIONS USED IN FORECASTING EMPLOYMENT LANDS DEMAND

	Employment lands Broad Land Use Categories						
Job industry	Business/ Office Parks	Bulky Goods Retail	Local light Ind. & urban support	Mfg.	Business/ Office Parks	Bulky Goods Retail	Other*
Agriculture, Forestry & Fishing	0%	0%	0%	0%	0%	0%	100%
Mining	0%	0%	0%	0%	0%	0%	100%
Manufacturing	2%	0%	20%	63%	0%	10%	5%
Utilities	0%	0%	0%	0%	0%	93%	7%
Construction	0%	0%	40%	20%	0%	35%	5%
Wholesale Trade	3%	0%	60%	0%	30%	5%	2%
Retail Trade	0%	20%	0%	0%	0%	0%	80%
Accommodation, Cafes & Restaurants	0%	0%	0%	0%	0%	0%	100%
Transport and Storage	0%	0%	60%	0%	37%	0%	3%
Information Media and Telecommunications	10%	0%	0%	0%	0%	50%	40%
Financial and Insurance Services	5%	0%	0%	0%	0%	0%	95%
Rental, Hiring and Real Estate Services	5%	0%	5%	0%	0%	0%	90%
Government, Administration & Defence	0%	0%	0%	0%	0%	0%	100%
Education	0%	0%	0%	0%	0%	0%	100%
Health Care and Social Assistance	0%	0%	0%	0%	0%	0%	100%
Arts and Recreation Services	0%	0%	0%	0%	0%	0%	100%
Other Services	0%	0%	15%	0%	0%	25%	60%
Floorspace per job (sqm)**	50	120	80	80	100	200	
Average floorspace ratio**	0.8	0.5	0.6	0.6	0.3	0.4	

Source: SGS calculations. 2015

*This refers to retail and non-industrial categories are not included in the employment land demand result. They are usually accommodated in other Business and Specialised Zones that do not necessarily align with employment lands definition.

**Floorspace per job ratio and average floorspace ratio are derived based on land audits and past research.

7 APPENDIX 2

Land use category conversion from ANZSIC to BLC

The table below presents a guide to interpretation of the SGS Broad Land Use Categories (BLCs).

TABLE 133. BROAD LAND USE CATEGORIES

BLC	BLC Name	Types of activities	Description
AST	Short Term Accommodation	Hotels and Motels (not including pubs), backpacker establishments	Good accessibility and visibility. Businesses in this category tend to be in high population density areas, on close to arterial infrastructure.
BP	Business Park	Integrated warehouse, storage, R&D, 'back-room' management and administration with up to 40% office component	Traditional business park environments offer large land parcels and attractive site aspects. Business park locations are heavily driven by strategic positioning with respect to arterial infrastructure. For business park land uses with higher industrial components proximity to population centres is not desirable.
D	Dispersed Activity	Primary and secondary education, lower level health, social and community services, trades construction, other 'nomads'	Institutions are dispersed but need to be accessible and well served by public transport.
FL	Freight and Logistics	Warehousing and distribution activities. Includes buildings with a number of docking facilities; 'hard stand' areas with trucks or goods awaiting distribution; and large storage facilities	Warehousing and distribution is a metro level issue with activities preferably locating close to air, sea and inter-modal inland ports, or with access to the motorway system
LL	Local Light	Car service and repair; joinery, construction and building supplies; and domestic storage	Wide range of businesses that service other business (components, maintenance and support) and Sub-regional populations. Need to be accessible for population centres
MH	Manufacturing Heavy	Large scale production activity. Likely to be characterised by high noise emission; emission stacks; use of heavy machinery; and frequency of large trucks	Industrial areas. Heavy manufacturing is in decline in Sydney, but will continue to cluster in some locations such as Wetherill Park, Campbelltown/ Ingleburn etc. There are strong arguments for collocation in terms of raw material delivery and to concentrate externalities (though impacts on surrounding uses are generally moderate).
ML	Manufacturing Light	Small scale production with lower noise and emission levels than heavy manufacturing	Industrial areas but with a lower requirement for distance from population than heavy manufacturing
O	Office	Office buildings that are independent (i.e. are not ancillary to another use on site) and likely to accommodate a significant number of administration staff	Typically require commercial centre locations. Need to have good accessibility for office workers.
RB	Retail Big Box	Large shopping complexes	Commercial centre locations. Require high visibility high traffic locations. Should be easily accessible with good public transport links

RBG	Retail Bulky Goods	Typically large, one-story buildings surrounded by car-parking,	Usually located out of centre and in high exposure (main road) locations.
RM	Retail Main Street	Main Street Retailing services.	Traditionally found in main street locations (e.g., supermarkets) and small cluster or strips of stores located next to a street or road
S	Special	Tertiary level education, health, and community services	Typically require strategic locations and needed in each sub-region.
US	Urban Services	Concrete batching, waste recycling and transfer, construction and local and state government depots, sewerage, water supply, electricity construction yards	These typically have noise dust and traffic implications and need to be isolated or buffered from other land uses. Needed in each sub-region

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SGS Economics & Planning

ENVIRONMENTAL INVESTIGATION SERVICES

REPORT

TO

ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

ON

PHASE 1 PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT

FOR

PROPOSED SHOPPING CENTRE DEVELOPMENT

AT

COMMERCIAL ROAD, ROUSE HILL

NOVEMBER 2008

REF: E22491K-RPT

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1 INTRODUCTION

Rouse Hill Commercial Road Development Company Pty Ltd commissioned Environmental Investigation Services (EIS), a division of Jeffery & Katauskas Pty Ltd (J&K), to undertake a Phase 1 preliminary environmental site assessment to assess the risk of potential contamination of the subsurface soils for a proposed shopping centre development at Commercial Road, Rouse Hill. The site is identified as Lot901 in DP1029336 and Lots 1021 and 1022 in DP1091484 (lot 1021 is duplicated) and at the time of this investigation was predominantly vacant with two residential properties located in the south-west corner of Lot 1021 in DP1091484 adjacent to Commercial Road and one residential property and garage located in the west and south-east section of lot 901 in DP1029336, respectively. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

The screening was undertaken generally in accordance with an EIS proposal of 10 October 2008 and written acceptance from Rouse Hill Commercial Road Development Company Pty Ltd of 10 October 2008.

EIS understands that the proposed development includes a shopping centre.

This report describes the investigation procedures and presents the results of the environmental site assessment, together with comments, discussion and recommendations.

2 ASSESSMENT OBJECTIVES

2.1 Investigation Objectives

The primary objective of the investigation was to assess the potential risk of significant widespread contamination of the site in relation to the suitability of the site for the proposed land use in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites NSW DECC (formerly the EPA) 1997* and the *State Environmental Planning Policy No.55 – Remediation of Land* (SEPP55).

2.2 Scope of Work

The scope of work undertaken to achieve the objective included:

1. Assessment of historical site use, including review of historical aerial photographs, land title records search, review of the deposited plan and development applications/building approvals held by Council.
2. Review of regional geology and groundwater conditions, including the location of registered groundwater bores.

3. Search of WorkCover records for licenses to store Dangerous Goods and investigation/remediation orders issued by the NSW DECC (EPA).
4. Design and implementation of a field sampling program.
5. Preparation of a report presenting the results of the assessment of potential soil contamination.

Field work for this investigation was undertaken on 15 October 2008.

2.3 Data Quality Objectives

The purpose of Data Quality Objectives is to develop criteria to assess the reliability of the laboratory data. The Data Quality Objectives established for this project are summarised below:

- Collection and analysis of 10% of the field samples as intra-laboratory duplicates.
- Relative percentage differences (RPDs) were calculated for the intra-laboratory duplicate. The RPD was calculated as the absolute value of the difference between the initial and repeat result divided by the average value, expressed as a percentage. The following acceptance criteria were used to assess the RPD results:
    - For results that were greater than 10 times the Practical Quantitation Limit (PQL) RPDs less than 50% were considered acceptable.
    - For results that were between 5 and 10 times PQL RPDs less than 75% were considered acceptable.
    - For results that were less than 5 times the PQL RPDs less than 100% were considered acceptable.
- Review of laboratory QA/QC data (including surrogate recovery, repeat analysis, duplicates, matrix spikes and method blanks).

The success of the Data Quality Objectives is based on assessment of the data set as a whole and not on individual acceptance or exceedance within the data set.

3 SITE INFORMATION

3.1 Site Description

The site identification details are summarised below:

Site Owner:	Norlex Holdings Pty Ltd
Site Address:	Commercial Road, Rouse Hill
Lot & Deposited Plan:	Lot901 in DP1029336 and Lots 1021 and 1022 in DP1091484 (lot 1021 is duplicated)
Local Government Authority:	Baulkham Hills Shire Council
Current Zoning:	Zone F
Site Area:	Approximately 50,000m^2
Geographical Location (MGA):	N: 6270710 E: 307140 (approximately)
Site Locality Plan:	Refer to Figure 1
Site Layout Plan	Refer to Figure 2

The investigation area comprises of three lots. Lots 1021 and 1022 in DP1091484 (Lot 1021 is duplicated) is located approximately 100m to the east of Windsor Road on the north side of Commercial Road. Lot 901 in DP1029336 is located at the south end of Resolution Place on the east side of Windsor Road. The north-east corner of lot 901 is bounded by Carnoustie Street. The investigation area is located within an undulating regional topographic setting. The west section of lots 1021 and 1022 is relatively flat and falls towards the north, south and north-east at slopes of approximately 5^0 in the east section of the site. Lot 901 falls towards the north-east at slopes of approximately 3^0 to 5^0 in the west and east sections of the site. The centre section of the site is relatively flat.

At the time of the investigation lots 1021 and 1022 was predominantly vacant. Two residential properties were located in the south-west corner of the investigation area fronted by Commercial Road. The two storey brick and fibro clad houses were adjoined by a car shelter. The houses did not appear in good condition and were surrounded by overgrown grass, trees and shrubs. A water tank was located at the rear of the dwellings. Overflow carparking facilities associated with the neighbouring Mean Fiddler Pub were located to the north of the residential properties in the west section of the site. The overflow carpark was surfaced with asphalt and gravel and appeared in poor condition. Overgrown grass and weeds surrounded the carpark area. Trees were aligned throughout the carpark and along the east and north boundaries. Waste bins occupied the carpark area in the south. An additional overflow carpark area was located north of the primary carpark area. Gravel, overgrown grass and weeds surfaced the carpark. The remainder of the site was vacant and generally vegetated with overgrown grass. A fence with associated bushes and weeds ran through the site from the east to the central section. A gravel surfaced driveway was located to the east of the residential properties. The driveway linked Commercial Road to the south section of the overflow carpark. A small stockpile consisting of wood

chips was located to the north-east of the driveway. A few scattered trees were located in the north section of the site.

Lot 901 was occupied by a one storey red brick residential property located at the west section of the site. A garage adjoined the house in the north. The property was surrounded by trees, shrubs and grass. A concrete paved driveway extended from Windsor Road to the front of the house. A water tank was located to the south-east of the house together with a septic tank located to the north-east of the building. A retaining wall associated with the 'Aldi' carparking facility, approximately 1m high bounded the property in the north-west. A metal and fibro garage occupied the east section of the site. A concrete paved area was located behind the garage. The remainder of the site was vegetated with overgrown grass.

In general the investigation area drained towards the east.

No major services were observed in the investigation areas.

The surrounding land uses for Lots 1021 and 1022 in DP1091484 were:
North: Lot 901 and residential properties.
West: The Mean Fiddler pub and associated carpark.
East: Paddock and residential properties.
South: Construction works associated with the new Rouse Hill Town Centre Development.

The surrounding land uses for Lot 901 in DP1029336 were:
North: Aldi supermarket and residential properties.
West: Windsor Road and residential properties.
East: Residential properties.
South: Lots 1021 and 1022 in DP1091484 and the Mean Fiddler pub with associated carpark.

3.2 Regional Geology and Hydrogeology

The 1:100,000 geological map of Penrith (Map 9030, 1:100,000 Department of Mineral Resources [now the Department of Primary Industries] – 1991 indicates the site to be underlain Ashfield shale of the Wianamatta Group typically consisting of dark-grey to black claystone, siltstone and fine sandstone siltstone laminate.

Department of Water and Energy (DWE) records were researched for the investigation and indicated that 44 registered groundwater bores lie within 1km of the site.

Information for one of the groundwater bores was provided. No information was available for the remaining groundwater bores. The details are summarised below:

Ref No	Approx. distance from site(m)	Approx. direction from site	Depth(m)	Registered Purpose
GW107600	1000	North-West	29.4	Monitoring Bore

The stratigraphy of the site is expected to consist of residual clayey soils overlying relatively shallow bedrock. Based on these conditions groundwater is not considered to be a significant resource in the immediate area of the site.

4 SITE HISTORY ASSESSMENT

4.1 Aerial Photographs

Aerial photographs were reviewed as part of the assessment of the site history. The following information was obtained:

1941 - Lots 1021 and 1022 located on the north side of Commercial Road were vacant and vegetated with scattered trees. The land may have been used for agricultural purposes.

Lot 901 located on the north-east side of Windsor Road was also vacant and may also have been used for agricultural purposes.

A large warehouse building was located to the south-west of lots 1021 and 1022 at the corner of Commercial and Windsor Roads. A second warehouse building was located to the south-east of lot 901. Predominantly vacant land vegetated with trees surrounded the investigation area.

1961 - Lots 1021 and 1022 were vacant and no longer vegetated with trees with the exception of a small number in the east section.

Lot 901 was vacant.

Additional buildings were located adjacent to the previous existing buildings at the corner of Windsor and Commercial Roads and south-east of lots 1021 and 1022. Trees had been cleared in the surrounding areas. A road south-west of the site on the other side of Windsor Road no longer existed. The remainder of the surrounding land was vacant.

1970 - Lots 1021 and 1022 were similar to the 1961 photograph with the exception of a small building located in the south-west section of the site.

Lot 901 appeared similar to the 1961 photograph with some exposed soil located in the south and central sections of the site.

The area to the south of lot 901 was vacant with circles of exposed soil and two narrow unpaved entrances extending from Windsor Road. Two new residential properties existed to the east of the investigation area together with a small number of scattered residential properties located to the west and south-west. A golf course appeared to have been constructed to the south of the site on the opposite side of Commercial Road. The remainder of the surrounding land appeared similar to the 1961 photograph.

1978 - Lots 1021, 1022 and 901 appeared similar to the 1970 photograph.

Small sheds or containers occupied the land south of lot 901. The surrounding area appeared similar to the 1970 photograph.

1986 - Additional building extensions had been added to the existing building located in the south-west section of lots 1021 and 1022. Small sheds and a small paved area were located in the north-west and west of the site, respectively. Dams were located in the north section of the site. The remainder of the site was vacant.

A new house was located in the west section of lot 901 together with a shed located in the south-east corner. A driveway extended from Windsor Road in the north-west corner of the site to the front of the house. Bright reflective circular areas to the east of the building have been associated with the construction of water and/or septic tanks. The remainder of the site was vacant.

Three buildings together with a small number of sheds were located in the land located to the south of lot 901. There was an increase in the number of apparent dwellings in the west and south-west. The remainder of the surrounding land was vacant.

1994 - The small sheds located in the north-west of lots 1021 and 1022 no longer existed. The paved area in the west had increased. The remainder of the site appeared similar to the 1986 photograph.

Lot 901 appeared similar to the 1986 photograph with the exception of a small shed located behind the existing garage in the south-east section of the site. The circular concrete paved areas were no longer visible.

The area to the west of the investigation area on the opposite side of Windsor Road showed further signs of development. The remainder of the surrounding area appeared similar to the 1986 photograph.

2005 - The majority of lots 1021 and 1022 were cleared. An unpaved driveway extended from Commercial Road adjacent to the east side of the existing buildings and terminated at the rear north-east corner of the dwellings. Two paved carpark areas were located in the west section of the site to the rear of the existing buildings. Exposed soil was located in the central section of the site. A concrete paved area was located in the south of the site adjacent to Commercial Road.

The small building behind the existing garage located at lot 901 no longer existed. The terminus of Resolution Place was located in the central-north section of the site.

New buildings and carparking facilities existed in the neighbouring site located at the corner of Commercial and Windsor Roads. The area to the south of lot 901 had been cleared and was vacant. There was a major increase in the number of residential developments located to the north and north-east of the investigation area. The surrounding area in general showed signs of further development.

4.2 Land Title Search

A limited historical land title search was performed on our behalf by Advance Legal Search Pty Ltd. Details are presented in Appendix C and a summary of the relevant information is provided below:

Lot901 in DP1029336

Registration Date	Proprietor
	(901/1029336)
2007 to date	Norlex Holdings Pty Limited
2001 – 2007	Balmoral Boardsailing School Pty limited
	(1/135801)
2000 – 2001	Balmoral Boardsailing School Pty limited
1999 – 2000	Annetta May Sandstrom
1997 – 1999	Annetta May Sandstrom
	Jack Leonard Sandstrom
	(1/30916)
1994 – 1997	Annetta May Sandstrom
	Jack Leonard Sandstrom
1988 – 1994	Jack Leonard Sandstrom, managing director
1985 – 1988	Jack Leonard Sandstrom, managing director
1980 – 1985	Annetta May Sandstrom, married woman
	Jack Leonard Sandstrom, managing director
1963 – 1980	Ronald John Halsey, interior decorator
	Lorna Margaret Halsey, married woman
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1949 – 1963	Stuart Lester Binns, dog fancier
1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor
1916 – 1916	John Seath, farmer
	Charles Seath, farmer
1900 – 1916	John Seath, farmer
	Charles Seath, farmer
	Jane Ann Seath, spinster

Lot 1021 in DP1091484

Registration Date	Proprietor
	(1021/1091484)
2005 to date	Brigid Theresa Tuite
	Laurence Oliver Tuite
2005 - 2005	Norlex Holdings Pty Limited
	(102/1058862)
2003 – 2005	Norlex Holdings Pty Limited
	(2/135801)

Registration Date	Proprietor
1998 – 2003	Norlex Holdings Pty Limited
1997 – 1998	Victor Francis Sammut
	Ruth Yvonne Sammut
	(2/30916)
1988 – 1997	Victor Francis Sammut, welder
	Ruth Yvonne Sammut, married woman
	(Lot 2 DP 30916 – CT Vol 9676 Fol 82)
1981 – 1988	Victor Francis Sammut, welder
	Ruth Yvonne Sammut, married woman
1979 – 1981	Tasmanian Board Mills Limited
1977 – 1979	Tamina Pty Limited
1964 – 1977	Cecil Eric Kroehnert, farmer
	Valerie Joan Kroehnert, married woman
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1949 – 1964	Stuart Lester Binns, dog fancier
1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor
1916 – 1916	John Seath, farmer
	Charles Seath, farmer
	(2/747364)
1998 – 2003	Norlex Holdings Pty Limited
1993 – 1998	Catherine Louise Schembri
	Joseph Schembri
1987 – 1993	Emanuel Schembri, signwriter
	Catherine Louise Schembri
	Joseph Schembri, signwriter
	(Lot 4 DP 30916 – CT Vol 9990 Fol 75)
1966 – 1987	Emanuel Schembri, signwriter
	Catherine Louise Schembri
	Joseph Schembri, signwriter
1965 – 1966	Stuart Lester Binns, dog fancier
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor
1916 – 1916	John Seath, farmer
	Charles Seath, farmer
1900 – 1916	John Seath, farmer

Registration Date	Proprietor
	Charles Seath, farmer Jane Ann Seath, spinster

Lot 1022 in DP1091484

Registration Date	Proprietor
	(1022/1091484)
2005 to date	Norlex Holdings Pty Limited
	(102/1058862)
2003 – 2005	Norlex Holdings Pty Limited
	(2/135801)
1998 – 2003	Norlex Holdings Pty Limited
1997 – 1998	Victor Francis Sammut Ruth Yvonne Sammut
	(2/30916)
1988 – 1997	Victor Francis Sammut, welder Ruth Yvonne Sammut, married woman
	(Lot 2 DP 30916 – CT Vol 9676 Fol 82)
1981 – 1988	Victor Francis Sammut, welder Ruth Yvonne Sammut, married woman
1979 – 1981	Tasmanian Board Mills Limited
1977 – 1979	Tamina Pty Limited
1964 – 1977	Cecil Eric Kroehnert, farmer Valerie Joan Kroehnert, married woman
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1949 – 1964	Stuart Lester Binns, dog fancier
1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor
1916 – 1916	John Seath, farmer Charles Seath, farmer
1900 – 1916	John Seath, farmer Charles Seath, farmer Jane Ann Seath, spinster
	(1/747364)
1987 – 2003	Norlex Holdings Pty Limited
	(Lot 3 DP 30916 – CT Vol 9676 Fol 83)
1983 – 1987	Norlex Holdings Pty Limited
1979 – 1983	Pakhurst Properties Pty Limited

Registration Date	Proprietor
1964 – 1979	Cecil Eric Kroehnert, farmer
	Valerie Joan Kroehnert, married woman
(1970 – 1987)	*(Various leases – see CT Vol 9676 Fol83)*
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1949 – 1964	Stuart Lester Binns, dog fancier
1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor
1916 – 1916	John Seath, farmer
	Charles Seath, farmer
1900 – 1916	John Seath, farmer
	Charles Seath, farmer
	Jane Ann Seath, spinster

The land search has indicated that a hotel proprietor (1947-1949), farmer (1900-1916, 1964-1979), welder (1981-1997) and Tasmanian Board Mills Limited (1979-1981) had owned sections of the land.

4.3 Council Records

A search of Development Application (DA) and Building Approval (BA) records/the property file held by Baulkham Hills Shire Council was undertaken on behalf of EIS. The results of the search included documents associated with the neighbouring Mean Fiddler Complex. No significant information was available regarding the investigation area.

4.4 WorkCover Database Records

A records search for licenses to store dangerous goods was undertaken on our behalf by WorkCover. The records did not indicate the existence of any licences, including underground storage tanks, at this site.

4.5 NSW EPA Records

A search of the NSW EPA on line database did not indicate the existence of any DECC (EPA) notices for the site under section 58 of the Contaminated Land Management Act (1997).

4.6 Assessment of Historical Information Integrity

The site history assessment has been obtained from: government records including the NSW land titles office, historical archives, historical aerial photographs, NSW WorkCover records. The veracity of the information from these sources is considered to be high.

Non verifiable anecdotal information has not been relied upon during assessment of historical site use. Therefore, there is considered to be a high level of integrity associated with information obtained with respect to historical use of the site.

4.7 Summary of Historical Site Use

The search of historical information has indicated the following:

- The early history of the site was probably associated with agriculture. Up until 1978 the site and surrounding area appeared to be predominately rural.
- The land title data indicates owners of the land included a welder, hotel proprietor and Tasmanian Board mills. However, there is no further evidence to indicate that these activities were undertaken at the site.
- There are no recorded notices listed on the NSW DECC CLM register and WorkCover have no records of underground storage tank licenses issued for the site.

4.8 Potential Contamination Sources

4.8.1 General Contamination Processes

Contamination of surface and subsurface soils generally arises from previous land use that can include petroleum hydrocarbon and warehouse storage, manufacturing processes and pesticide and fertiliser usage. Imported fill soils may contain contaminants derived from unknown sources. Migration of contaminants can occur in permeable subsurface soil or fill materials and via man-made and natural drainage systems. The extent of contamination migration is dependent on the hydro-geological environment and the chemical and physical characteristics of the contaminants. Contamination migration in clayey soils can be expected to be limited, whilst sandy soils are conducive to greater spatial migration.

Backfill to service trenches can form contamination migration pathways via poorly compacted or permeable backfill. Backfill may also be contaminated.

The general history of contamination of sites in the Sydney region indicates that analysis for heavy metals including lead, copper and zinc should be incorporated in the

schedule of laboratory testing. In addition screening tests should be performed on selected samples for polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCs), polychlorinated biphenyls (PCBs), petroleum hydrocarbons (TPH), monocyclic aromatic hydrocarbons (BTEX) and asbestos. Contaminants including cyanide, phenolic compounds, barium, beryllium, cobalt, manganese, vanadium and boron are generally associated with specific site industrial uses and so have not been considered in this investigation.

4.8.2 Potential Site Specific Contamination

- Potentially contaminated, imported fill material;
- Potentially asbestos containing building materials from past construction/demolition activities at the site;
- Pesticide usage associated with previous agricultural use of the land; and
- Localised hydrocarbon contamination associated with vehicle use and parking.

4.8.3 Site Specific Contaminants of Concern

The compounds identified as soil contaminants of concern at the subject site include:

- Heavy metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc;
- Total petroleum hydrocarbons (TPH);
- Monocyclic aromatic hydrocarbon (BTEX) compounds: Benzene, Toluene, Ethyl Benzene and Xylenes;
- Polycyclic aromatic hydrocarbons (PAHs) including Benzo(a)pyrene;
- Organochlorine pesticides (OCPs): Aldrin, dieldrin, DDT, chlordane, etc;
- Organophosphorus (OP) pesticides;
- Polychlorinated Biphenyls (PCBs); and
- Asbestos.

4.9 Potential Receptors

The main potential contamination receptors are considered to include:

- Caddies Creek and Ponds Creek located approximately 600m and 900m to the east and west of the site, respectively.
- Site visitors, workers and adjacent property owners, who may come into contact with contaminated soil and/or be exposed to contaminated dust arising from construction activity.
- Future site occupants.

4.10 Contaminant Laydown and Transport Mechanisms

At this site, mobile contaminants would be expected to move down to the rock surface and migrate laterally down-slope from the source. The movement of contaminants would be expected to be associated with groundwater flow and seepage at the top of the bedrock.

5 ASSESSMENT CRITERIA DEVELOPMENT

5.1 Regulatory Background

In 1997 the NSW Government introduced the *Contaminated Land Management Act, 1997* (CLM Act). This act, associated regulations, State Environmental Planning Policy (SEPP) No.55 – Remediation of Land (1998) and associated NSW DECC (EPA) guidelines, were designed to provide uniform state-wide control of the management, investigation and remediation of contaminated land.

Prior to granting consent for any proposed rezoning or development, SEPP55 requires the consent authority to:

- consider whether the land is contaminated;
- consider whether the site is suitable, or if contaminated, can be made suitable by remediation, for the proposed land use;
- be satisfied that remediation works will be undertaken prior to use of the site for the proposed use.

Should the assessment indicate that the site poses a risk to human health or the environment, remediation of the site is required prior to commencement of the proposed development works. SEPP55 requires that the relevant local council be notified of all remediation works, whether or not development consent is required. Where development consent is not required, 30 days written notice of the proposed works must be provided to council. Details of validation of remediation work must also be submitted to Council within one month of completion of remediation works.

The consent authority may request that a site audit be undertaken during, or following the completion of the site assessment process. Under the terms of the CLM Act the NSW DECC (EPA) Site Auditor Scheme was developed to provide a system of independent review for assessment reports. An accredited Contaminated Site Auditor is engaged to review reports prepared by suitably qualified consultants to ensure that the investigation has been undertaken in accordance with the guidelines and confirm that the sites are suitable for their intended use.

Section 59(2) of the CLM Act states that specific notation relating to contaminated land issues must be included on S.149 planning certificates prepared by Council where the land to which the certificate relates is:

- within an investigation or remediation area.
- subject to an investigation or remediation order by the DECC (EPA).
- the subject of a voluntary investigation or remediation proposal.
- the subject of a site audit statement.

Submission of contaminated site investigation and validation reports to council as part of rezoning or development application submissions may also result in notation of actual or potential site contamination on future S.149 certificates prepared for the site.

Section 60 of the CLM Act sets out a positive duty on an owner, or person whose activities cause contamination, to notify the DECC if they are aware that the contamination presents a significant risk of harm.

Off-site disposal of fill, contaminated material and excess soil/rock excavated as part of the proposed development works is regulated by the provisions of the Protection of the Environment Operations Act (POEO Act 1997) and associated regulations and guidelines including the *Waste Classification Guidelines Part 1: Classifying Waste. DECC NSW 2008.* All materials should be classified in accordance with these guidelines prior to disposal.

Section 143 of the *Protection of the Environment Operations Act 1997* states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner.

5.2 Soil Contaminant Threshold Concentrations

The soil investigation levels adopted for this investigation are derived from the NSW DEC (now DECC) document *Guidelines for the NSW Site Auditor Scheme (2nd Edition) 2006* and the National Environmental Protection Council document *National Environmental Protection (Assessment of Site Contamination) Measure 1999.* The contaminant thresholds listed below are levels at which further investigation and evaluation is required to assess whether the site is considered suitable for the proposed urban land use.

To accommodate the range of human and ecological exposure settings, a number of generic settings are used on which the Health based Investigation Levels (HILs) can be

based. Four categories of HILs are adopted for urban site assessments. Contaminant levels for a standard residential site with gardens and accessible soil (Column A in Table A-1) are based on protection of a young child resident at the site. The remaining categories (Columns D to F) present alternative exposure settings where there is reduced access to soil or reduced exposure time. These categories include residential land use with limited soil access, recreational and public open space and commercial/industrial use. Where the proposed land use will include more than one land use category (eg. mixed residential/commercial development) the exposure setting of the most "sensitive" land use is adopted for the site.

Threshold concentrations for petroleum hydrocarbon contaminants including total petroleum hydrocarbons (TPH) and monocyclic aromatic hydrocarbon (BTEX) compounds have previously been established in the *NSW DECC (EPA) Contaminated Sites: Guidelines for Assessing Service Station Sites* (1994) publication and this document is referenced in the 1998 Site Auditor Guidelines. Heavy fraction petroleum hydrocarbon aliphatic/aromatic component threshold concentrations have also been introduced in the *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (NEPC Guidelines).

The *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (NEPC Guidelines) do not provide numeric guidelines for the assessment of asbestos in soil. NSW DECC (EPA) advice (2006) has indicated that consultants should use their 'professional judgement' regarding determination of appropriate investigation and remediation levels for asbestos in soils; however the NSW DECC (EPA) have not published numerical guidelines for the assessment of asbestos in subsurface soils.

The WorkCover publication *Working with Asbestos Guide* (NSW WorkCover 2008) states that, where buried asbestos in encountered, "A competent occupational hygienist should assess the site to determine:

- If asbestos material is bonded or friable
- The extent of asbestos contamination
- Safe work procedures for the remediation of the site"

"Any asbestos cement products that have been subjected to weathering, or damaged by hail, fire or water blasting are considered to be friable asbestos and an asbestos removal contractor with a WorkCover license for friable asbestos removal is required for its removal". Under the *NSW Occupational Health and Safety (OHS) Regulations 2001* and WorkCover requirements all necessary disturbance works associated with

asbestos containing materials must be conducted by a licensed AS-1 Asbestos Removal Contractor.

5.2.1 Site Assessment Criteria for Soil Contaminants

The 'commercial/industrial' exposure setting has been adopted for this assessment and the appropriate soil criteria are listed in the following table:

Site Soil Assessment Criteria (mg/kg)		
Contaminant	**HIL Column F Exposure Setting**	**Guidelines for Assessing Service Station Sites (1994)**
Inorganics		
Arsenic (total)	500	
Cadmium	100	
Chromium (III)	60%	
Copper	5000	
Lead	1500	
Mercury (inorganic)	75	
Nickel	3000	
Zinc	35000	
Organic Contaminants		
TPH (C_6-C_9)		65
TPH (C_{10}-C_{36})		1000
Benzene		1
Toluene		1.4
Ethylbenzene		3.1
Total Xylenes		14
Total PAHs	100	
Benzo(a)pyrene	5	
Aldrin + Dieldrin	50	
Chlordane	250	
DDT + DDD + DDE	1000	
Heptachlor	50	
PCBs (Total)	50	

For the purpose of off-site disposal, the classification of soil into 'General Solid Waste', "Restricted Solid Waste" and 'Hazardous Waste" categories is defined by chemical contaminant criteria outlined in *Waste Classification Guidelines Part 1: Classifying Waste. DECC NSW 2008.* This investigation did not include a waste classification assessment.

5.3 Evaluation of Soil Analysis Data and Contaminant Threshold Concentrations

Assessment of the soil analytical data using the soil contaminant threshold concentrations has been undertaken in accordance with the methodology outlined in the *National Environmental Protection (Assessment of Site Contamination) Measure (1999) Schedule 7(a) Soil Investigation Levels.*

The following criteria have been adopted for assessment of the analytical data:

- For a site to be considered suitable for the proposed land use the individual contaminant concentrations should be less than the applicable contaminant threshold concentration.
- The relevance of localised elevated values must also be considered and should not be obscured by consideration only of the arithmetic mean of the results. The results must also meet the following criteria:
  - the standard deviation of the results must be less than 50% of the soil assessment criteria; and
  - no single value exceeds 250% of the relevant soil assessment criteria.

- Where the concentration of each contaminant is less than the applicable contaminant threshold concentration (site assessment criteria) in all samples, UCL calculations may not be required and the suitability of the site for the proposed use may be based solely on the individual analytical results

Where contamination results exceed the site criteria developed above a method of remediating the site is to physically and selectively remove the contamination hotspots from the site. This process should be continued until analysis of the data meets the above criteria. Validation of the remediated site is generally required to demonstrate that the site is suitable for the proposed land use.

6 ASSESSMENT PLAN AND METHODOLOGY

The *NSW DECC (EPA) Sampling Design Guidelines (1995)* for contaminated site investigations state that samples should be obtained from a minimum of 85 evenly spaced sampling points for a site of this size (approximately 70,500m^2). Samples were obtained from 11 sampling locations for this investigation. This density is approximately 15% of the minimum sampling density.

The boreholes were drilled on a systematic grid with a spacing of up to 30m between sampling points. A systematic sampling plan was considered most appropriate for this investigation as:

- no specific potential contaminant sources were identified by the available site history.
- the distribution of contamination is expected to be associated with imported potentially contaminated fill material and is therefore likely to be random.

Sampling was not undertaken beneath the existing buildings at the site as access was not possible during the field investigation.

7 INVESTIGATION PROCEDURE

7.1 Subsurface Investigation and Soil Sampling Methods

Subsurface investigations were undertaken using the Ezi Probe drill rig equipped with push tubes. Soil samples were obtained from the push tubes directly, which were disposed off after each use. Sampling personnel used disposable Nitrile gloves during sampling activities.

Soil samples were obtained at various depths, based on observations made during the field investigation. All samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. During the investigation, soil samples were preserved by immediate storage in an insulated sample container with ice in accordance with AS 4482.1-2005 and AS 4482.2-1999 as summarised in the following table:

Analyte	Preservation	Storage
Heavy metals	Unpreserved glass jar with Teflon lined lid	Store at <4°, analysis within 28 days (mercury and Cr[VI]) and 180 days (other metals).
VOCs (TPH/BTEX)		Store at <4°, nil headspace, extract within 14 days, analysis within forty days
PAHs, OC/PCBs		
Asbestos	Sealed plastic bag	None

Each sample was labelled with a unique job number, the sampling location, sampling depth and date. All samples were recorded on the borehole logs presented in Appendix A and on the chain of custody (COC) record presented in Appendix B.

On completion of the fieldwork, the samples were delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody procedures. Detailed EIS field sampling protocols are included in Appendix D.

7.1.1 Photoionisation Detector (PID) Screening

A portable PID was used in this investigation to assist with selection of samples for laboratory hydrocarbon (TPH/BTEX) analysis. The PID is sensitive to volatile organic compounds. The sensitivity of the PID is dependent on the organic compound and varies for different mixtures of hydrocarbons. Some compounds give relatively high readings and some can be undetectable even though present in identical concentrations. The portable PID is best used semi-quantitatively to compare samples contaminated by the same hydrocarbon source.

The PID is calibrated before use by measurement of an isobutylene standard gas. All the PID measurements are quoted as parts per million (ppm) isobutylene equivalents.

Photoionisation detector (PID) screening of detectable volatile organic compounds (VOC) was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled glass jar samples following equilibration of the headspace gases. The PID headspace data is included on the COC documents.

7.2 Laboratory Analysis

7.2.1 Soil Samples

Analysis of soil samples was undertaken by NATA registered laboratories using analytical methods detailed in the Schedule B(3) NEPC (1999) Guideline on Laboratory Analysis of Potentially Contaminated Soils. Laboratory analysis was undertaken by Envirolab Services Pty Ltd (NATA Accreditation No. 2901).

For this investigation selected soil samples were analysed for contaminants using the following laboratory techniques:

- Heavy metals – Nitric acid digestion. Analysis by ICP.
- Low level mercury – cold vapour AAS.
- OC pesticides and PCBs – Extracted with acetone/hexane. Analysis by GC/ECD.
- PAHs – Soil extracted with dichloromethane/acetone. Analysis by GC/MS.
- TPH (volatile) – Soil extracted with methanol. Analysis by P&T GC/PID.
- TPH – Soil extracted with dichloromethane/acetone. Analysis by GC/FID.
- BTEX – Soil extracted with methanol. Analysis by P&T PID. Confirmed with column flame ionisation detection.
- Asbestos – Polarizing light microscopy.

8 RESULTS OF INVESTIGATION

8.1 Subsurface Conditions

Site details and borehole locations are shown on Figure 2. For details of the subsurface soil profile reference should be made to the borehole logs in Appendix A. Eleven boreholes were drilled for this investigation. A summary of the subsurface conditions encountered by the boreholes is presented below:

Pavement

Asphaltic pavement was encountered in borehole BH3. The pavement was in poor condition with gravel patches observed throughout the pavement.

Fill

Fill material generally consisting of clayey silt, silty clay, sandy silt and silt with varying proportions of fine to medium grained sand, root fibres, extremely weathered shale, clay nodules and igneous, shale, ironstone and sandstone gravel were encountered in the 11 boreholes. The depth of fill material was approximately 0.3m in boreholes BH1, BH3 and BH5 to BH8, 0.8m in boreholes BH4 and BH9, and ranged from 1.32m to 2.5m in boreholes BH2, BH10 and BH11.

Natural Soils

Clayey silt and silty clayey sand was encountered underlying the fill material in boreholes BH1 and BH5. The silty clayey sand was underlain by silty clay in borehole BH5 and extended to a termination depth of 0.7m. Silty clay was encountered in the remainder of the boreholes and extended to an approximate termination depth of 1.5m.

Bedrock

Extremely weathered shale was encountered underlaying the fill material in boreholes BH2, BH3 and BH10 to termination depths ranging from 1.5m to 2.6m. In boreholes BH1 and BH8 the natural soil was underlain by extremely weathered shale and extended to the termination depths of approximately 1.5m. The shale generally consisted of iron indurated bands with grey-brown and orange-brown colourings.

8.2 Laboratory Results - Soil

The laboratory analysis results for soil samples are summarised in Table B to Table C inclusive and analysis reports are presented in Appendix B. The site soil assessment criteria for this investigation are specified in the "Site Assessment Criteria for Soil

Contaminants" section earlier in this report. The results of the analyses are summarised below.

Heavy Metals

Eleven selected fill soil samples were analysed for heavy metals. The results of the analyses were below the site assessment criteria.

The results of all analyses were less than the SCC1 criteria outlined in the Waste Classification Guidelines Part 1: Classifying Waste DECC NSW 2008.

Petroleum Hydrocarbons (TPH) and Monocyclic Aromatic Hydrocarbons (BTEX)

PID soil sample headspace readings were all below 0.1 ppm equivalent isobutylene. These results indicate a lack of PID detectable volatile organic contaminants. Eleven selected fill soil samples were analysed for petroleum hydrocarbons and BTEX compounds. The results of the analyses were below the site assessment criteria.

The results of all analyses were less than the relevant CT1 criteria outlined in the Waste Classification Guidelines Part 1: Classifying Waste DECC NSW 2008.

Polycyclic Aromatic Hydrocarbons (PAHs)

Eleven selected fill soil samples were analysed for a range of PAHs including Benzo(a)pyrene. The results of the analyses were less than the site assessment criteria.

The results of all analyses were less than the relevant CT1 criteria outlined in the Waste Classification Guidelines Part 1: Classifying Waste DECC NSW 2008.

Organophosphorus (OP), Organochlorine (OC) Pesticides, and Polychlorinated Biphenyls (PCBs)

Eleven selected fill soil samples were analysed for a range of OC/OP pesticides and PCBs. The results of the analyses were below laboratory practical quantitation limit and less than the site assessment criteria.

The results of all analyses were less than the SCC1 criteria outlined in the Waste Classification Guidelines Part 1: Classifying Waste DECC NSW 2008.

Asbestos

Eleven selected fill soil samples were screened for the presence of asbestos fibres. The results of the analyses indicated that asbestos fibres were not encountered within the samples and no respirable fibres were detected.

8.3 Assessment of Analytical QA/QC

The objective of the assessment of the laboratory QA/QC is to ensure that the sample data is reliable. All laboratory reports for project E22491K have been checked and issued as final by Envirolab Services Pty Ltd, NATA Accreditation No. 2901, Report number: 23481.

The objective of the assessment of the laboratory QA/QC is to ensure that the sample data is reliable. All laboratory reports for project E22491K have been checked and issued as final by Envirolab Services Pty Ltd, NATA Accreditation No. 2901, Report number: 23481.

Chain of custody documentation and sample receipt advice notices were signed and dated by Envirolab Services laboratory stating that all samples were received cool, in good order and in suitable containers. Compliance of holding times was met for all analyses undertaken by the above laboratory. EIS and laboratory QA/QC procedures for the site screening are summarised in the following table:

Contaminant	QA/QC Procedure						
	Total no. of Samples	Intra-lab Duplicate	Repeat Analysis	Matrix Spike	LCS	Lab Blank	Surrogate Spike
Heavy metals	11	1	2	2	2	1	-
TPH	11	1	2	2	2	1	11
BTEX	11	1	2	2	2	1	11
PAH	11	1	2	2	2	1	11
OCP	11	1	2	2	2	1	11
OP	11	1	2	2	2	1	11
PCB	11	1	2	2	2	1	11

Dup 2 is the Inter-laboratory duplicate for BH11 (0.0m-0.5m).

The RPD results for the field QA/QC duplicate samples are summarised in Table C. The following comments are an overall summary of the quality of the analytical component of the project:

1. Sample integrity and container requirements were documented as satisfactory.

2. All sample extraction analyses were performed within the required holding times.
3. Matrix spike, laboratory control sample (LCS) and surrogate recovery values indicated that the laboratory accuracy was very good, and that no outliers were reported.
4. Laboratory duplicate RPD results indicated that the sample precision was acceptable.
5. The intra -laboratory RPD values indicated that field precision was acceptable.

The QA/QC data reported by Envirolab Services laboratory for the documented soil samples were assessed to be of sufficient quality to be considered acceptable for the environmental assessment of EIS project E22491K.

The QA/QC data including the RPD results are considered to meet the Data Quality Objectives developed for this project.

9 COMMENTS AND RECOMMENDATIONS

The Phase 1 preliminary environmental site assessment undertaken for the proposed commercial development at Commercial Road, Rouse Hill, was designed to assess the risk of potential contamination of the sub-surface soils at the site.

EIS understands that the proposed development includes a shopping centre.

The site assessment included performance of a site inspection, review of historical site use, including examination of regional aerial photographs and review of geology and groundwater conditions. Historical information and inspection of the site and surrounding areas suggested that some of the land may have been used for agricultural purposes since at least 1900. The search also indicated that a hotel proprietor (1947-1949), welder (1981-1997) and Tasmanian Board Mills Limited (1979-1981) had owned parts of the site.

Based upon the site history and site inspection potential contamination sources at the site were considered to include:

- Potentially contaminated, imported fill material;
- Potentially asbestos containing building materials from past construction/demolition activities at the site;
- Pesticide usage associated with previous agricultural use of the land; and
- Localised hydrocarbon contamination associated with vehicle use and parking.

Limited soil/fill sampling was subsequently undertaken on the basis of a relatively uniform exploration spacing. The purpose of the sampling and analysis was to undertaken a preliminary screening to identify any widespread significant contamination issues.

9.1 Soil Contamination

The results of the laboratory tests on selected soils samples covered a range of contaminants commonly encountered in the Sydney region. Elevated levels of contaminants were not detected in the samples analysed. All results were less than the appropriate Health Investigation Levels.

The investigation undertaken by EIS included the analysis of eleven surficial soil samples for the presence of asbestos fibres using NATA accredited microscopic screening techniques. Asbestos, neither apparent to the naked eye nor apparent using microscopic techniques were not detected within the samples. The scope of work undertaken was designed to assess widespread surficial contamination and has not included an exhaustive assessment of the site for the presence of small scale asbestos contamination. EIS adopts no responsibility for small scale or buried asbestos features at the site which may be encountered during future earth or construction works at the site.

9.2 Waste Classification

Further analysis of fill samples for waste classification will be required if off-site disposal of excess soil is undertaken as part of the proposed development. Fill and contaminated soil disposal costs are significant and may affect project viability. These costs should be assessed at an early stage of the project development to avoid significant future unexpected additional costs.

Provided that no significant contamination issues are encountered in any subsequent investigations the underlaying natural soil may be able to be classified as Virgin Excavated Natural Material (VENM). The VENM may be suitable for reuse on another site, however the material should be assessed for geotechnical suitability and may not be suitable for some landscaped areas. Where doubt exists about the difference between fill and VENM material an environmental/geotechnical engineer should be contacted.

9.3 Groundwater

Groundwater was not encountered in the boreholes drilled for this project (to a maximum depth of 2.6m). Groundwater is not considered to be a significant resource in the area and on this basis has not been considered in any further detail for this assessment.

9.4 Conclusions

The boreholes drilled for the investigation have enabled an assessment to be made of the existence of significant, large quantities of contaminated soils. The conclusions based on this investigation are that, while major contamination of the site is not apparent, problems may be encountered with smaller scale features between boreholes. EIS adopts no responsibility whatsoever for any problems such as underground storage tanks, buried items or contaminated material that may be encountered between sampling locations at the site. The proposed construction activities at the site should be planned on this basis, and any unexpected problem areas that are encountered between boreholes should be immediately inspected by experienced environmental personnel. This should ensure that such problems are dealt with in an appropriate manner, with minimal disruption to the project timetable and budget.

During earthworks, the site should be inspected by experienced environmental personnel to assess any unexpected conditions or subsurface facilities that may be discovered between investigation locations. This should facilitate appropriate adjustment of the works programme and schedule in relation to the changed site conditions.

Based on the scope of work undertaken for this assessment EIS consider that the site can be made suitable for the proposed development provided that:

- An additional investigation is undertaken to increase the sampling density to meet the minimum sampling density recommended in the NSW DECC (EPA) Sampling Design Guidelines, 1995;
- A waste classification is assigned to any excavated soil that may require off-site disposal; and
- A hazardous building material survey is undertaken on all on-site structures prior to demolition.

Normal good engineering site management practice including control of run-off and dust suppression is recommended during earthworks and construction.

10 LIMITATIONS

The conclusions developed in this report are based on site conditions which existed at the time of the site assessment and the scope of work outlined previously in this report. They are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, and visual observations of the site and vicinity, together with the interpretation of available historical information and documents reviewed as described in this report.

This investigations for this assessment and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined previously in this report.

Where information has been provided by third parties, EIS has not undertaken any verification process, except where specifically stated.

EIS has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination.
Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes.
Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work.

EIS accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1970 constructed buildings or fill material at the site.

EIS have not and will not make any determination regarding finances associated with the site.

Changes in the proposed or current site use may result in remediation or further investigation being required at the site.

During construction at the site, soil, fill and any unsuspected materials that are encountered should be monitored by qualified environmental and geotechnical engineers to confirm assumptions made on the basis of the limited investigation data,

and possible changes in site level and other conditions since the investigation. Soil materials considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. Copyright in this report is the property of EIS. EIS has used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report.

Should you require any further information regarding the above, please do not hesitate to contact us.

Yours faithfully
For and on behalf of
ENVIRONMENTAL INVESTIGATION SERVICES

Rose Healy
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ABBREVIATIONS

AAS	Atomic Absorption Spectrometry
ADWG	Australian Drinking Water Guidelines
AGST	Above Ground Storage Tank
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
ASS	Acid Sulfate Soil
B(a)P	Benzo(a)pyrene
BH	Borehole
BTEX	Benzene, Toluene, Ethyl benzene, Xylene
COC	Chain of Custody documentation
CLM	Contaminated Land Management
DECC	Department of Environment and Climate Change (formerly DEC and EPA)
DNR	NSW Department of Natural Resources (now split between DWE and DECC)
DWE	NSW Department of Water and Energy
DP	Deposited Plan
DQO	Data Quality Objective
EC	Electrical Conductivity
EPA NSW	Environment Protection Authority, New South Wales (now part of DECC)
GC-ECD	Gas Chromatograph-Electron Capture Detector
GC-FID	Gas Chromatograph-Flame Ionisation Detector
GC-MS	Gas Chromatograph-Mass Spectrometer
HIL	Health Based Investigation Level
HM	Heavy Metals
ICP-AES	Inductively Couple Plasma – Atomic Emission Spectra
NATA	National Association of Testing Authorities, Australia
NEPC.	National Environmental Protection Council
NHMRC	National Health and Medical Research Council
OCPs	Organochlorine Pesticides
OHS (OH&S)	Occupational Health and Safety
PAH	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PID	Photo-ionisation Detector
PPIL	Provisional Phyto-toxicity Investigation Levels
PQL	Practical Quantitation Limit
P&T	Purge & Trap
RAP	Remedial Action Plan
QA/QC	Quality Assurance and Quality Control
RPD	Relative Percentage Difference
SEPP	State Environmental Planning Policy
sPOCAS	suspension Peroxide Oxidation Combined Acidity and Sulfate
SPT	Standard Penetration Test
SWL	Standing Water Level
TCLP	Toxicity Characteristic Leaching Procedure
TP	Test Pit
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
UCL	Upper Confidence Limit
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WP	Work Plan

REFERENCE DOCUMENTS

- ANZECC/ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (and updates).
- NSW DEC (2007) (now DECC) Guidelines for the Assessment and Management of Groundwater Contamination.
- ASSMAC (1998) (Acid Sulfate Soils Management Advisory Committee) Acid Sulfate Soil Manual.
- Australian Government, National Occupational Health and Safety Commission (2005) Code of Practice for the Safe Removal of Asbestos.
- Australian Government, National Occupational Health and Safety Commission (2005) Code of Practice for the Management and Control of Asbestos in Workplaces.
- Australian Petroleum Institute Code of Practice (CP22) Removal and Disposal of Underground Storage Tanks.
- Australian Standard (2004) Storage and Handling of Flammable and Combustible Liquids. AS1940-2004.
- DUAP/NSW EPA (1998) (now NSW Department of Planning / NSW Department of Environment and Climate Change (DECC) incorporating the EPA) Managing Land Contamination: Planning Guidelines SEPP 55 - Remediation of Land.
- Dutch Ministry of Housing, Spatial Planning and the Environment (1994) Environmental Quality Standards in the Netherlands.
- NEPM. (1999) National Environmental Protection (Assessment of Site Contamination) Measure (NEPC. Guidelines).
- NSW EPA (1994) (now NSW DECC) Contaminated Sites: Guidelines for Assessing Service Station Sites.
- NSW EPA (1995) (now NSW DECC) Contaminated Sites: Sampling Design Guidelines.
- NSW EPA (1996) (now NSW DECC) Guidelines for Solid Waste Landfills.
- NSW EPA (1997) (now NSW DECC) Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites.
- NSW DEC (2006) (now DECC) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition).
- NSW EPA (1999) (now NSW DECC) Contaminated Sites: Guideline son Significant Risk of Harm and the Duty to Report.
- NSW DECC (2008) Waste Classification Guidelines Part 1: Classifying Waste and Part 2: Immobilisation of Waste.
- NSW Legislation (1948) Rivers and Foreshores Improvement Act.
- NSW Legislation (1975) Dangerous Goods Act.
- NSW Legislation (1994) Environmental Planning and Assessment Act (EP&AA) and associated Regulations.
- NSW Legislation (1997) Contaminated Land Management Act.
- NSW Legislation (1997) Protection of the Environment Operations Act No156 which includes Schedule 2 of the Clean Waters Regulations 1972 made under the Clean Waters Act (1970).
- NSW Legislation (2000) Occupational Health and Safety Act.
- NSW Regulation (2001) Occupation Health and Safety Regulation.
- NSW Regulation (1999) Abandoning Underground Storage Tanks for Flammable and Combustible Liquids (Ref: DG310 October 1999).
- NSW WorkCover (2008) Working With Asbestos Guide.
- NSW WorkCover Code of Practice (2005) Storage and Handling of Dangerous Goods.
- US EPA (2004) Region 9 Preliminary Remediation Goals.

- NSW Government, Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation (2008).

TABLE A-1
ENVIRONMENTAL AND HEALTH-BASED SOIL INVESTIGATION LEVELS (mg/kg)

Substances	Health Investigation Levels (HILs)[1]				Provisional Phyto-toxicity Investigation Levels (PPILs)[1]	NSW EPA Guidelines for Assessing Service Station Sites[2]	Back-ground Ranges[1]
	A	D	E	F			
	'Standard' residential with garden/ accessible soil (home-grown produce contributing less than 10% of vegetable and fruit intake; no poultry); includes children's day-care centres, kindergartens, preschools and primary schools	Residential with minimal opportunities for soil access: includes dwellings with fully and permanently paved yard space such as high-rise apartments and flats	Parks, recreational open space and playing fields: includes secondary schools	Commercial/industrial: includes premises such as shops and offices as well as factories and industrial sites			
METALS/METALLOIDS							
Arsenic (total)	100	400	200	500	20		1-50
Barium					300		100-3000
Beryllium	20	80	40	100			
Cadmium	20	80	40	100	3		1
Chromium(III)	12%	48%	24%	60%	400		
Chromium(VI)	100	400	200	500	1		
Chromium (total)							5-1000
Cobalt	100	400	200	500			1-40
Copper	1000	4000	2000	5000	100		2-100
Lead	300	1200	600	1500	600		2-200
Manganese	1500	6000	3000	7500	500		850
Methyl mercury	10	40	20	50			
Mercury (inorganic)	15	60	30	75	1		0.03
Nickel	600	2400	600	3000	60		5-500
Vanadium					50		20-500
Zinc	7000	28000	14000	35000	200		10-300
ORGANICS							
Aldrin + Dieldrin	10	40	20	50			
Chlordane	50	200	100	250			
DDT + DDD + DDE	200	800	400	1000			
Heptachlor	10	40	20	50			
Polycyclic aromatic hydrocarbons (PAHs)	20	80	40	100			
Benzo(a)pyrene	1	4	2	5			
Phenol	8500	34000	17000	42500			
PCBs (total)	10	40	20	50			
Petroleum Hydrocarbon Components (constituents):							
>C16 - C35 Aromatics	90	360	180	450			
>C16 - C35 Aliphatics	5600	22400	11200	28000			
>C35 Aliphatics	56000	224000	112000	280000			
C6-C9						65	
C10-C40						1000	
Benzene						1	
Toluene						1.4	
Ethyl Benzene						3.1	
Total Xylenes						14	
OTHER							
Boron	3000	12000	6000	15000			
Cyanides (complexed)	500	2000	1000	2500			
Cyanides (free)	250	1000	500	1250			
Phosphorus					2000		
Sulfur					600		
Sulfate					2000		

Reference should be made to the following guidelines for further details (as referenced in the above table):

1 National Environment Protection (Assessment of Site Contamination) Measure - 1999, National Environment Protection Council. Human exposure settings based on land use have been established for HILs and details are outlined in Taylor and Langley 1998.

2 NSW DECC (formerly EPA) Guidelines for Assessing Service station Sites - 1994.

TABLE B
SUMMARY OF LABORATORY TEST DATA
SITE CHARACTERISATION ASSESSMENT
All data in mg/kg unless stated otherwise

ANALYTE	Sample Description	HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES					PCBs	PETROLEUM HYDROCARBONS								Asbestos Fibres
																		Total Petroleum Hydrocarbons				Benzene	Toluene	Ethyl Benzene	Total Xylenes	
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Aldrin and Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor	Total OP Pesticides @		C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}					
PQL - Envirolab Services		4.0	1.0	1.0	1.0	1.0	0.1	1.0	1.0	-	0.05	0.1	0.1	0.1	0.1	0.1	0.1	25	50	100	100	1.0	1.0	1.0	3.0	
Guideline concentration-HIL *		500	100	60%	5000	1500	75	3000	35000	100	5	50	250	1000	50	0.1^^	40	65 ^		1000 ^		1 ^	1.4 ^	3.1 ^	14 ^	
SAMPLE (Depth in metres)																										
BH1 (0.0-0.1)	Fill	13	LPQL	4	49	11	LPQL	11	56	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH2 (0.0-0.2)	Fill	7	0.7	12	70	24	LPQL	49	230	2.5	0.2	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH3 (0.0-0.3)	Fill	LPQL	LPQL	16	74	5	LPQL	140	56	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH4 (0.4-0.6)	Fill	11	LPQL	10	13	24	LPQL	2	7	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH5 (0.0-0.3)	Fill	5	LPQL	15	28	19	LPQL	26	47	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH6 (0.0-0.3)	Fill	9	LPQL	19	7	19	LPQL	6	17	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH7 (0.0-0.3)	Fill	10	LPQL	21	13	25	LPQL	9	33	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH8 (0.0-0.3)	Fill	9	LPQL	24	17	29	LPQL	9	35	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH9 (0.5-0.7)	Fill	13	LPQL	23	19	35	LPQL	8	53	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH10 (0.0-0.5)	Fill	9	LPQL	15	24	27	LPQL	12	56	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
BH11 (0.0-0.5)	Fill	8	LPQL	14	28	28	LPQL	11	65	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	Not Detected
Total no. of samples		11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Maximum Value		13	0.7	24	74	35	0	140	230	2.5	0.2	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NC

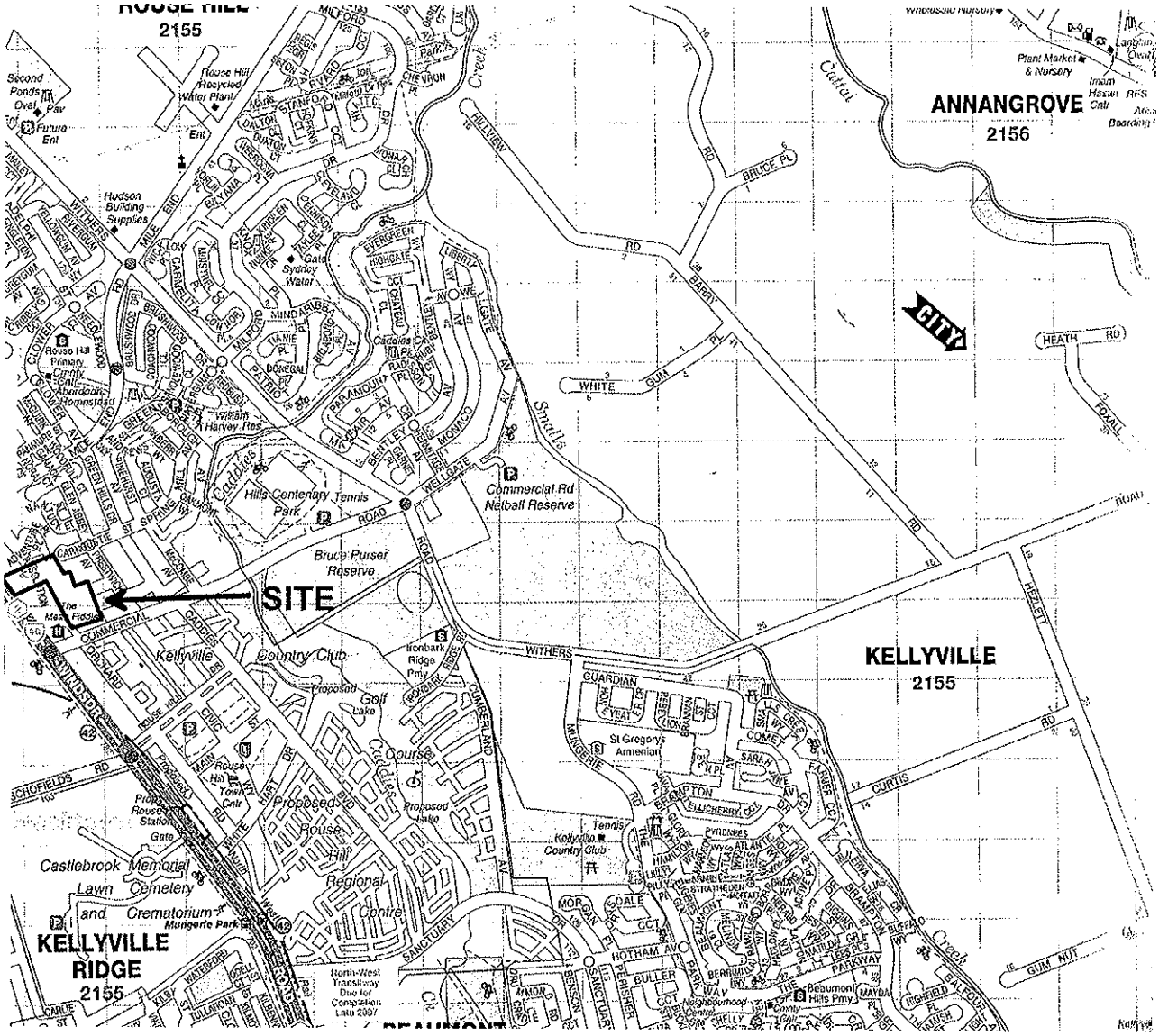
EXPLANATION:
* National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC Guidelines)
HIL - Column F, Commercial/Industrial
^ NSW DECC (EPA) Guidelines for Assessing Service Station Sites (1994)
@ The lowest Practical Quantitation Limit was selected as the guideline criterion
^^ In the absence of Australian guidelines, the laboratory PQL has been adopted as the site assessment criteria
Concentration above Site Assessment Criteria **VALUE**

ABBREVIATIONS:
PQL: Practical Quantitation Limit
LPQL: Less than PQL
PAHs: Polycyclic Aromatic Hydrocarbons
B(a)P: Benzo(a)pyrene
OP: Organophosphorus
PCB: Polychlorinated biphenlys

TABLE C
SOIL INTRA LABORATORY DUPLICATE RESULTS
QA/QC - RELATIVE PERCENTAGE DIFFERENCES

SAMPLE	ANALYSIS	INITIAL (mg/kg)	REPEAT (mg/kg)	MEAN (mg/kg)	RPD %
Intra-laboratory Soil sample ID = BH11 (0.0-0.5) Dup ID = Dup 2 Sample Date: 15/10/08 Batch Ref:23481	Arsenic	8	10	9	22
	Cadmium	LPQL	LPQL	NC	NC
	Chromium	14	17	15.5	19
	Copper	28	26	27	7
	Lead	28	31	29.5	10
	Mercury	LPQL	LPQL	NC	NC
	Nickel	11	12	11.5	9
	Zinc	65	59	62	10
	Naphthalene	LPQL	LPQL	NC	NC
	Acenaphthylene	LPQL	LPQL	NC	NC
	Acenaphthene	LPQL	LPQL	NC	NC
	Fluorene	LPQL	LPQL	NC	NC
	Phenanthrene	LPQL	LPQL	NC	NC
	Anthracene	LPQL	LPQL	NC	NC
	Fluoranthene	LPQL	LPQL	NC	NC
	Pyrene	LPQL	LPQL	NC	NC
	Benzo(a)anthracene	LPQL	LPQL	NC	NC
	Chrysene	LPQL	LPQL	NC	NC
	Benzo(b)&(k)fluorant	LPQL	LPQL	NC	NC
	Benzo(a)pyrene	LPQL	LPQL	NC	NC
	Indeno(123-cd)pyrene	LPQL	LPQL	NC	NC
	Dibenzo(ah)anthracene	LPQL	LPQL	NC	NC
	Benzo(ghi)perylene	LPQL	LPQL	NC	NC
	Total PAHs	LPQL	LPQL	NC	NC
	Total DDT/DDD/DDE	LPQL	LPQL	NC	NC
	Total Chlordanes	LPQL	LPQL	NC	NC
	Aldrin + Dieldrin	LPQL	LPQL	NC	NC
	Heptachlor	LPQL	LPQL	NC	NC
	Total OP Pesticides	LPQL	LPQL	NC	NC
	Total PCBs	LPQL	LPQL	NC	NC
	C_6-C_9 TPH	LPQL	LPQL	NC	NC
	C_{10}-C_{14} TPH	LPQL	LPQL	NC	NC
	C_{15}-C_{28} TPH	LPQL	LPQL	NC	NC
	C_{29}-C_{36} TPH	LPQL	LPQL	NC	NC
	Benzene	LPQL	LPQL	NC	NC
	Toluene	LPQL	LPQL	NC	NC
	Ethylbenzene	LPQL	LPQL	NC	NC
	Total Xylenes	LPQL	LPQL	NC	NC

ABBREVIATIONS:
NC : Not Calculated
PQL: Practical Quantitation Limit
LPQL: Less than Practical Quantitation Limit



Recreated from UBD
Ref: 129A10

SITE LOCATION PLAN

Commercial Road, Rouse Hill

NOT TO SCALE

Note: Reference should be made to the text for a full understanding of this plan

ENVIRONMENTAL INVESTIGATION SERVICES

Job No: E22491K
Figure: 1

Legend:

BH1 (0.1) EIS BOREHOLE LOCATION, NUMBER AND DEPTH OF FILL (m)

INVESTIGATION AREA

Approximate Scale (m)

0 22 44 66 88 110

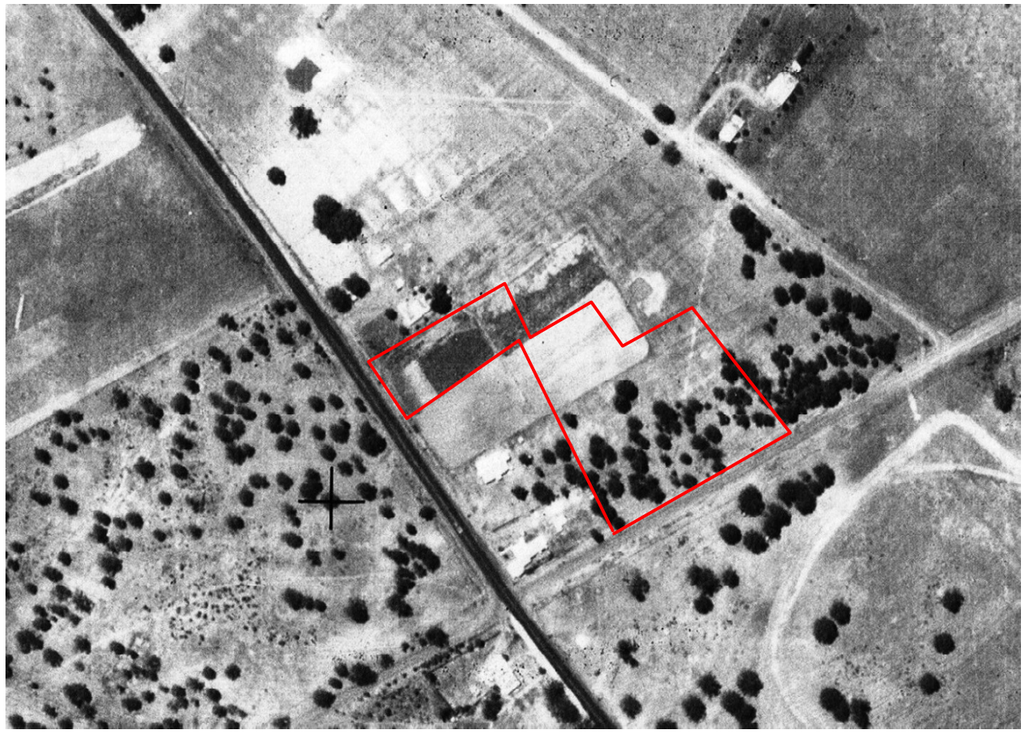
Note: Reference should be made to the text for a full understanding of this plan

BOREHOLE LOCATION PLAN

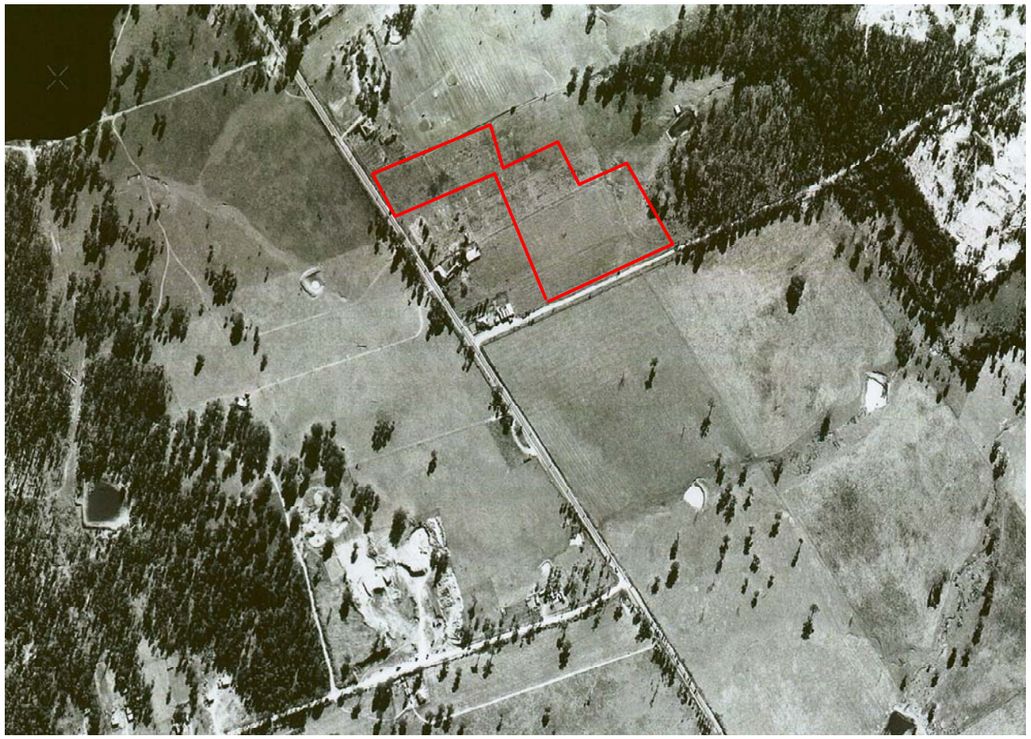
Commercial Road, Rouse Hill

ENVIRONMENTAL INVESTIGATION SERVICES

Job No: E22491K
Figure: 2

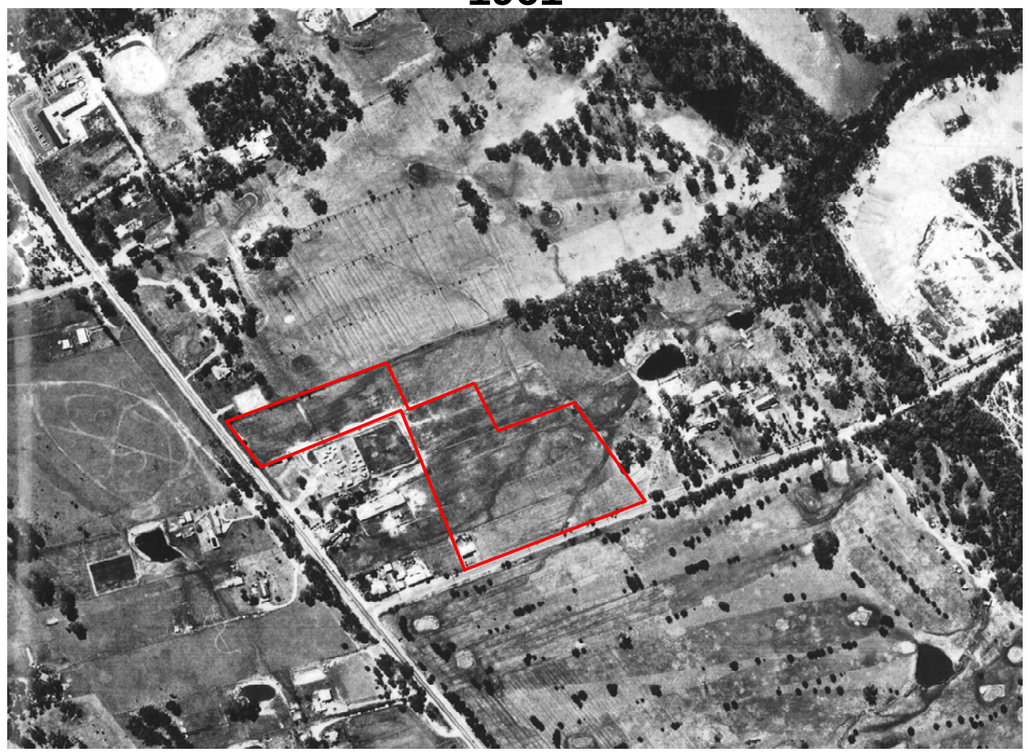


1941



1961

1970



1978

Legend

Investigation Boundary

AERIAL PHOTOS 1941-1978

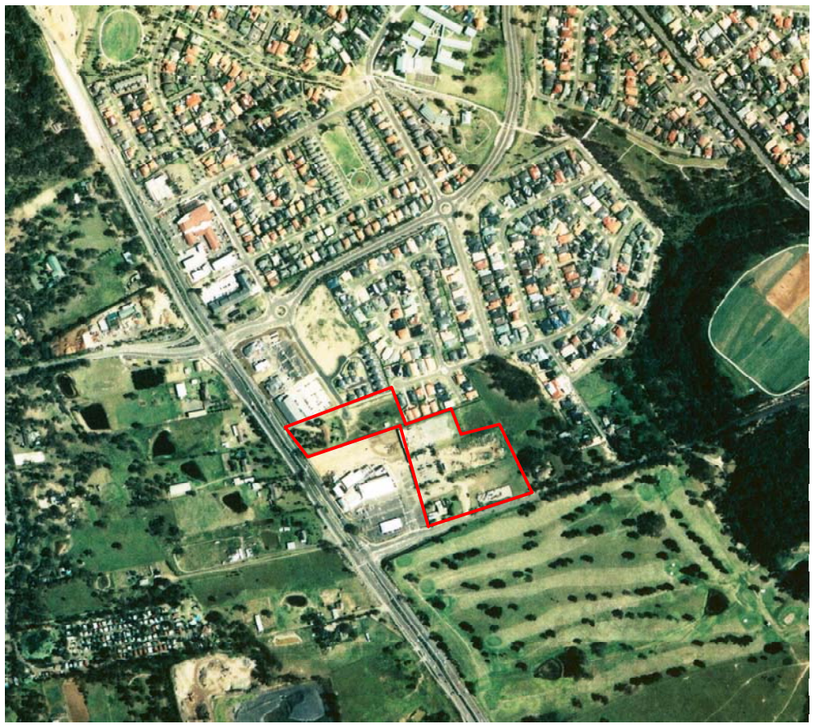
Commercial Road, Rouse Hill

ENVIRONMENTAL INVESTIGATION SERVICES

Job No: E22491K
Figure: 3

1986

1994



2005

Legend

Investigation Boundary

Aerial Photos 1986-2005

Commercial Road, Rouse Hill

ENVIRONMENTAL INVESTIGATION SERVICES

Job No: E22491K
Figure: 4

APPENDIX A

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 1 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Clayey silt, low plasticity, grey, with a trace of igneous gravel.	MC < PL			GRAVEL COVER
								CL	SILTY CLAY: low plasticity, brown and grey brown, with ironstone gravel and XW shale bands.	MC < PL	-	-	
						0.5		-	SHALE: brown and grey brown, with iron indurated bands.	XW	-	-	
						1							
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 2 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty clay, low to medium plasticity, brown, grey brown and orange brown, with a trace of ironstone, igneous and sandstone gravel, fine to medium grained sand and root fibres.	MC≈PL			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, grey brown and orange brown, with a trace of ironstone, igneous and sandstone gravel, fine to medium grained sand and root fibres.	MC > PL			
						1							
						1.5							
						2							
						2.5		-	SHALE: grey brown.	XW	-	-	
									END OF BOREHOLE AT 2.6m				
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **3** 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Sandy silt, low plasticity, brown, with a trace of igneous gravel.	MC < PL			ASPHALT COVER
						0.5		-	SHALE: grey brown and orange brown with iron indurated bands.	XW	-	-	
						1							
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 4 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty clay/clayey silt, low to medium plasticity, brown, orange brown and grey brown, with a trace of igneous gravel.	MC≈PL			
						0.5			FILL: Silty clay, medium plasticity, red brown, orange brown and grey brown, with a trace of igneous and ironstone gravel, weathered shale gravel and fine to medium grained sand.	MC > PL			
						1		CL-CH	SILTY CLAY: medium to high plasticity, orange brown and grey brown, with a trace of ironstone gravel.	MC > PL	-	-	
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **5** 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty clay, medium to high plasticity, orange brown, grey brown and red brown, with a trace of root fibres, igneous and ironstone gravel and weathered shale gravel.	MC > PL			GRASS COVER
						0.5		SC	SILTY CLAYEY SAND: fine to medium grained, red brown and orange brown.	M	-	-	
								CL	SILTY CLAY: low to medium plasticity, red brown and orange brown, with a trace of ironstone gravel.	MC≈PL			
						1			END OF BOREHOLE AT 0.7m				
						1.5							
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 6 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./RM

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0			FILL: Silty clay, medium to high plasticity, brown, with a trace of root fibres and fine to medium grained sand.	MC > PL			GRASS COVER
	■					0.5		CL-CH	SILTY CLAY: medium to high plasticity, red brown, orange brown and grey brown, with a trace of ironstone gravel.	MC > PL	-	-	
						1							
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. **7** 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Clayey silt, low plasticity, brown, with a trace of root fibres.	MC < PL			GRASS COVER
									FILL: Silty clay, medium to high plasticity, brown and orange brown, with a trace of root fibres.	MC > PL			
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, brown and orange brown, with a trace of root fibres.	MC > PL	-	-	
									END OF BOREHOLE AT 0.6m				
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 8 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty clay, low plasticity, brown, with a trace of root fibres and ironstone gravel.	MC < PL			GRASS COVER
						0.5		CL	SILTY CLAY: low to medium plasticity, red brown and orange brown, with a trace of ironstone gravel.	MC < PL	-	-	
						1		-	SHALE: grey brown, red brown and orange brown, with iron indurated bands.	XW	-	-	
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 9 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■	■				0			FILL: Clayey silt, low plasticity, grey brown and orange brown, with a trace of igneous and ironstone gravel and root fibres.	MC < PL			GRASS COVER
			■			0.5			FILL: Silty clay, low to medium plasticity, grey brown and orange brown, with a trace of igneous and ironstone gravel.				
	■					1		CL-CH	SILTY CLAY: medium to high plasticity, red brown and orange brown, with a trace of ironstone gravel.	MC > PL	-	-	
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 10 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silt, low plasticity, brown and grey brown, with a trace of igneous and ironstone gravel and clay nodules.	MC < PL			GRASS COVER
						0.5			FILL: Silty clay, low to medium plasticity, grey brown and orange brown, with a trace of igneous and shale gravel.	MC≈PL			
						1							
						1.5		-	SHALE: orange brown and grey brown, with iron indurated bands.	XW	-	-	
									END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 11 1/1

Environmental logs are not to be used for geotechnical purposes

Client: ROUSE HILL COMMERCIAL ROAD DEVELOPMENT COMPANY PTY LTD

Project: PROPOSED SHOPPING CENTRE DEVELOPMENT

Location: COMMERCIAL ROAD, ROUSE HILL, NSW

Job No. E22491K **Method:** EZI PROBE **R.L. Surface:**

Date: 15-10-08 **Datum:**

Logged/Checked by: R.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0			FILL: Silt, low plasticity, brown and grey brown, with igneous, ironstone and shale gravel.	MC < PL			GRASS COVER
						0.5			FILL: Silty clay, medium plasticity, grey brown, orange brown and red brown, with a trace of shale, ironstone and igneous gravel.	MC≈PL			
	■		■			1			FILL: Silty clay, medium to high plasticity, grey brown, orange brown and red brown, with a trace of shale, ironstone and igneous gravel.	MC > PL			
	■					1.5		CL-CH	SILTY CLAY: medium to high plasticity, orange brown, grey brown and red brown, with a trace of ash.	MC > PL	-	-	
						2			END OF BOREHOLE AT 2.1m				
						2.5							
						3							
						3.5							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
ABN 17 003 550 801

REPORT EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the geotechnical report in regard to classification methods, field procedures and certain matters relating to the Comments and Recommendations section. Not all notes are necessarily relevant to all reports.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, the SAA Site Investigation Code. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached Unified Soil Classification Table qualified by the grading of other particles present (eg sandy clay) as set out below:

Soil Classification	Particle Size
Clay	less than 0.002mm
Silt	0.002 to 0.06mm
Sand	0.06 to 2mm
Gravel	2 to 60mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose	less than 4
Loose	4 – 10
Medium dense	10 – 30
Dense	30 – 50
Very Dense	greater than 50

Cohesive soils are classified on the basis of strength (consistency) either by use of hand penetrometer, laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength kPa
Very Soft	less than 25
Soft	25 – 50
Firm	50 – 100
Stiff	100 – 200
Very Stiff	200 – 400
Hard	Greater than 400
Friable	Strength not attainable – soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'Shale' is used to describe thinly bedded to laminated siltstone.

SAMPLING

Sampling is carried out during drilling or from other excavations to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon the degree of disturbance, some information on strength and structure. Bulk samples are similar but of greater volume required for some test procedures.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All except test pits, hand auger drilling and portable dynamic cone penetrometers require the use of a mechanical drilling rig which is commonly mounted on a truck chassis.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for an excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Premature refusal of the hand augers can occur on a variety of materials such as hard clay, gravel or ironstone, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock fragments. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel, which gives a core of about 50mm diameter, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS. The location of losses are determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the top end of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" – Test F3.1.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N>30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

Occasionally, the drop hammer is used to drive 50mm diameter thin walled sample tubes (U50) in clays. In such circumstances, the test results are shown on the borehole logs in brackets.

A modification to the SPT test is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as "N_c" on the borehole logs, together with the number of blows per 150mm penetration.

Static Cone Penetrometer Testing and Interpretation: Cone penetrometer testing (sometimes referred to as a Dutch Cone) described in this report has been carried out using an Electronic Friction Cone Penetrometer (EFCP). The test is described in Australian Standard 1289, Test F5.1.

In the tests, a 35mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the frictional resistance on a separate 134mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are electrically connected by wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output as incremental digital records every 10mm. The results given in this report have been plotted from the digital data.

The information provided on the charts comprise:

- Cone resistance – the actual end bearing force divided by the cross sectional area of the cone – expressed in MPa.
- Sleeve friction – the frictional force on the sleeve divided by the surface area – expressed in kPa.
- Friction ratio – the ratio of sleeve friction to cone resistance, expressed as a percentage.

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and occasionally very soft clays, rising to 4% to 10% in stiff clays and peats. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Correlations between EFCP and SPT values can be developed for both sands and clays but may be site specific.

Interpretation of EFCP values can be made to empirically derive modulus or compressibility values to allow calculation of foundation settlements.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive. The test method provides a continuous profile of engineering properties but, where precise information on soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometers: Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a rod into the ground with a sliding hammer and counting the blows for successive 100mm increments of penetration.

Two relatively similar tests are used:

- Cone penetrometer (commonly known as the Scala Penetrometer) – a 16mm rod with a 20mm diameter cone end is driven with a 9kg hammer dropping 510mm (AS1289, Test F3.2). The test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various Road Authorities.
- Perth sand penetrometer – a 16mm diameter flat ended rod is driven with a 9kg hammer, dropping 600mm (AS1289, Test F3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.

LOGS

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

The attached explanatory notes define the terms and symbols used in preparation of the logs.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than "straight line" variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it 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 and may not be the same at the time of construction.
- 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 be washed out of the hole or 'reverted' chemically if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after stabilising at intervals ranging from several days to 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 perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg bricks, steel etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably determine the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 *'Methods of Testing Soil for Engineering Purposes'*. Details of the test procedure used are given on the individual report forms.

ENGINEERING REPORTS

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building) the information and interpretation may not be relevant if the design proposal is changed (eg to a twenty storey building). If this happens, the company 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 aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions – the potential for this will be partially dependent on borehole spacing and sampling frequency as well as investigation technique.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of persons or contractors responding to commercial pressures.

If these occur, the company will be pleased to assist with investigation or advice to resolve any problems occurring.

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, the company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed that at some later stage, well after the event.

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

Attention is drawn to the document *'Guidelines for the Provision of Geotechnical Information in Tender Documents'*, published by the Institution of Engineers, Australia. Where information obtained from this investigation 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. The company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

REVIEW OF DESIGN

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/ constraints are quite complex, it is prudent to have a joint design review which involves a senior geotechnical engineer.

SITE INSPECTION

The company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

Requirements could range from:

i) a site visit to confirm that conditions exposed are no worse than those interpreted, to

ii) a visit to assist the contractor or other site personnel in identifying various soil/rock types such as appropriate footing or pier founding depths, or

iii) full time engineering presence on site.

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GRAPHIC LOG SYMBOLS FOR SOILS AND ROCKS

SOIL


FILL


TOPSOIL


CLAY (CL, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CH)


SILTY CLAY (CL, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML)


PEAT AND ORGANIC SOILS

ROCK


CONGLOMERATE


SANDSTONE


SHALE


SILTSTONE, MUDSTONE, CLAYSTONE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

DEFECTS AND INCLUSIONS


CLAY SEAM


SHEARED OR CRUSHED SEAM


BRECCIATED OR SHATTERED SEAM/ZONE


IRONSTONE GRAVEL


ORGANIC MATERIAL

OTHER MATERIALS


CONCRETE


BITUMINOUS CONCRETE, COAL


COLLUVIUM

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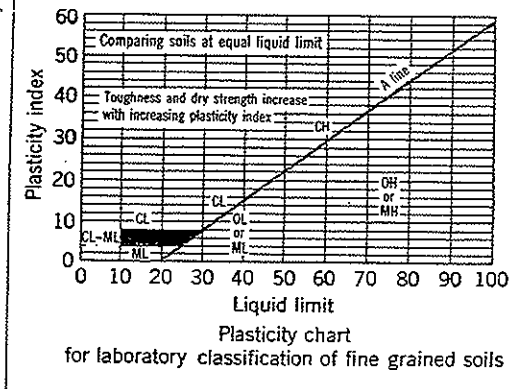
UNIFIED SOIL CLASSIFICATION TABLE

Field Identification Procedures (Excluding particles larger than 75 μm and basing fractions on estimated weights)				Group Symbols[a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
Coarse-grained soils More than half of material is *larger* than 75 μm sieve size[b] (The 75 μm sieve size is about the smallest particle visible to naked eye)	Gravels More than half of coarse fraction is larger than 4 mm sieve size	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles 12 mm maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Determine percentages of gravel and sand from grain size curve. Depending on percentage of fines (fraction smaller than 75 μm sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP* More than 12% *GM, GC, SM, SC* 5% to 12% *Borderline* cases requiring use of dual symbols Use grain size curve in identifying the fractions as given under field identification
			Predominantly one size or a range of sizes with some intermediate sizes missing	*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *GW*
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)	*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures		Atterberg limits below "A" line, or *PI* less than 4 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits above "A" line, with *PI* greater than 7
			Plastic fines (for identification procedures, see *CL* below)	*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures		
	Sands More than half of coarse fraction is smaller than 4 mm sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes	*SW*	Well graded sands, gravelly sands, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *SW*
			Predominantly one size or a range of sizes with some intermediate sizes missing	*SP*	Poorly graded sands, gravelly sands, little or no fines		
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)	*SM*	Silty sands, poorly graded sand-silt mixtures		Atterberg limits below "A" line or *PI* less than 5 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits below "A" line with *PI* greater than 7
			Plastic fines (for identification procedures, see *CL* below)	*SC*	Clayey sands, poorly graded sand-clay mixtures		
Fine-grained soils More than half of material is *smaller* than 75 μm sieve size (The 75 μm sieve size is about the smallest particle visible to naked eye)	Identification Procedures on Fraction Smaller than 380 μm Sieve Size						
	Silts and clays liquid limit less than 50	Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)			
		None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)
		Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
		Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity	
	Silts and clays liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
		High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays	
		Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity	
Highly Organic Soils	Readily identified by colour, odour, spongy feel and frequently by fibrous texture				*Pt*	Peat and other highly organic soils	



Plasticity chart
for laboratory classification of fine grained soils

NOTE: 1) Soils possessing characteristics of two groups are designated by combinations of group symbols (e.g. GW-GC, well graded gravel-sand mixture with clay fines).

2) Soils with liquid limits of the order of 35 to 50 may be visually classified as being of medium plasticity.

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LOG SYMBOLS

LOG COLUMN	SYMBOL	DEFINITION
Groundwater Record		Standing water level. Time delay following completion of drilling may be shown.
		Extent of borehole collapse shortly after drilling.
		Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	ES	Soil sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos screening.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'R' as noted below.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60 degree solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of Undrained Shear Strength.
	PID = 100	Photoionisation detector reading in ppm (Soil sample headspace test).
Moisture Condition (Cohesive Soils)	MC > PL	Moisture content estimated to be greater than plastic limit.
	MC ≈ PL	Moisture content estimated to be approximately equal to plastic limit.
	MC < PL	Moisture content estimated to be less than plastic limit.
(Cohesionless Soils)	D	DRY - runs freely through fingers.
	M	MOIST - does not run freely but no free water visible on soil surface.
	W	WET - free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT - Unconfined compressive strength less than 25kPa
	S	SOFT - Unconfined compressive strength 25-50kPa
	F	FIRM - Unconfined compressive strength 50-100kPa
	St	STIFF - Unconfined compressive strength 100-200kPa
	VSt	VERY STIFF - Unconfined compressive strength 200-400kPa
	H	HARD - Unconfined compressive strength greater than 400kPa
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other tests.
Density Index/ Relative Density (Cohesionless Soils)		**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)**
	VL	Very Loose: <15 / 0-4
	L	Loose: 15-35 / 4-10
	MD	Medium Dense: 35-65 / 10-30
	D	Dense: 65-85 / 30-50
	VD	Very Dense: >85 / >50
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other tests.
Hand Penetrometer Readings	300 250	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Tungsten carbide wing bit.
	T 60	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.

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LOG SYMBOLS

ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely weathered rock	XW	Rock is weathered to such an extent that it has "soil" properties, ie it either disintegretes or can be remoulded, in water.
Distinctly weathered rock	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Slightly weathered rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh rock	FR	Rock shows no sign of decomposition or staining.

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by the International Journal of Rock Mechanics, Mining, Science and Geomechanics. Abstract Volume 22, No 2, 1985.

TERM	SYMBOL	Is (50) MPa	FIELD GUIDE
Extremely Low:	EL	0.03	Easily remoulded by hand to a material with soil properties.
Very Low:	VL	0.1	May be crumbled in the hand. Sandstone is "sugary" and friable.
Low:	L	0.3	A piece of core 150mm long x 50mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.
Medium Strength:	M	1	A piece of cora 150mm long x 50mm dia. can be broken by hand with difficulty. Readily scored with knife.
High:	H	3	A piece of core 150mm long x 50mm dia. core cannot be broken by hand, can be slightly scratched or scored with knife; rock rings under hammer.
Very High:	VH	10	A piece of core 150mm long x 50mm dia. may be broken with hand-held pick after more than one blow. Cannot be scratched with pen knife; rock rings under hammer.
Extremely High:	EH		A piece of core 150mm long x 50mm dia. is very difficult to break with hand-held hammer. Rings when struck with a hammer.

ABBREVIATIONS USED IN DEFECT DESCRIPTION

ABBREVIATION	DESCRIPTION	NOTES
Be	Bedding Plane Parting	Defect orientations measured relative to the normal to the long core axis (ie relative to horizontal for vertical holes)
CS	Clay Seam	
J	Joint	
P	Planar	
Un	Undulating	
S	Smooth	
R	Rough	
IS	Ironstained	
XWS	Extremely Weathered Seam	
Cr	Crushed Seam	
60t	Thickness of defect in millimetres	

APPENDIX B

Envirolab Services Pty Ltd
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enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 23481

Client:
Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Rose Healy

Sample log in details:

Your Reference:	**E22491K, Rouse Hill**
No. of samples:	31 Soils
Date samples received:	15/10/08
Date completed instructions received:	15/10/08

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by:	22/10/08
Date of Preliminary Report:	Not Issued
Issue Date:	22/10/08

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NATA
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vTPH & BTEX in Soil						
Our Reference:	UNITS	23481-1	23481-3	23481-8	23481-11	23481-13
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.0-0.1	0.0-0.2	0.0-0.3	0.4-0.6	0.0-0.3
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	18/10/2008	18/10/2008	18/10/2008	18/10/2008	18/10/2008
vTPH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	100	117	128	106	127

vTPH & BTEX in Soil						
Our Reference:	UNITS	23481-15	23481-17	23481-19	23481-22	23481-24
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.0-0.3	0.0-0.3	0.0-0.3	0.5-0.7	0.0-0.5
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	18/10/2008	18/10/2008	18/10/2008	18/10/2008	18/10/2008
vTPH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	115	103	114	98	109

vTPH & BTEX in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ---------- 	23481-27 BH11 0.0-0.5 15/10/2008 Soil	23481-31 Dup2 - 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008
Date analysed	-	18/10/2008	18/10/2008
vTPH C_6 - C_9	mg/kg	<25	<25
Benzene	mg/kg	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	113	130

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	23481-1	23481-3	23481-8	23481-11	23481-13
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.0-0.1	0.0-0.2	0.0-0.3	0.4-0.6	0.0-0.3
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	98	91	87	89	91

sTPH in Soil (C10-C36)						
Our Reference:	UNITS	23481-15	23481-17	23481-19	23481-22	23481-24
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.0-0.3	0.0-0.3	0.0-0.3	0.5-0.7	0.0-0.5
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	86	90	88	89	89

sTPH in Soil (C10-C36)			
Our Reference:	UNITS	23481-27	23481-31
Your Reference	----------	BH11	Dup2
Depth	----------	0.0-0.5	-
Date Sampled		15/10/2008	15/10/2008
Type of sample		Soil	Soil
Date extracted	-	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008
TPH C_{10} - C_{14}	mg/kg	<50	<50
TPH C_{15} - C_{28}	mg/kg	<100	<100
TPH C_{29} - C_{36}	mg/kg	<100	<100
Surrogate o-Terphenyl	%	88	88

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-1 BH1 0.0-0.1 15/10/2008 Soil	23481-3 BH2 0.0-0.2 15/10/2008 Soil	23481-8 BH3 0.0-0.3 15/10/2008 Soil	23481-11 BH4 0.4-0.6 15/10/2008 Soil	23481-13 BH5 0.0-0.3 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.5	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	0.4	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.2	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d14	%	98	96	98	97	97

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-15 BH6 0.0-0.3 15/10/2008 Soil	23481-17 BH7 0.0-0.3 15/10/2008 Soil	23481-19 BH8 0.0-0.3 15/10/2008 Soil	23481-22 BH9 0.5-0.7 15/10/2008 Soil	23481-24 BH10 0.0-0.5 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	97	94	97	96	99

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ---------- 	23481-27 BH11 0.0-0.5 15/10/2008 Soil	23481-31 Dup2 - 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	96	97

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-1 BH1 0.0-0.1 15/10/2008 Soil	23481-3 BH2 0.0-0.2 15/10/2008 Soil	23481-8 BH3 0.0-0.3 15/10/2008 Soil	23481-11 BH4 0.4-0.6 15/10/2008 Soil	23481-13 BH5 0.0-0.3 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	63	62	64	60	72

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-15 BH6 0.0-0.3 15/10/2008 Soil	23481-17 BH7 0.0-0.3 15/10/2008 Soil	23481-19 BH8 0.0-0.3 15/10/2008 Soil	23481-22 BH9 0.5-0.7 15/10/2008 Soil	23481-24 BH10 0.0-0.5 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	60	62	61	70	73

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-27 BH11 0.0-0.5 15/10/2008 Soil	23481-31 Dup2 - 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008
HCB	mg/kg	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Surrogate TCLMX	%	74	75

Organophosphorus Pesticides						
Our Reference:	UNITS	23481-1	23481-3	23481-8	23481-11	23481-13
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.0-0.1	0.0-0.2	0.0-0.3	0.4-0.6	0.0-0.3
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	63	62	64	60	72

Organophosphorus Pesticides						
Our Reference:	UNITS	23481-15	23481-17	23481-19	23481-22	23481-24
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.0-0.3	0.0-0.3	0.0-0.3	0.5-0.7	0.0-0.5
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	60	62	61	70	73

Organophosphorus Pesticides Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-27 BH11 0.0-0.5 15/10/2008 Soil	23481-31 Dup2 - 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008
Diazinon	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Surrogate TCLMX	%	74	75

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-1 BH1 0.0-0.1 15/10/2008 Soil	23481-3 BH2 0.0-0.2 15/10/2008 Soil	23481-8 BH3 0.0-0.3 15/10/2008 Soil	23481-11 BH4 0.4-0.6 15/10/2008 Soil	23481-13 BH5 0.0-0.3 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	63	62	64	60	72

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-15 BH6 0.0-0.3 15/10/2008 Soil	23481-17 BH7 0.0-0.3 15/10/2008 Soil	23481-19 BH8 0.0-0.3 15/10/2008 Soil	23481-22 BH9 0.5-0.7 15/10/2008 Soil	23481-24 BH10 0.0-0.5 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	60	62	61	70	73

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-27 BH11 0.0-0.5 15/10/2008 Soil	23481-31 Dup2 - 15/10/2008 Soil
Date extracted	-	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008
Arochlor 1016	mg/kg	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1
Surrogate TCLMX	%	74	75

Acid Extractable metals in soil						
Our Reference:	UNITS	23481-1	23481-3	23481-8	23481-11	23481-13
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.0-0.1	0.0-0.2	0.0-0.3	0.4-0.6	0.0-0.3
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008
Date analysed	-	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008
Arsenic	mg/kg	13	7	<4	11	5
Cadmium	mg/kg	<0.5	0.7	<0.5	<0.5	<0.5
Chromium	mg/kg	4	12	16	10	15
Copper	mg/kg	49	70	74	13	28
Lead	mg/kg	11	24	5	24	19
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	11	49	140	2	26
Zinc	mg/kg	56	230	56	7	47

Acid Extractable metals in soil						
Our Reference:	UNITS	23481-15	23481-17	23481-19	23481-22	23481-24
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.0-0.3	0.0-0.3	0.0-0.3	0.5-0.7	0.0-0.5
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008
Date analysed	-	20/10/2008	20/10/2008	20/10/2008	20/10/2008	20/10/2008
Arsenic	mg/kg	9	10	9	13	9
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	19	21	24	23	15
Copper	mg/kg	7	13	17	19	24
Lead	mg/kg	19	25	29	35	27
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	9	9	8	12
Zinc	mg/kg	17	33	35	53	56

Acid Extractable metals in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	23481-27 BH11 0.0-0.5 15/10/2008 Soil	23481-31 Dup2 - 15/10/2008 Soil
Date digested	-	20/10/2008	20/10/2008
Date analysed	-	20/10/2008	20/10/2008
Arsenic	mg/kg	8	10
Cadmium	mg/kg	<0.5	<0.5
Chromium	mg/kg	14	17
Copper	mg/kg	28	26
Lead	mg/kg	28	31
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	11	12
Zinc	mg/kg	65	59

Moisture						
Our Reference:	UNITS	23481-1	23481-3	23481-8	23481-11	23481-13
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.0-0.1	0.0-0.2	0.0-0.3	0.4-0.6	0.0-0.3
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Moisture	%	10	11	8.4	16	10

Moisture						
Our Reference:	UNITS	23481-15	23481-17	23481-19	23481-22	23481-24
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.0-0.3	0.0-0.3	0.0-0.3	0.5-0.7	0.0-0.5
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008	17/10/2008	17/10/2008	17/10/2008
Moisture	%	17	17	16	14	9

Moisture			
Our Reference:	UNITS	23481-27	23481-31
Your Reference	----------	BH11	Dup2
Depth	----------	0.0-0.5	-
Date Sampled		15/10/2008	15/10/2008
Type of sample		Soil	Soil
Date prepared	-	17/10/2008	17/10/2008
Date analysed	-	17/10/2008	17/10/2008
Moisture	%	12	11

Asbestos ID - soils						
Our Reference:	UNITS	23481-1	23481-3	23481-8	23481-11	23481-13
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.0-0.1	0.0-0.2	0.0-0.3	0.4-0.6	0.0-0.3
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	20/10/2008	20/10/2008	20/10/2008	21/10/2008	21/10/2008
Sample Description	-	20g Soil	40g Soil	40g Soil	40g Soil	40g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	23481-15	23481-17	23481-19	23481-22	23481-24
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.0-0.3	0.0-0.3	0.0-0.3	0.5-0.7	0.0-0.5
Date Sampled		15/10/2008	15/10/2008	15/10/2008	15/10/2008	15/10/2008
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	21/10/2008	21/10/2008	21/10/2008	21/10/2008	21/10/2008
Sample Description	-	40g Soil	40g Soil	40g Soil	40g Soil	20g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils			
Our Reference:	UNITS	23481-27	23481-31
Your Reference	----------	BH11	Dup2
Depth	----------	0.0-0.5	-
Date Sampled		15/10/2008	15/10/2008
Type of sample		Soil	Soil
Date analysed	-	21/10/2008	21/10/2008
Sample Description	-	40g Soil	40g Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected

Method ID	Methodology Summary
GC.16	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
GC.3	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
GC.12 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
GC-5	Soil samples are extracted with hexane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
GC.8	Soil samples are extracted with hexane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
GC-6	Soil samples are extracted with hexane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals.20 ICP-AES	Determination of various metals by ICP-AES.
Metals.21 CV-AAS	Determination of Mercury by Cold Vapour AAS.
LAB.8	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.
AS4964-2004	Qualitative identification of asbestos type fibres in bulk using Polarised Light Microscopy and Dispersion Staining Techniques.

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/10/08	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/08
Date analysed	-			18/10/08	23481-1	18/10/2008 || 18/10/2008	LCS-6	18/10/08
vTPH C_6 - C_9	mg/kg	25	GC.16	<25	23481-1	<25 || <25	LCS-6	89%
Benzene	mg/kg	0.5	GC.16	<0.5	23481-1	<0.5 || <0.5	LCS-6	74%
Toluene	mg/kg	0.5	GC.16	<0.5	23481-1	<0.5 || <0.5	LCS-6	101%
Ethylbenzene	mg/kg	1	GC.16	<1	23481-1	<1 || <1	LCS-6	89%
m+p-xylene	mg/kg	2	GC.16	<2	23481-1	<2 || <2	LCS-6	91%
o-Xylene	mg/kg	1	GC.16	<1	23481-1	<1 || <1	LCS-6	85%
Surrogate aaa-Trifluorotoluene	%		GC.16	113	23481-1	100 || 117 || RPD: 16	LCS-6	115%
QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/10/08	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/08
Date analysed	-			17/10/08	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/08
TPH C_{10} - C_{14}	mg/kg	50	GC.3	<50	23481-1	<50 || <50	LCS-6	84%
TPH C_{15} - C_{28}	mg/kg	100	GC.3	<100	23481-1	<100 || 100	LCS-6	93%
TPH C_{29} - C_{36}	mg/kg	100	GC.3	<100	23481-1	<100 || <100	LCS-6	89%
Surrogate o-Terphenyl	%		GC.3	87	23481-1	98 || 92 || RPD: 6	LCS-6	92%
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/10/08	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/08
Date analysed	-			17/10/08	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/08
Naphthalene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	LCS-6	97%
Acenaphthylene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	LCS-6	89%
Phenanthrene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	LCS-6	91%
Anthracene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	LCS-6	88%
Pyrene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	LCS-6	93%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)anthracene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	LCS-6	115%
Benzo(b+k)fluoranthene	mg/kg	0.2	GC.12 subset	<0.2	23481-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	GC.12 subset	<0.05	23481-1	<0.05 || <0.05	LCS-6	108%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	GC.12 subset	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		GC.12 subset	94	23481-1	98 || 102 || RPD: 4	LCS-6	97%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/10/2008	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/2008
Date analysed	-			17/10/2008	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/2008
HCB	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	120%
gamma-BHC	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	112%
Heptachlor	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	120%
delta-BHC	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	108%
Heptachlor Epoxide	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	104%
gamma-Chlordane	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	100%
Dieldrin	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	100%
Endrin	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	98%
pp-DDD	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	86%
Endosulfan II	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	LCS-6	86%
Methoxychlor	mg/kg	0.1	GC-5	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-5	68	23481-1	63 || 65 || RPD: 3	LCS-6	68%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/10/2008	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/2008
Date analysed	-			17/10/2008	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/2008
Diazinon	mg/kg	0.1	GC.8	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	0.1	GC.8	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	0.1	GC.8	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	0.1	GC.8	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	GC.8	<0.1	23481-1	<0.1 || <0.1	LCS-6	60%
Fenitrothion	mg/kg	0.1	GC.8	<0.1	23481-1	<0.1 || <0.1	LCS-6	68%
Bromophos-ethyl	mg/kg	0.1	GC.8	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	GC.8	<0.1	23481-1	<0.1 || <0.1	LCS-6	78%
Surrogate TCLMX	%		GC.8	68	23481-1	63 || 65 || RPD: 3	LCS-6	63%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/10/2008	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/2008
Date analysed	-			17/10/2008	23481-1	17/10/2008 || 17/10/2008	LCS-6	17/10/2008
Arochlor 1016	mg/kg	0.1	GC-6	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	GC-6	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	GC-6	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	GC-6	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	GC-6	<0.1	23481-1	<0.1 || <0.1	LCS-6	98%
Arochlor 1260	mg/kg	0.1	GC-6	<0.1	23481-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		GC-6	68	23481-1	63 || 65 || RPD: 3	LCS-6	96%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			20/10/08	23481-1	20/10/2008 || 20/10/2008	LCS-2	20/10/08
Date analysed	-			20/10/08	23481-1	20/10/2008 || 20/10/2008	LCS-2	20/10/08
Arsenic	mg/kg	4	Metals.20 ICP-AES	<4	23481-1	13 || 17 || RPD: 27	LCS-2	100%
Cadmium	mg/kg	0.5	Metals.20 ICP-AES	<0.5	23481-1	<0.5 || <0.5	LCS-2	100%
Chromium	mg/kg	1	Metals.20 ICP-AES	<1	23481-1	4 || 5 || RPD: 22	LCS-2	102%
Copper	mg/kg	1	Metals.20 ICP-AES	<1	23481-1	49 || 59 || RPD: 19	LCS-2	105%
Lead	mg/kg	1	Metals.20 ICP-AES	<1	23481-1	11 || 11 || RPD: 0	LCS-2	101%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Mercury	mg/kg	0.1	Metals.21 CV-AAS	<0.1	23481-1	<0.1 || <0.1	LCS-2	99%
Nickel	mg/kg	1	Metals.20 ICP-AES	<1	23481-1	11 || 11 || RPD: 0	LCS-2	105%
Zinc	mg/kg	1	Metals.20 ICP-AES	<1	23481-1	56 || 58 || RPD: 4	LCS-2	105%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD
Date prepared	-			17/10/08	23481-1	17/10/2008 || 17/10/2008
Date analysed	-			17/10/08	23481-1	17/10/2008 || 17/10/2008
Moisture	%	0.1	LAB.8	<0.1	23481-1	10 || 10 || RPD: 0

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

QUALITY CONTROL vTPH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/08
Date analysed	-	23481-27	18/10/2008 || 18/10/2008	23481-3	18/10/08
vTPH C_6 - C_9	mg/kg	23481-27	<25 || <25	23481-3	114%
Benzene	mg/kg	23481-27	<0.5 || <0.5	23481-3	80%
Toluene	mg/kg	23481-27	<0.5 || <0.5	23481-3	115%
Ethylbenzene	mg/kg	23481-27	<1 || <1	23481-3	117%
m+p-xylene	mg/kg	23481-27	<2 || <2	23481-3	130%
o-Xylene	mg/kg	23481-27	<1 || <1	23481-3	126%
Surrogate aaa-Trifluorotoluene	%	23481-27	113 || 107 || RPD: 5	23481-3	139%

QUALITY CONTROL sTPH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/08
Date analysed	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/08
TPH C_{10} - C_{14}	mg/kg	23481-27	<50 || <50	23481-3	84%
TPH C_{15} - C_{28}	mg/kg	23481-27	<100 || <100	23481-3	89%
TPH C_{29} - C_{36}	mg/kg	23481-27	<100 || <100	23481-3	82%
Surrogate o-Terphenyl	%	23481-27	88 || 87 || RPD: 1	23481-3	87%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/08
Date analysed	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/08
Naphthalene	mg/kg	23481-27	<0.1 || <0.1	23481-3	96%
Acenaphthylene	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	23481-27	<0.1 || <0.1	23481-3	89%
Phenanthrene	mg/kg	23481-27	<0.1 || <0.1	23481-3	90%
Anthracene	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	23481-27	<0.1 || <0.1	23481-3	93%
Pyrene	mg/kg	23481-27	<0.1 || <0.1	23481-3	96%
Benzo(a)anthracene	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	23481-27	<0.1 || <0.1	23481-3	108%
Benzo(b+k)fluoranthene	mg/kg	23481-27	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	23481-27	<0.05 || <0.05	23481-3	110%
Indeno(1,2,3-c,d)pyrene	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%	23481-27	96 || 95 || RPD: 1	23481-3	98%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/2008
Date analysed	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/2008
HCB	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	23481-27	<0.1 || <0.1	23481-3	106%
gamma-BHC	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	23481-27	<0.1 || <0.1	23481-3	76%
Heptachlor	mg/kg	23481-27	<0.1 || <0.1	23481-3	106%
delta-BHC	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	23481-27	<0.1 || <0.1	23481-3	96%
Heptachlor Epoxide	mg/kg	23481-27	<0.1 || <0.1	23481-3	112%
gamma-Chlordane	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	23481-27	<0.1 || <0.1	23481-3	90%
Dieldrin	mg/kg	23481-27	<0.1 || <0.1	23481-3	94%
Endrin	mg/kg	23481-27	<0.1 || <0.1	23481-3	86%
pp-DDD	mg/kg	23481-27	<0.1 || <0.1	23481-3	76%
Endosulfan II	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	23481-27	<0.1 || <0.1	23481-3	82%
Methoxychlor	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	23481-27	74 || 65 || RPD: 13	23481-3	63%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/2008
Date analysed	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/2008
Diazinon	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	23481-27	<0.1 || <0.1	23481-3	96%
Fenitrothion	mg/kg	23481-27	<0.1 || <0.1	23481-3	110%
Bromophos-ethyl	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	23481-27	<0.1 || <0.1	23481-3	60%
Surrogate TCLMX	%	23481-27	74 || 65 || RPD: 13	23481-3	71%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/2008
Date analysed	-	23481-27	17/10/2008 || 17/10/2008	23481-3	17/10/2008
Arochlor 1016	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	23481-27	<0.1 || <0.1	23481-3	81%
Arochlor 1260	mg/kg	23481-27	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	23481-27	74 || 65 || RPD: 13	23481-3	63%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	23481-27	20/10/2008 || 20/10/2008	23481-3	20/10/08
Date analysed	-	23481-27	20/10/2008 || 20/10/2008	23481-3	20/10/08
Arsenic	mg/kg	23481-27	8 || 9 || RPD: 12	23481-3	104%
Cadmium	mg/kg	23481-27	<0.5 || <0.5	23481-3	97%
Chromium	mg/kg	23481-27	14 || 17 || RPD: 19	23481-3	101%
Copper	mg/kg	23481-27	28 || 30 || RPD: 7	23481-3	113%
Lead	mg/kg	23481-27	28 || 28 || RPD: 0	23481-3	99%
Mercury	mg/kg	23481-27	<0.1 || <0.1	23481-3	112%
Nickel	mg/kg	23481-27	11 || 11 || RPD: 0	23481-3	99%
Zinc	mg/kg	23481-27	65 || 66 || RPD: 2	23481-3	90%

QUALITY CONTROL Moisture	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	23481-27	17/10/2008 || 17/10/2008
Date analysed	-	23481-27	17/10/2008 || 17/10/2008
Moisture	%	23481-27	12 || 12 || RPD: 0

Report Comments:

Asbestos was analysed by Approved Identifier: Joshua Lim

INS: Insufficient sample for this test	NT: Not tested	PQL: Practical Quantitation Limit
RPD: Relative Percent Difference	NA: Test not required	LCS: Laboratory Control Sample
NR: Not requested	<: Less than	>: Greater than

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria:

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable. Surrogates: 60-140% is acceptable for general organics and 10-140% for SVOC and speciated phenols.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC NSW 1670

ph: 02 9888 5000
Fax: 02 9888 5001

Attention: Rose Healy

Sample log in details:

Your reference:	**E22491K, Rouse Hill**
Envirolab Reference:	**23481**
Date received:	15/10/08
Date results expected to be reported:	**22/10/08**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	31 Soils
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice Pack

Comments:

Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

SAMPLE AND CHAIN OF CUSTODY FORM

TO:
Envirolab Services Pty Ltd
12 Ashley Street
Chatswood NSW 2067
Phone: (02) 99106200
Fax: (02) 99106201

Attention: Aileen

EIS Job Number: E22491K

Date Results Required: Standard

Sheet 1 / 2

FROM:
Environmental Investigation Services
Rear 115 Wicks Road
Macquarie Park NSW 2113

Phone: (02) 9888 5000
Fax: (02) 9888 5004
Contact: Rose Healy

Project: Proposed Development
Location: Rouse Hill
Sampler: RH

Sample Preservation:
In esky on ice

Tests Required

Date Sampled	Lab Ref:	Borehole/ Sample Number	Depth (m)	Sample Container	PID	Sample Description	Heavy Metals (8)	TPH/BTEX	PAH	OC/OP/ PCB	Asbestos	TCLP Prep + M6. PAH	Phenols	VOC	sVOC	sPOCAS		
15-10-08	1	BH1	0.0-0.1	Glass jar + Asb Bag	0.0	Fill: clayey silt	X	X	X	X	X							
	2	↓	0.1-0.3	Glass jar + Asb Bag		clayey silt												
	3	BH2	0.0-0.2	Glass jar + Asb Bag		Fill	X	X	X	X	X							
	4		0.5-0.7	Glass jar + Asb Bag	↓	↓												
	5		1.3-1.5	Glass jar + Asb Bag	0.1													
	6		2.3-2.5	Glass jar + Asb Bag	0.0	↓	X				X							
	7	↓	2.5-2.6	Glass jar + ~~Asb Bag~~	0.1	Shale												
	8	BH3	0.0-0.3	Glass jar + Asb Bag	0.0	Fill	X	X	X	X	X							
	9	↓	0.5-0.7	Glass jar + Asb Bag		weathered shale												
	10	BH4	0.0-0.3	Glass jar + Asb Bag		Fill												
	11		0.4-0.6	Glass jar + Asb Bag		↓	X	X	X	X	X							
	12	↓	0.8-1.0	Glass jar + Asb Bag		Silty clay												
	13	BH5	0.0-0.3	Glass jar + Asb Bag		Fill	X	X	X	X	X							
	14	↓	0.3-0.6	Glass jar + ~~Asb Bag~~		Silty clay												
	15	BH6	0.0-0.3	Glass jar + Asb Bag		Fill	X	X	X	X	X							
	16	↓	0.4-0.7	Glass jar + ~~Asb Bag~~		Silty clay												
	17	BH7	0.0-0.3	Glass jar + Asb Bag		Fill	X	X	X	X	X							
	18	↓	0.3-0.6	Glass jar + ~~Asb Bag~~		Silty clay												
	19	BH8	0.0-0.3	Glass jar + Asb Bag		Fill	X	X	X	X	X							
	20	↓	0.3-0.6	Glass jar + ~~Asb Bag~~		Silty clay												
	21	BH9	0.0-0.3	Glass jar + Asb Bag		Fill	X	X	X	X	X							
	22		0.5-0.7	Glass jar + Asb Bag		↓	X	X	X	X	X							
	23	↓	0.8-1.0	Glass jar + ~~Asb Bag~~		Silty clay												
	24	BH10	0.0-0.5	Glass jar + Asb Bag		Fill	X	X	X	X	X							
↓	25	↓	0.8-1.0	Glass jar + Asb Bag	↓	↓												

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: 9910 6200

Job No: 23481
Date received: 15/10/08
Time received: 1500
Received by:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):

Relinquished By:	Date: Time:	Received By:	Relinquished By:	Date: Time:		Received By:
RH	15-10-08					

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
Envirolab Services Pty Ltd 12 Ashley Street Chatswood NSW 2067 Phone: (02) 99106200 Fax: (02) 99106201 Attention: Aileen	EIS Job Number: E22491K Date Results Required: Standard Sheet 2 / 2	Environmental Investigation Services Rear 115 Wicks Road Macquarie Park NSW 2113 Phone: (02) 9888 5000 Fax: (02) 9888 5004 Contact: Rose Healy

Project: Proposed Development
Location: Rouse Hill
Sampler: RH

Sample Preservation: In esky on ice

Tests Required

Date Sampled	Lab Ref:	Borehole/ Sample Number	Depth (m)	Sample Container	PID	Sample Description	Heavy Metals (8)	TPH/BTEX	PAH	OC/OP/ PCB	Asbestos	TCLP Prep + M6, PAH	Phenols	VOC	sVOC	sPOCAS		
15-10-08	26	BH10	1.3-1.5	Glass jar + ~~Asb Bag~~	0.0	weathered shale												
↓	27	BH11	0.0-0.5	Glass jar + Asb Bag	↓	fill	X	X	X	X	X							
↓	28	↓	0.7-1.0	Glass jar + Asb Bag	↓	↓												
↓	29	↓	1.5-1.7	Glass jar + ~~Asb Bag~~	↓	silty clay												
↓	30	DUP1		Glass jar + ~~Asb Bag~~	↓	fill												
↓	31	DUP2		Glass jar + ~~Asb Bag~~	↓	↓	X	X	X	X	X							
				Glass jar + Asb Bag														
				Glass jar + Asb Bag														
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				Glass jar + Asb Bag														
				Glass jar + Asb Bag														

Remarks (comments/detection limits required):

Relinquished By:	Date: Time:	Received By:	Relinquished By:	Date: Time:	Received By:
RH	15-10-08	Feeneolds			

APPENDIX C

RH 21 OCT 2008

ADVANCE LEGAL SEARCH PTY LIMITED

(ACN 077 067 068)
ABN 49 077 067 068

PO Box 149
Yagoona NSW 2199

Telephone: +612 9754 1590
Mobile: 0412 169 809
Facsimile: +612 9754 1364
Email: alsearch@optusnet.com.au

14th. October, 2008

ENVIRONMENTAL INVESTIGATION SERVICES
PO Box 976
North Ryde BC
NSW 1670

Attention: Rose Healy

RE: **Commercial Road, Rouse Hill**

Note 1: **Lot 901 DP 1029336**
Note 2: **Lot 1021 DP 1091484**
Note 3: **Lot 1022 DP 1091484**

Note 1:

Current Search

Folio Identifier 901/1029336 (attached)
DP 1029336 (attached)
Dated 4TH. August, 2008
Registered Proprietor:
NORLEX HOLDINGS PTY LIMITED

Title Tree

Lot 901 DP1029336

Folio Identifier 901/1029336

Folio Identifier 1/135801

Folio Identifier 1/30916

Certificate of Title Volume 9533 Folio 114

Certificate of Title Volume 1316 Folio 5

Summary of Proprietor(s)
Lot 901 DP 1029336

Year	Proprietor
	(901/1029336)
2007 to date	Norlex Holdings Pty Limited
2001 – 2007	Balmoral Boardsailing School Pty limited
	(1/135801)
2000 – 2001	Balmoral Boardsailing School Pty limited
1999 – 2000	Annetta May Sandstrom
1997 – 1999	Annetta May Sandstrom Jack Leonard Sandstrom
	(1/30916)
1994 – 1997	Annetta May Sandstrom Jack Leonard Sandstrom
1988 – 1994	Jack Leonard Sandstrom, managing director
	(Lot 1 DP 30916 – CT Vol 9533 Fol 114)
1985 – 1988	Jack Leonard Sandstrom, managing director
1980 – 1985	Annetta May Sandstrom, married woman Jack Leonard Sandstrom, managing director
1963 – 1980	Ronald John Halsey, interior decorator Lorna Margaret Halsey, married woman
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1949 – 1963	Stuart Lester Binns, dog fancier

1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor
1916 – 1916	John Seath, farmer Charles Seath, farmer
1900 – 1916	John Seath, farmer Charles Seath, farmer Jane Ann Seath, spinster

Note 2:

Current Search

Folio Identifier 1021/1091484 (attached)
DP 1091484 (attached)
Dated 4TH. August, 2008
Registered Proprietor:
BRIGID THERESA TUITE
LAURENCE OLIVER TUITE

Title Tree

Lot 1021 1091484

Folio Identifier 1021/1091484

Folio Identifier 102/105862

See Notes (a) & (b)

(a)

Folio Identifier 2/135801

Folio Identifier 2/30916

Certificate of Title Volume 9676 Folio 82

Certificate of Title Volume 1316 Folio 5

(b)

Folio Identifier 2/747364

Certificate of Title Volume 9990 Folio 75

Certificate of Title Volume 1316 Folio 5

Summary of Proprietor(s)
Lot 1021 DP 1091484

Year	Proprietor
	(1021/1091484)
2005 to date	Brigid Theresa Tuite Laurence Oliver Tuite
2005 - 2005	Norlex Holdings Pty Limited
	(102/1058862)
2003 – 2005	Norlex Holdings Pty Limited

Note (a)

	(2/135801)
1998 – 2003	Norlex Holdings Pty Limited
1997 – 1998	Victor Francis Sammut Ruth Yvonne Sammut
	(2/30916)
1988 – 1997	Victor Francis Sammut, welder Ruth Yvonne Sammut, married woman
	(Lot 2 DP 30916 – CT Vol 9676 Fol 82)
1981 – 1988	Victor Francis Sammut, welder Ruth Yvonne Sammut, married woman
1979 – 1981	Tasmanian Board Mills Limited
1977 – 1979	Tamina Pty Limited
1964 – 1977	Cecil Eric Kroehnert, farmer Valerie Joan Kroehnert, married woman
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1949 – 1964	Stuart Lester Binns, dog fancier
1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor
1916 – 1916	John Seath, farmer Charles Seath, farmer
1900 – 1916	John Seath, farmer Charles Seath, farmer Jane Ann Seath, spinster

Note (b)

	(2/747364)
1998 – 2003	Norlex Holdings Pty Limited
1993 – 1998	Catherine Louise Schembri Joseph Schembri
1987 – 1993	Emanuel Schembri, signwriter Catherine Louise Schembri Joseph Schembri, signwriter
	(Lot 4 DP 30916 – CT Vol 9990 Fol 75)
1966 – 1987	Emanuel Schembri, signwriter Catherine Louise Schembri Joseph Schembri, signwriter
1965 – 1966	Stuart Lester Binns, dog fancier
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1949 – 1965	Stuart Lester Binns, dog fancier
1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor
1916 – 1916	John Seath, farmer Charles Seath, farmer
1900 – 1916	John Seath, farmer Charles Seath, farmer Jane Ann Seath, spinster

Note 3:

Current Search

Folio Identifier 1022/1091484 (attached)
DP 1091484 (attached)
Dated 4TH. August, 2008
Registered Proprietor:
NORLEX HOLDINGS PTY LIMITED

Title Tree

Lot 1022 1091484

Folio Identifier 1022/1091484

Folio Identifier 102/1058862

See Notes (a) & (b)

(a)

Folio Identifier 2/135801

Folio Identifier 2/30916

Certificate of Title Volume 9676 Folio 82

Certificate of Title Volume 1316 Folio 5

(b)

Folio Identifier 1/747364

Certificate of Title Volume 9676 Folio 83

Certificate of Title Volume 1316 Folio 5

Summary of Proprietor(s)
Lot 1022 DP 1091484

Year	Proprietor
	(1022/1091484)
2005 to date	Norlex Holdings Pty Limited
	(102/1058862)
2003 – 2005	Norlex Holdings Pty Limited

Note (a)

	(2/135801)
1998 – 2003	Norlex Holdings Pty Limited
1997 – 1998	Victor Francis Sammut Ruth Yvonne Sammut
	(2/30916)
1988 – 1997	Victor Francis Sammut, welder Ruth Yvonne Sammut, married woman
	(Lot 2 DP 30916 – CT Vol 9676 Fol 82)
1981 – 1988	Victor Francis Sammut, welder Ruth Yvonne Sammut, married woman
1979 – 1981	Tasmanian Board Mills Limited
1977 – 1979	Tamina Pty Limited
1964 – 1977	Cecil Eric Kroehnert, farmer Valerie Joan Kroehnert, married woman
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1949 – 1964	Stuart Lester Binns, dog fancier
1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor
1916 – 1916	John Seath, farmer Charles Seath, farmer
1900 – 1916	John Seath, farmer Charles Seath, farmer Jane Ann Seath, spinster

Note (b)

	(1/747364)
1987 – 2003	Norlex Holdings Pty Limited
	(Lot 3 DP 30916 – CT Vol 9676 Fol 83)
1983 – 1987	Norlex Holdings Pty Limited
1979 – 1983	Pakhurst Properties Pty Limited
1964 – 1979	Cecil Eric Kroehnert, farmer Valerie Joan Kroehnert, married woman
(1970 – 1987)	*(Various leases – see CT Vol 9676 Fol83)*
	(Part Portion 80 Parish of Castle Hill County of Cumberland – CT Vol 1316 Fol 5)
1949 – 1964	Stuart Lester Binns, dog fancier
1947 – 1949	John Cooper, hotel proprietor
1916 – 1947	Thomas Alfred Peterson, contractor

1916 – 1916	John Seath, farmer Charles Seath, farmer
1900 – 1916	John Seath, farmer Charles Seath, farmer Jane Ann Seath, spinster

* * * * *

Title Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 901/1029336

SEARCH DATE	TIME	EDITION NO	DATE
14/10/2008	3:53 PM	5	20/11/2007

LAND

LOT 901 IN DEPOSITED PLAN 1029336
AT ROUSE HILL
LOCAL GOVERNMENT AREA BAULKHAM HILLS
PARISH OF CASTLE HILL COUNTY OF CUMBERLAND
TITLE DIAGRAM DP1029336

FIRST SCHEDULE

NORLEX HOLDINGS PTY LIMITED (T AD578859)

SECOND SCHEDULE (2 NOTIFICATIONS)

1 U369820 EASEMENT FOR WATER SUPPLY WORKS 3.5 METRE(S) WIDE AS SET OUT IN MEMORANDUM X342178 AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
2 AD578860 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

PLAN FORM 2

Plan Drawing only to appear in this space

SIGNATURES AND SEALS ONLY

Dated at Sydney: 26th day of July 2001

Executed by Australia and New Zealand Banking Group Limited (ACN 005 357 522)

Signed by its Attorney ANTHONY BRECK ROLLINS who certifies that he is Manager - Business Banking pursuant to Power of Attorney Registered No. 540 Book 4228

Signed in the presence of:

(Signature)

TYLER BARKLEY
(Print Name)

ASSISTANT MANAGER
(Title)

Crown Lands Office Approval

PLAN APPROVED ..... Authorised Officer

Land District .....

Paper No .....

Field Book ..... pages .....

Subdivision Certificate

I certify that the provisions of s. 109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed SUBDIVISION set out hereon

(Insert 'Subdivision' or 'new road')

*Authorised Person/~~General Manager/Accredited Certifier~~

Consent Authority: BAULKHAM HILLS SHIRE COUNCIL

Date of endorsement: 18.7.2001

Accreditation No. –

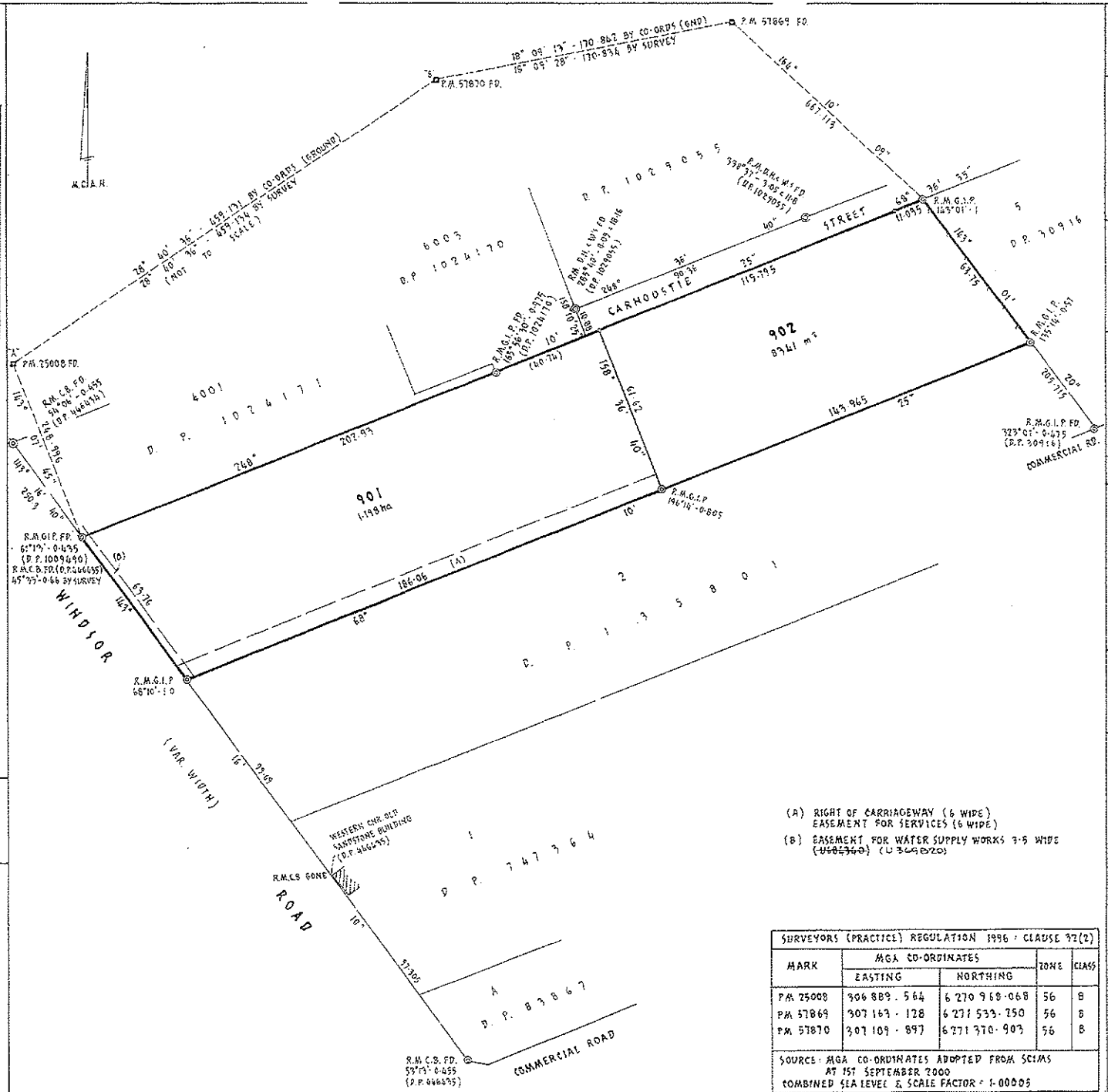
Subdivision Certificate No.: 9492

File No.: 3386-01

When the plan is to be lodged electronically in the Land Titles Office, it should include a signature in an electronic or digital format approved by the Registrar-General.

*Delete whichever is inapplicable.

SURVEYOR'S REFERENCE: 2926/E



SURVEYORS (PRACTICE) REGULATION 1996 - CLAUSE 92(2)				
MARK	MGA CO-ORDINATES		ZONE	CLASS
	EASTING	NORTHING		
PM 25008	306 889 . 564	6 270 968 . 068	56	B
PM 57869	307 169 . 128	6 271 539 . 250	56	B
PM 57870	307 109 . 897	6 271 370 . 903	56	B

SOURCE: MGA CO-ORDINATES ADOPTED FROM SCIMS AT 1ST SEPTEMBER 2000
COMBINED SEA LEVEL & SCALE FACTOR = 1.00005

10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 Table of mm 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370 380 390

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

DP1029336

Registered: 27.7.2001

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U 9161-4 #

Last Plan: DP135801

PLAN OF: SUBDIVISION OF LOT 1 IN D.P. 135801

Lengths are in metres Reduction Ratio 1:1000

L.G.A.: BAULKHAM HILLS

Locality: ROUSE HILL

Parish: CASTLE HILL

County: CUMBERLAND

This is sheet 1 of my plan in sheets.
(Delete if inapplicable)

Surveyors (Practice) Regulation 1996
BRENT DOUGLAS ANNIS-BROWN
P.O. BOX 208, PENNANT HILLS, 1715

A surveyor registered under the Surveyors Act, 1929, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveyors (Practice) Regulation 1996 and was completed on 21st MAY 2001.

The survey relates to LOTS 901, 902

(Here specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey)

Datum Line: 'A'-'B'

Zone: Suburban/County

(Signature)

Surveyor registered under the Surveyors Act, 1929

Plans used in preparation of survey/compilation

D.P. 30916, D.P. 1024170, D.P. 1012892, D.P. 1024171, D.P. 747364, D.P. 83867

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT, 1919, AS AMENDED IT IS INTENDED TO CREATE:-

1. RIGHT OF CARRIAGEWAY (6 WIDE)
2. EASEMENT FOR SERVICES (6 WIDE)

* OFFICE USE ONLY

Department of Lands
Reliable from the ground up

Cadastral Records Enquiry Report

Ref : 97 - ROUSE HILL

Requested Parcel : Lot 901 DP 1029336 **Identified Parcel :** Lot 901 DP 1029336

Locality : ROUSE HILL **LGA :** BAULKHAM HILLS **Parish :** CASTLE HILL **County :** CUMBERLAND

Report Generated 9:31:34 AM, 15 October, 2008

This information is provided as a searching aid only. While every endeavour is made to ensure the current cadastral pattern is accurately reflected, the Registrar General cannot guarantee the information provided. For all ACTIVITY PRIOR to SEPT 2002 you must refer to the RGs Charting and Reference Maps.

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:16PM

FOLIO: 901/1029336

First Title(s): OLD SYSTEM
Prior Title(s): 1/135801

Recorded	Number	Type of Instrument	C.T. Issue
27/7/2001	DP1029336	DEPOSITED PLAN	FOLIO CREATED EDITION 1
27/7/2001	DP1029338	DEPOSITED PLAN	EDITION 2
31/1/2003	9335399	DISCHARGE OF MORTGAGE	
31/1/2003	9335400	MORTGAGE	EDITION 3
/11/2006	AC748357	CAVEAT	
18/12/2006	AC816442	DISCHARGE OF MORTGAGE	EDITION 4
20/11/2007	AD578859	TRANSFER	
20/11/2007	AD578860	MORTGAGE	EDITION 5

*** END OF SEARCH ***

EIS - ROUSE HILL ALSP PRINTED ON 14/10/2008

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:17PM

FOLIO: 1/135801

First Title(s): OLD SYSTEM
Prior Title(s): 1/30916

Recorded	Number	Type of Instrument	C.T. Issue
1/12/1997	DP135801	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
25/3/1999	5654010	NOTICE OF DEATH	FOLIO CREATED CT NOT ISSUED
26/3/1999	5654010	NOTICE OF DEATH	EDITION 1
14/4/1999	5749909	DEPARTMENTAL DEALING	EDITION 2
17/9/1999	6206194	CAVEAT	
28/4/2000	6740443	TRANSFER	
28/4/2000	6740444	MORTGAGE	EDITION 3
27/7/2001	DP1029336	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

EIS - ROUSE HILL ALSP PRINTED ON 14/10/2008

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:20PM

FOLIO: 1/30916

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 9533 FOL 114

Recorded	Number	Type of Instrument	C.T. Issue
21/8/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
6/12/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
?9/1/1993	I81130	DISCHARGE OF MORTGAGE	
/1/1993	I81131	MORTGAGE	EDITION 1
8/6/1993	DP647840	DEPOSITED PLAN	
28/6/1994	U369820	GRANT OF EASEMENT	EDITION 2
12/9/1994	U610399	DISCHARGE OF MORTGAGE	EDITION 3
18/10/1994	U712332	TRANSFER	EDITION 4
1/12/1997	DP135801	DEPOSITED PLAN	
25/3/1999	5698380	DEPARTMENTAL DEALING	FOLIO CANCELLED

*** END OF SEARCH ***

Information Provided Through
Advance Legal Search Pty Ltd
Ph. 0297541590 *Fax.* 0297541364

Title Search

LEAP Legal
An Approved LPI *NSW*
Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 1021/1091484

SEARCH DATE	TIME	EDITION NO	DATE
14/10/2008	3:53 PM	2	20/12/2005

LAND

LOT 1021 IN DEPOSITED PLAN 1091484
AT ROUSE HILL
LOCAL GOVERNMENT AREA BAULKHAM HILLS
PARISH OF CASTLE HILL COUNTY OF CUMBERLAND
TITLE DIAGRAM DP1091484

FIRST SCHEDULE

BRIGID THERESA TUITE
LAURENCE OLIVER TUITE
AS JOINT TENANTS (T AB998572)

SECOND SCHEDULE (8 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 DP1058862 EASEMENT TO DRAIN WATER 5 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
3 DP1058862 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (2) IN THE S. 88B INSTRUMENT
4 DP1058862 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (3) IN THE S. 88B INSTRUMENT
5 DP1091484 EASEMENT TO DRAIN WATER 1.0 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
6 DP1091484 RIGHT OF CARRIAGEWAY 4 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
7 DP1091484 RIGHT OF CARRIAGEWAY 6 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED
8 DP1091484 EASEMENT FOR SERVICES 6 METRE(S) WIDE APPURTENANT TO THE LAND ABOVE DESCRIBED

NOTATIONS

DP1033579 NOTE: ROADS ACT 1993
UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

EIS - ROUSE HILL ALSP PRINTED ON 14/10/2008

PLAN FORM 2 (APPROVED FORM 3)

Plan Drawing only to appear in this space

SIGNATURES, AND SEALS ONLY.

Director

Director

Department of Lands Approval

.....in approving this plan certify that all necessary approvals in regard to the allocation of the land shown hereon have been given.

Signature: .....

Date: .....

File Number: .....

Office: .....

Subdivision Certificate

I certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed

SUBDIVISION set out herein (insert 'subdivision' or 'new road')

*Authorised Person/General Manager/Accredited Certifier

Consent Authority: BAULKHAM HILLS SHIRE COUNCIL

Date of Endorsement: 25.11.2005

Accreditation No: —

Subdivision Certificate No: 10207

File No: 690-06

*Delete whichever is inapplicable

SURVEYOR'S REFERENCE: 05234 D.P.

(A) EASEMENT FOR DRAINAGE 3·05 WIDE (J 479633)

(B) EASEMENT TO DRAIN WATER 5 WIDE (D.P.1058862)

(C) EASEMENT TO DRAIN WATER 1·0 WIDE

(D) RIGHT OF CARRIAGEWAY 4 WIDE

(E) RIGHT OF CARRIAGEWAY & EASEMENT FOR SERVICES 6 WIDE

(M) COVENANT – X613080

(N) BENEFITED BY EASEMENT TO DRAIN WATER 1·2 WIDE – DP1029338

SURVEYING REGULATION CLAUSE 32(2)					
MARK	M.G.A. CO-ORDINATES		ZONE	CLASS	ORDER
	EASTING	NORTHING			
P.M.25006	306 889·585	6 270 956·065	56	B	2
S.S.M.121565	307 411·547	6 270 927·461	56	C	3
S.S.M.121566	307 473·704	6 270 950·790	56	C	3
SOURCE: M.G.A. CO-ORDINATES ADOPTED FROM S.C.I.M.S. AT 11-8-2005					
COMBINED SCALE FACTOR 1·000046					

DP1091484

Registered: 7.12.2005

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U 9167-4 (B)

Last Plan: D.P.1058862

PLAN OF
SUBDIVISION OF
LOT 102 IN D.P.1058862

Lengths are in metres. Reduction Ratio 1:1250

L.G.A.: BAULKHAM HILLS

Locality: ROUSE HILL

Parish: CASTLE HILL

County: CUMBERLAND

This is sheet 1 of my plan in sheets
(Delete if inapplicable)

Surveying Regulation 2001

I, PAUL MICHAEL DALY

of JOHN M.DALY & ASSOC.PTY.LTD.
P.O.BOX 25 CASTLE HILL NSW

a surveyor registered under the Surveying Act, 2002, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation 2001 and was completed on 4.11.2005

The survey relates to LOTS 1021 AND 1022

(Delete whichever is inapplicable)

(Signature): Paul Daly Dated: 7.11.05

Surveyor registered under the Surveying Act 2002

Datum Line: 'X'-'Y'

Type: Urban/Rural

Plans used in preparation of Survey/Compilation

D.P.1058862
D.P.

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919 IT IS INTENDED TO CREATE:

1. EASEMENT TO DRAIN WATER 1·0 WIDE
2. RIGHT OF CARRIAGEWAY 4 WIDE
3. RIGHT OF CARRIAGEWAY 6 WIDE
4. EASEMENT FOR SERVICES 5 WIDE

*OFFICE USE ONLY

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

Department of Lands
Reliable from the ground up

Cadastral Records Enquiry Report

Ref : 97 - ROUSE HILL

Requested Parcel : Lot 1021 DP 1091484

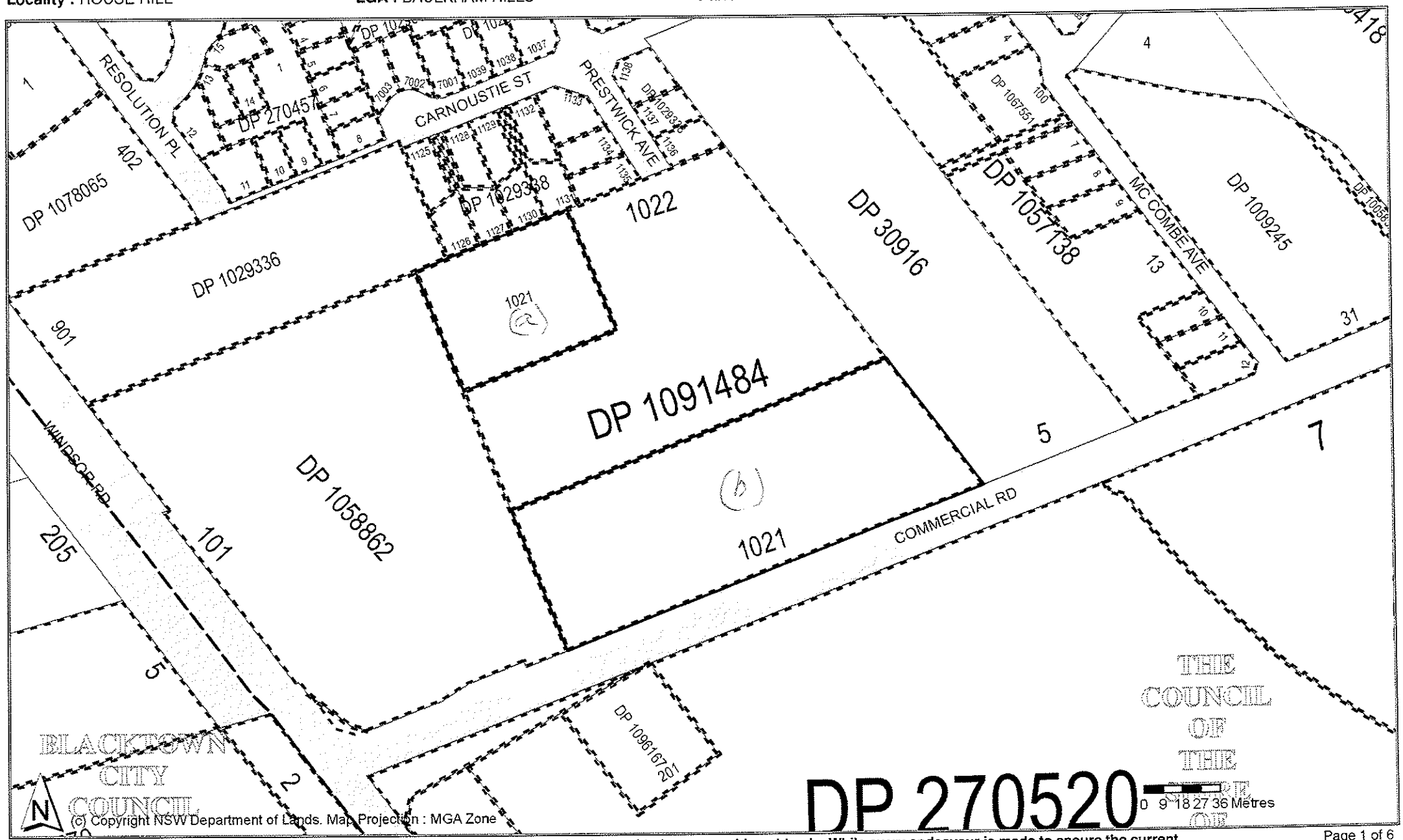
Identified Parcel : Lot 1021 DP 1091484

Locality : ROUSE HILL

LGA : BAULKHAM HILLS

Parish : CASTLE HILL

County : CUMBERLAND



Report Generated 9:32:28 AM, 17 October, 2008

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:24PM

FOLIO: 1021/1091484

First Title(s): OLD SYSTEM
Prior Title(s): 102/1058862

Recorded	Number	Type of Instrument	C.T. Issue
7/12/2005	DP1091484	DEPOSITED PLAN	FOLIO CREATED EDITION 1
20/12/2005	AB998572	TRANSFER	EDITION 2

*** END OF SEARCH ***

EIS - ROUSE HILL ALSP PRINTED ON 14/10/2008

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:25PM

FOLIO: 102/1058862

First Title(s): OLD SYSTEM
Prior Title(s): 2/135801 1-2/747364

Recorded	Number	Type of Instrument	C.T. Issue
8/12/2003	DP1058862	DEPOSITED PLAN	FOLIO CREATED EDITION 1
23/12/2003	AA280783	DISCHARGE OF MORTGAGE	EDITION 2
29/11/2005	DP1091482	UNNECESSARY - DEPOSITED PLAN	
12/2005	DP1091484	DEPOSITED PLAN	FOLIO CANCELLED
20/12/2005	DP1091482	RE-INSTATED - DEPOSITED PLAN	

*** END OF SEARCH ***

EIS - ROUSE HILL ALSP PRINTED ON 14/10/2008

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:26PM

FOLIO: 2/135801

First Title(s): OLD SYSTEM
Prior Title(s): 2/30916

Recorded	Number	Type of Instrument	C.T. Issue
1/12/1997	DP135801	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
29/7/1998	5122048	TRANSFER	FOLIO CREATED CT NOT ISSUED
30/7/1998	5122048	TRANSFER	
30/7/1998	5122049	MORTGAGE	EDITION 1
20/10/1998	5341820	DISCHARGE OF MORTGAGE	
20/10/1998	5341825	MORTGAGE	EDITION 2
6/10/2000	6833649	REQUEST	
27/7/2001	DP1029338	DEPOSITED PLAN	
15/11/2001	7860992	REQUEST	
8/12/2003	DP1058862	DEPOSITED PLAN	FOLIO CANCELLED RESIDUE REMAINS

*** END OF SEARCH ***

EIS - ROUSE HILL ALSP PRINTED ON 14/10/2008

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:33PM

FOLIO: 2/747364

First Title(s): OLD SYSTEM
Prior Title(s): VOL 9990 FOL 75

Recorded	Number	Type of Instrument	C.T. Issue
2/10/1987	DP747364	DEPOSITED PLAN	FOLIO CREATED EDITION 1
19/2/1992	E269302	APPLN FOR REPLACEMENT CT	
19/2/1992	E269303	MORTGAGE	EDITION 2
26/11/1993	I826088	DISCHARGE OF MORTGAGE	EDITION 3
15/12/1993	I879581	NOTICE OF DEATH	EDITION 4
3/2/1998	3770270	DISCHARGE OF MORTGAGE	
3/2/1998	3770271	TRANSFER	EDITION 5
13/7/1998	5122039	MORTGAGE	EDITION 6
20/10/1998	5341821	DISCHARGE OF MORTGAGE	
20/10/1998	5341826	MORTGAGE	EDITION 7
8/12/2003	DP1058862	DEPOSITED PLAN	FOLIO CANCELLED RESIDUE REMAINS

*** END OF SEARCH ***

Title Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 1022/1091484

SEARCH DATE	TIME	EDITION NO	DATE
14/10/2008	3:53 PM	1	7/12/2005

LAND

LOT 1022 IN DEPOSITED PLAN 1091484
AT ROUSE HILL
LOCAL GOVERNMENT AREA BAULKHAM HILLS
PARISH OF CASTLE HILL COUNTY OF CUMBERLAND
TITLE DIAGRAM DP1091484

FIRST SCHEDULE

NORLEX HOLDINGS PTY LIMITED

SECOND SCHEDULE (9 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 X613080 COVENANT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM.
3 DP1029338 EASEMENT TO DRAIN WATER 1.2 METRE(S) WIDE APPURTENANT TO THE PART SHOWN SO BENEFITED IN THE TITLE DIAGRAM
4 DP1058862 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (2) IN THE S. 88B INSTRUMENT
5 DP1058862 RESTRICTION(S) ON THE USE OF LAND REFERRED TO AND NUMBERED (3) IN THE S. 88B INSTRUMENT
6 DP1091484 EASEMENT TO DRAIN WATER 1.0 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
7 DP1091484 RIGHT OF CARRIAGEWAY 4 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
8 DP1091484 RIGHT OF CARRIAGEWAY 6 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
9 DP1091484 EASEMENT FOR SERVICES 6 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM

NOTATIONS

DP1033579 NOTE: ROADS ACT 1993
UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

EIS - ROUSE HILL ALSP PRINTED ON 14/10/2008

Department of Lands
Reliable from the ground up

Cadastral Records Enquiry Report

Ref : 97 - ROUSE HILL

Requested Par_ _ : Lot 1022 DP 1091484

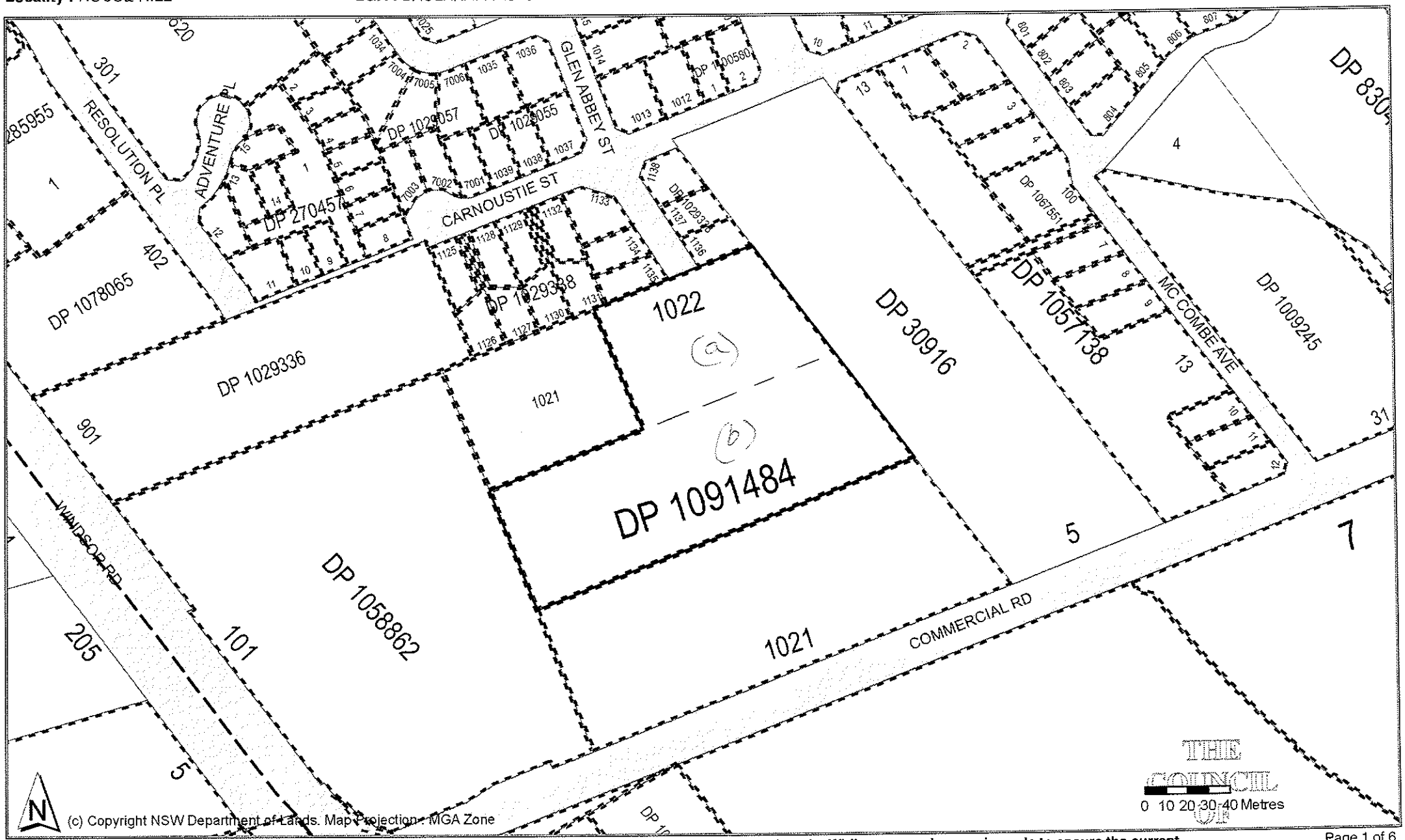
ntified Parcel : Lot 1022 DP 1091484

Locality : ROUSE HILL

LGA : BAULKHAM HILLS

Parish : CASTLE HILL

County : CUMBERLAND



Report Generated 9:32:29 AM, 17 October, 2008

PLAN FORM 2 (APPROVED FORM 3)

Plan Drawing only to appear in this space

SIGNATURES, AND SEALS ONLY

Director

Director

Ⓐ EASEMENT FOR DRAINAGE 3·05 WIDE (J 479633)

Ⓑ EASEMENT TO DRAIN WATER 5 WIDE (D.P.1058862)

Ⓒ EASEMENT TO DRAIN WATER 1·0 WIDE

Ⓓ RIGHT OF CARRIAGEWAY 4 WIDE

Ⓔ RIGHT OF CARRIAGEWAY & EASEMENT FOR SERVICES 6 WIDE

(M) COVENANT – X613080

(N) BENEFITED BY EASEMENT TO DRAIN WATER 1·2 WIDE – DP1029338

SURVEYING REGULATION CLAUSE 32(2)					
MARK	M.G.A. CO-ORDINATES		ZONE	CLASS	ORDER
	EASTING	NORTHING			
P.M.25008	306 889·565	6 270 968·065	56	B	2
S.S.M.121565	307 411·347	6 270 927·461	56	C	3
S.S.M.121566	307 473·706	6 270 950·790	56	C	3
SOURCE: M.G.A. CO-ORDINATES ADOPTED FROM S.C.I.M.S. AT 11-8-2005					
COMBINED SCALE FACTOR 1·000046					

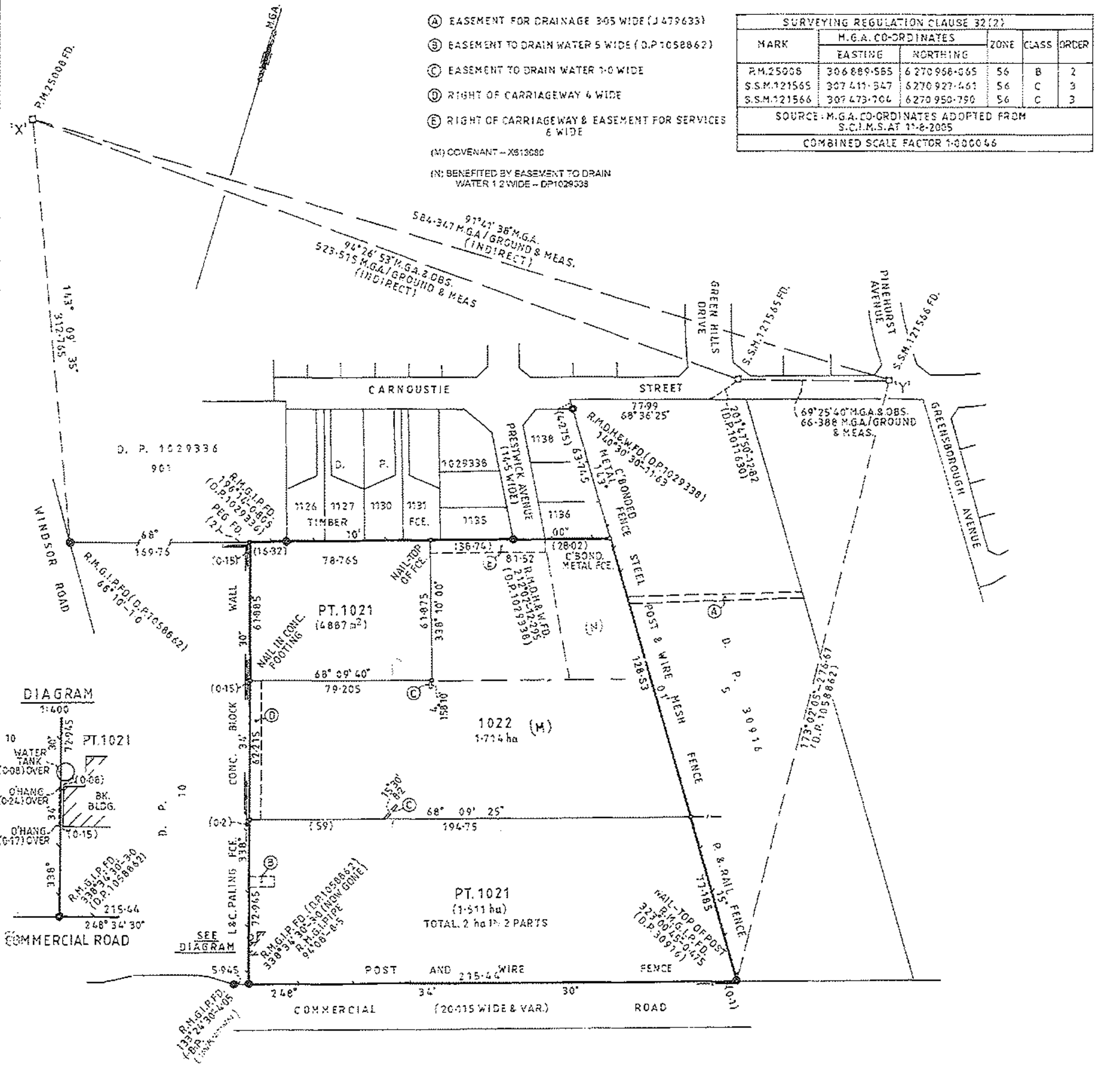


Table of mm

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

DP1091484

Registered: 7.12.2005

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U 9167-4

Last Plan: D.P.1058862

PLAN OF

SUBDIVISION OF LOT 102 IN D.P.1058862

Lengths are in metres. Reduction Ratio 1:1250

L.G.A.: BAULKHAM HILLS

Locality: ROUSE HILL

Parish: CASTLE HILL

County: CUMBERLAND

~~This is sheet 1 of my plan in .... sheets.~~
(Delete if inapplicable)

Surveying Regulation 2001

I, PAUL MICHAEL DALY

of JOHN M. DALY & ASSOC. PTY. LTD. P.O. BOX 25 CAMPBELLTOWN

a surveyor registered under the Surveying Act, 2002, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation 2001 and was completed on 4.11.2005

The survey relates to LOTS 1021 AND 1022

(here specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey)

(Signature) .... Dated 7-11-05

Surveyor registered under the Surveying Act 2002

Datum Line: 'X'–'Y'

Type: Urban/Rural

Plans used in preparation of Survey/Compilation

D.P. 1058862

D.P.

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT 1919 IT IS INTENDED TO CREATE:

1. EASEMENT TO DRAIN WATER 1·0 WIDE
2. RIGHT OF CARRIAGEWAY 4 WIDE
3. RIGHT OF CARRIAGEWAY 6 WIDE
4. EASEMENT FOR SERVICES 6 WIDE

'OFFICE USE ONLY'

Department of Lands Approval

I, ... (Authorised Officer) in approving this plan certify that all necessary approvals in regard to the allocation of the land shown hereon have been given.

Signature: ....

Date: ....

File Number: ....

Office: ....

Subdivision Certificate

I certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed SUBDIVISION set out herein

*(Insert 'subdivision' or 'new road')

*Authorised Person/General Manager/Accredited Certifier

Consent Authority: BAULKHAM HILLS SHIRE COUNCIL

Date of Endorsement: 25.11.2005

Accreditation No: ——

Subdivision Certificate No: 10207

File No: 690-06

*Delete whichever is inapplicable

SURVEYOR'S REFERENCE: 05234 D.P.

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:40PM

FOLIO: 1022/1091484

First Title(s): OLD SYSTEM
Prior Title(s): 102/1058862

Recorded	Number	Type of Instrument	C.T. Issue
7/12/2005	DP1091484	DEPOSITED PLAN	FOLIO CREATED EDITION 1

*** END OF SEARCH ***

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:29PM

FOLIO: 2/30916

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 9676 FOL 82

Recorded	Number	Type of Instrument	C.T. Issue
21/8/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
15/12/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
8/6/1993	DP647840	DEPOSITED PLAN	
27/6/1994	U361532	GRANT OF EASEMENT	EDITION 1
1/12/1997	DP135801	DEPOSITED PLAN	
28/7/1998	5158949	DEPARTMENTAL DEALING	FOLIO CANCELLED RESIDUE REMAINS
28/7/1998	5158966	DEPARTMENTAL DEALING	FOLIO CANCELLED RESIDUE REMAINS

*** END OF SEARCH ***

Historical Search

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
14/10/2008 4:32PM

FOLIO: 1/747364

First Title(s): OLD SYSTEM
Prior Title(s): VOL 9676 FOL 83 VOL 9990 FOL 75

Recorded	Number	Type of Instrument	C.T. Issue
2/10/1987	DP747364	DEPOSITED PLAN	FOLIO CREATED EDITION 1
16/6/1988	X613078	DISCHARGE OF MORTGAGE	
16/6/1988	X613079	DISCHARGE OF MORTGAGE	
16/6/1988	X613080	TRANSFER	
16/6/1988	X613081	MORTGAGE	EDITION 2
22/7/1993	DP647991	DEPOSITED PLAN	
13/4/1995	O154601	GRANT OF EASEMENT	EDITION 3
20/10/1998	5341824	DISCHARGE OF MORTGAGE	
20/10/1998	5341829	MORTGAGE	EDITION 4
6/10/2000	6833648	REQUEST	
14/9/2001	DP1033579	DEPOSITED PLAN	
15/11/2001	7860991	REQUEST	
19/8/2003	DP1057486	DEPOSITED PLAN	EDITION 5
8/12/2003	DP1058862	DEPOSITED PLAN	FOLIO CANCELLED RESIDUE REMAINS

*** END OF SEARCH ***

EIS - ROUSE HILL ALSP PRINTED ON 14/10/2008

G. 2

NEW SOUTH WALES

Application No. 11352

Prior Title Vol. 1316 Fol. 5.

IFICATE OF TITLE

ERTY ACT, 1900, as amended.

Vol. 9676 Fol. 83

CANCELLED W

1st Edition issued 7-4-1964

EH J479949

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness S Maclennan

Registrar-General.

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 3 in Deposited Plan 30916 in the Shire of Baulkham Hills Parish of Castle Hill and County of Cumberland being part of Portion 80 granted to Charles Davis on 13-1-1818.

Registrar General.

FIRST SCHEDULE (continued overleaf)

~~CECIL ERIC KROEHNERT, of Rouse Hill, Farmer and VALERIE JOAN KROEHNERT, his wife, as Joint Tenants.~~

Registrar General.

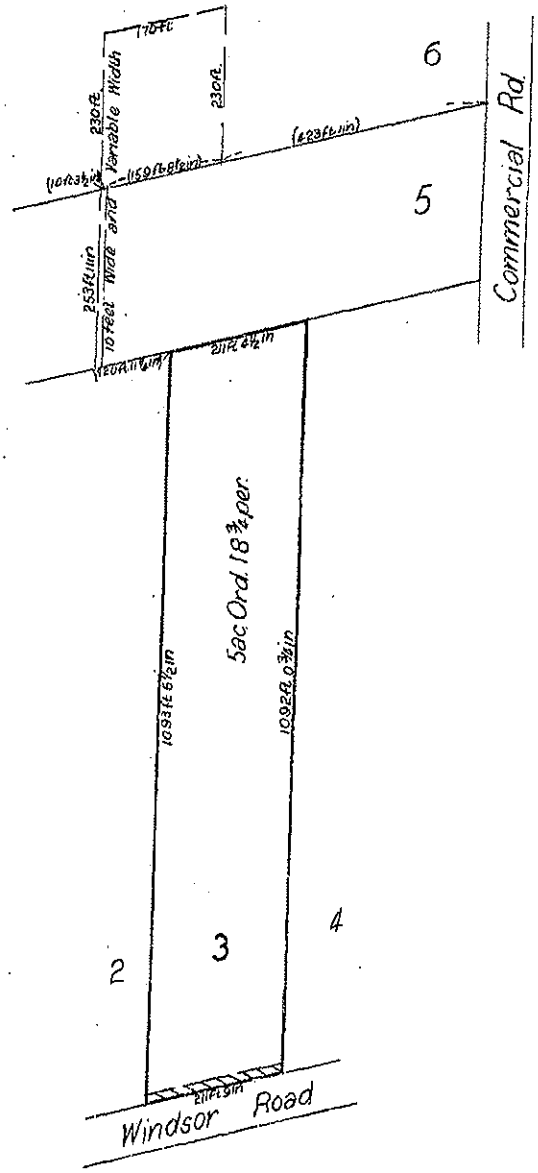
SECOND SCHEDULE (continued overleaf)

1. Reservations and conditions, if any, contained in the Crown Grant(s) referred to in the said Deposited Plan.
2. Restriction on User No. H709057 ~~J709057~~ of land shown by hatching in the plan hereon see Section 27E(6) Main Roads Act, 1924. Entered 15-6-1962.
3. Easement for Drainage created by Transfer No.J479949 appurtenant to the land above described affecting the piece of land shown as "10 feet wide and variable width" in the plan hereon.

Registrar General.

Vol. 9676 Fol. 83

PLAN SHOWING LOCATION OF LAND



1479040 AH

Scale: 200 feet to one inch

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	NUMBER	DATE	ENTERED	Signature of Registrar-General
~~Peakhurst Properties Pty. Limited~~	~~Transfer~~	~~R212773~~		~~14-5-1979~~	
Norlex Holdings Pty. Limited by Transfer T758974. Registered 4-10-1983					
DP/747364 Registered 29-9-1987					
This folio is cancelled as to whole/ upon ... of computer folios for lots 1 ... abovementioned plan.					

R R127724/x —372/R
R473577m. CT 8/2/82
S929475/R
T758973/R —25/L (S929475) —7311/74 TC

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	NUMBER	DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION		
~~Caveat~~	~~M425912~~	~~9-9-1971~~	~~as to land shown in plan annexed to caveat No M425912 marked "A" and edged red~~	~~9-9-1971~~		Withdrawn	R212772	
~~Mortgage~~	~~R473577~~		~~to Bank of New South Wales~~	~~17-10-1979~~				
~~Lease~~	~~M442580~~	~~16-5-1970~~	~~to Stepport (Holdings) Pty. Limited, being land shown in plan annexed hereto, edged red.~~	~~5-10-1971~~		Expired	14-5-1979	
~~Mortgage~~	~~R473577~~		~~to Bank of New South Wales~~	~~17-10-1979~~		Discharged	T758973	
~~S929475 Lease to Cotonvale Holdings Pty. Limited, together with rights. Expires 28-9-1986. Registered 24-2-1982.~~						Surrendered	T758972	
T758971 Lease to Cotonvale Holdings Pty. Limited together with an option of renewal. Expires 28-9-1989. Registered 4-10-1983								
W910524 Mortgage to Commonwealth Bank of Australia. Registered 11.6.1987.								

DP747364R
W910524M R
Reg Gen 24.2.82

(Page 3 of 4 Pages)

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

Vol. 9676 Fol. 83

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION		
~~Lease~~	~~M442580~~	~~16-5-1970~~	~~to Stoppart (Holdings) Pty. Limited, being land shown in plan annexed hereto, edged red~~	5-10-1971	[signature]	~~Expired~~	~~14-5-1979~~	[illegible] Reg-Gen 24-2-82

(Page 4 of 4 pages)

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

G.

NEW SOUTH WALES

For Grant and title reference prior to first edition see Deposited Plan.

CERTIFICATE OF TITLE

PROPERTY ACT, 1900, as amended.

Vol. 9533 Fol. 114

1st Edition issued 4-10-1963

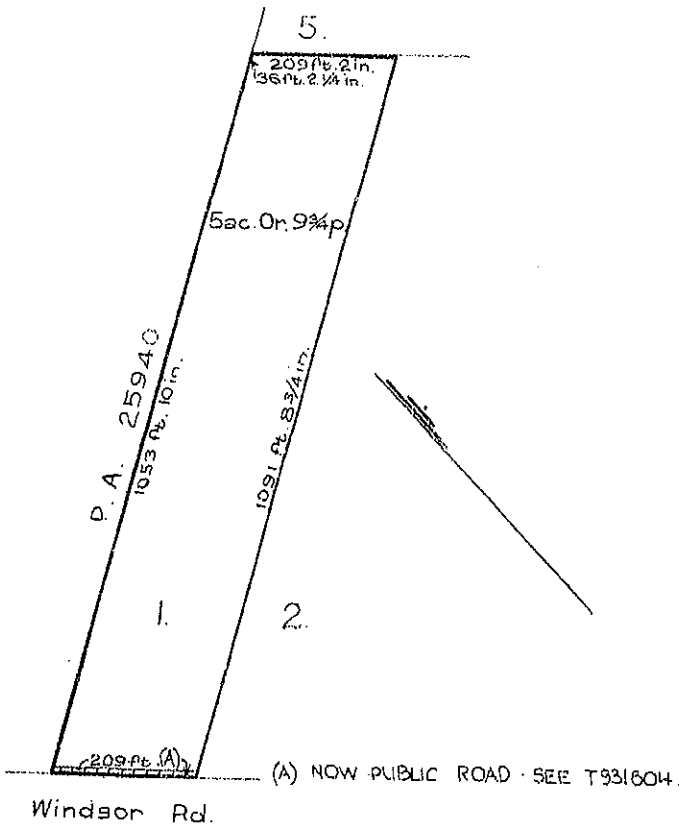
MA J407826

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness

Registrar-General.

PLAN SHOWING LOCATION OF LAND



J407826 A.M.G. Scale: 200 feet to one inch.

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 1 in Deposited Plan 30916 in the Shire of Baulkham Hills Parish of Castle Hill and County of Cumberland.

Registrar General.

FIRST SCHEDULE (continued overleaf)

~~RONALD JOHN HALSEY, of Castle Hill, Interior Decorater and LORNA MARGARET HALSEY, his wife as Joint Tenants~~

Registrar General.

SECOND SCHEDULE (continued overleaf)

1. Reservations and conditions if any contained in the Crown Grant(s) referred to in the said Deposited Plan.

~~2. Restriction on User No. H[illegible]67 of land shown by hatching in plan hereon. See Section 27E(6) Main Roads Act 1924. Entered 15-6-1962.~~ Cancelled T931804

Registrar General.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED.

Vol. 9533 Fol. 114

70039 1.62 ST 1609 V. C. N. BLIGHT GOVERNMENT PRINTER

CT 21/3/78
R 829572T
V417578

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General
~~Jack Leonard Sandstrom of Kings Langley, Managing Director and Annette May Sandstrom his wife as joint tenants~~	~~Transfer~~	~~R829572~~		~~29-5-1980~~	
Jack Leonard Sandstrom by Transfer V417578 Registered 14-1-1985					

CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION
Mortgage	R829573	——	to The National Bank of Australasia Limited	29-5-1980		
T931804 Application. The land so indicated in the plan hereon designated (A) is now public road vested in the Council of the Shire of Baulkham Hills. Registered 22-3-1984.						

(Page 2 of 2 pages)

FORM No. 183A

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

C. 2
NEW SOUTH WALES

Application No. 11352

Prior Title Vol. 1316 Fol. 5

IFICATE OF TITLE
ERTY ACT, 1900, as amended.

Vol. 9676 Fol. 82

1st Edition issued 7-4-1964

EH J479633

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness S Maclennan

CANCELLED
Registrar-General.
SEE AUTO FOLIO

S

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 2 in Deposited Plan 30916 in the Shire of Baulkham Hills Parish of Castle Hill and County of Cumberland being part of Portion 80 granted to Charles Davis on 13-1-1818.

Registrar General.

FIRST SCHEDULE (continued overleaf)

~~CECIL ERIC KROEHNERT, of Rouse Hill, Grazier and VALERIE JOAN KROEHNERT, his wife, as Joint Tenants.~~

Registrar General.

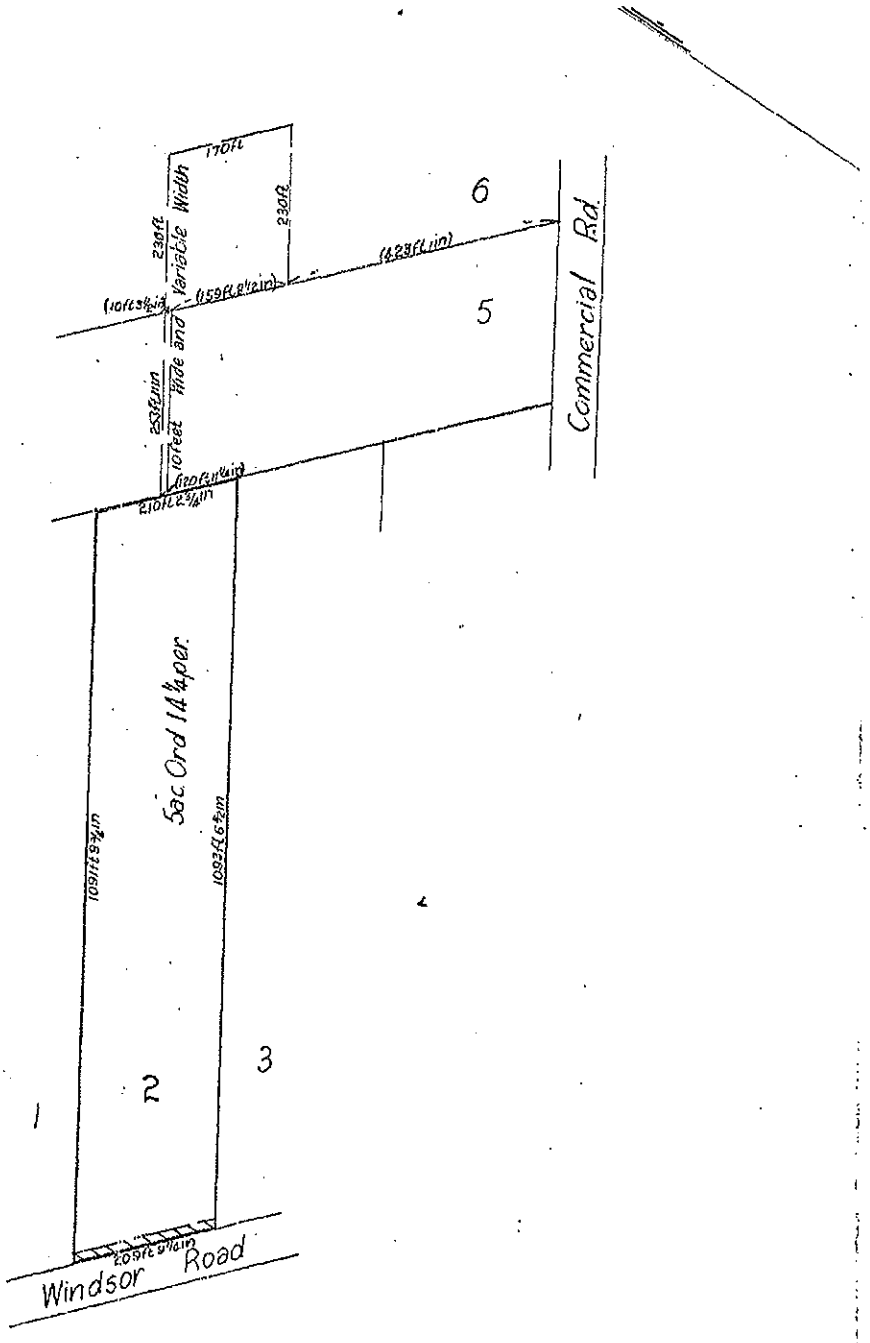
SECOND SCHEDULE (continued overleaf)

CRY
1. Reservations and conditions, if any, contained in the Crown Grant(s) above referred to.
2. ~~Restriction on User No.H709057 of land shown by hatching in the plan hereon see Section 27E(6) Main Roads Act 1924. Entered 15-6-1962.~~ cancelled K662292. NSW
3. Easement for Drainage created by Transfer No.J479633 appurtenant to the land above described affecting the piece of land shown as "10 feet wide and variable width" in the plan hereon;

Registrar General.

Vol. 9676 Fol. 82

PLAN SHOWING LOCATION OF LAND



J479633 CH

Scale: 200 feet to one inch

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar-General
~~Tarnina Pty. Limited~~	~~Transfer~~	~~Q440553~~		~~12-12-1977~~	
~~Tasmanian Board Mills Limited~~	Transfer	~~R411958~~		~~11-9-1979~~	
Victor Francis Sammut of Oakville, Welder, and Ruth Yvonne Sammut, his wife, as joint tenants	Transfer	S241647		13-1-1981	

CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION		
~~Mortgage~~	~~J473634~~	~~17.10.1963~~	~~to Stuart Lester Binns, of Rodd Hill, Antique Dealer.~~	~~20.5.1964~~		Discharged	K484013	
Application	K662292	4.4.1967	The land shown by black hatching in the plan hereon is now public road and is vested in the ~~Shire of~~ ~~B.~~ Council of the Shire of Baulkham Hills	20.2.1967				
~~Caveat~~	~~P351897~~			~~30-7-1975~~		Cancelled	P914495	
~~Mortgage~~	~~Q440554~~		~~to The Commercial Bank of Australia Limited~~	~~12-12-1977~~		Discharged	R411057	
~~Mortgage~~	~~R771893~~		~~to The Commercial Bank of Australia Limited~~	~~18-4-1980~~		Discharged	S241646	
~~Mortgage~~	~~S241648~~		~~to Commonwealth Savings Bank of Australia~~	~~13-1-1981~~		Discharged	W52848	

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

Vol. 9876 Fol. 82

Vol. 9576 Fol. 82

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT			ENTERED	Signature of Registrar-General
	NATURE	NUMBER	DATE		

SECOND SCHEDULE (continued)

INSTRUMENT			PARTICULARS	ENTERED	Signature of Registrar-General	CANCELLATION		
NATURE	NUMBER	DATE						

 NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR-GENERAL ARE CANCELLED

IFICATE OF TITLE

NEW SOUTH WALES — 'ERTY ACT, 1900, as amended.

Applications Nos. 11352 and 33
Prior Titles (Vol. 1316 Fol. 5
(Vol. 6819 Fol. 75

33867

Vol. 9990 Fol. 75

CANCELLED W

1st Edition issued 12.4.1965.

SC. J936058

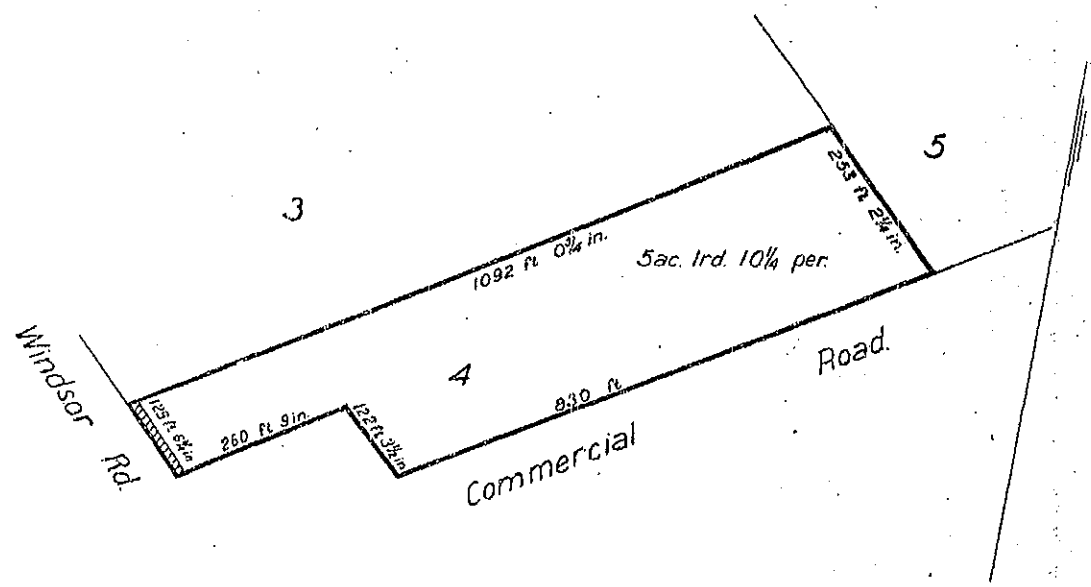
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness S Maclennan

Registrar General.

Vol 9990 Fol 75 (Page 1)

PLAN SHOWING LOCATION OF LAND



Scale: 200 feet to one inch

1058 J.O.

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 4 in Deposited Plan 30916 in the Shire of Baulkham Hills, Parish of Castle Hill and County of Cumberland, being part of Portion 80 granted to Charles Davis on 13.1.1818.

Registrar General.

FIRST SCHEDULE (continued overleaf)

~~STUART LESTER BINNS of Rouse Hill, Dog Fancier.~~

Registrar General.

SECOND SCHEDULE (continued overleaf)

1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
2. Restriction on user No. H709057 of land shown by hatching in plan hereon. - See Section 27E (6) Main Roads Act, 1924. Entered 15.6.1962.

Registrar General.

Vol. 9990 Fol. 75

V. C. N. BLIGHT, GOVERNMENT PRINTER

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR		INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
Emanuel Schembri of Prospect Sigwater and Caterina Louise Schembri his wife as joint tenants as to an undivided one half share and Joseph Domenic Schembri of Prospect Sigwater as to the remaining undivided one half share	as tenants in common	Transfer	M846391	26.1.1966	15.8.1972	[signature]
DP/ 747364 Registered 29.9.1987 This folio is cancelled as to whole [illegible] upon creation of computer folios for lots 1 and 2 in the abovementioned plan.						

M26591/T

~~DP 226174~~ DOES NOT AFFECT V658792

DP747364

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		
V658792			Mortgage to Westpac Banking Corporation. Registered 29.4.1985		[seal]			

(Page 2 of 2 pages)

FORM No. 62

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

97 01T

TRANSFER (1)

Real Property Act, 1900

Land Titles Office use only

U 712332 B

Office of S

B97
/Req: B472783
/Doc: DL U712332
/Prt: 15-Oct-2008

E
PS
NO STAMP DUTY IS PAYABLE ON THIS INSTRUMENT

(A) **LAND TRANSFERRED**
Show no more than 20 References to Title. If appropriate, specify the share transferred.

FOLIO IDENTIFIER 1/30916

(B) **LODGED BY**

L.T.O. Box	Name, Address or DX and Telephone
	COLEMAN & GREIG COLEMAN & GREIG SOLICITORS 180 Y
	Reference (max. 15 characters): SANDSTROM

(C) **TRANSFEROR** JACK LEONARD SANDSTROM

(D) acknowledges receipt of the consideration of $1.00
and as regards the land specified above transfers to the transferee an estate in fee simple

(E) subject to the following **ENCUMBRANCES** 1. ..... 2. ..... 3. .....

(F) **TRANSFEREE** T

JACK LEONARD SANDSTROM and ANNETTA MAY SANDSTROM

(G) TENANCY: AS JOINT TENANTS

(H) We certify this dealing correct for the purposes of the Real Property Act, 1900

DATE 10th October 1994

Signed in my presence by the transferor who is personally known to me

Signature of Witness

F.L. Booth

Name of Witness (BLOCK LETTERS)

WINDSOR RD ROUSE HILL

Address of Witness

Signature of Transferor

Signed in my presence by the transferee who is personally known to me

Signature of Witness

F.L. Booth

Name of Witness (BLOCK LETTERS)

WINDSOR RD ROUSE HILL

Address of Witness

A M Sandstrom

Signature of Transferee

INSTRUCTIONS FOR FILLING OUT THIS FORM ARE AVAILABLE FROM THE LAND TITLES OFFICE

CHECKED BY (office use only)

H C MARTYN & SONS (AUST.) PTY LTD PH (02) 699 2499

Req:R994143 /Doc:DL 3770271 /Rev:04-Feb-1998 /Sts:NO.OK /Prt:14-Oct-2008 16:40 /Pgs:ALL /Seq:1 of 1
Ref:EIS - ROUSE HILL ALSP /Src:M

Form: 97-01T
Licence: AUS/0634/96

TRANSFE

New South Wale:
Real Property Act 19:

3770271 R

nly

Instructions for filling out this form are available from the Land Titles Office

Office of State Revenue use only

(A) **LAND TRANSFERRED**
If appropriate, specify the share or part transferred.

FOLIO IDENTIFIER 2/747364

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone
1057M	Atkinsons Vinden Reference (15 character maximum): CS

(C) **TRANSFEROR** CATHERINE LOUISE SCHEMBRI and JOSEPH SCHEMBRI

(D) acknowledges receipt of the consideration of $1,400,000.00
and as regards the land specified above transfers to the transferee an estate in fee simple.

(E) Encumbrances (if applicable): 1. ..... 2. ..... 3. .....

(F) **TRANSFEREE**

(G)

T TS (s713 LGA) TW (Sheriff)	NORLEX HOLDINGS PTY LIMITED (ACN 002 073 145) **TENANCY:**

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. **DATE** 23rd January 1998
Signed in my presence by the transferor who is personally known to me.

X .....
Signature of Witness

X ROBERT H STEPHEN
Name of Witness (BLOCK LETTERS)

X 42 PANORAMA TERRACE GREEN POINT
Address of Witness

CLS X C L Schembri

J.S. X .....
Signature of Transferor

Signed in my presence by the transferee who is personally known to me.

.....
Signature of Witness

.....
Name of Witness (BLOCK LETTERS)

.....
Address of Witness

.....
Solicitor ~~Signature of~~ Transferee
GRAHAM A. RUSHFORTH
DIP.LAW (S.A.B.)
A.C.I.S. (ENR.)

If signed on the transferee's behalf by a solicitor or licensed conveyancer, show the signatory's full name in block letters.

Checked by (LTO use) .....

Licence: AUS/0634/96

TRANSFER

New South Wales
Real Property Act 1900

5122048 M

Instructions for filling out this form are available from the Land Titles Office

Office of State Revenue use only

$2.00

(A) **LAND TRANSFERRED**
If appropriate, specify the share or part transferred.

folio Identifier: 2/30916
NOW BEING 2/1357801

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone
24J	CTB Reference (15 character maximum): 044290-TE93

(C) **TRANSFEROR** VICTOR FRANCIS SAMMUT & RUTH YVONNE SAMMUT

(D) acknowledges receipt of the consideration of $1,700,000.00
and as regards the land specified above transfers to the transferee an estate in fee simple.

(E) Encumbrances (if applicable): 1. ..... 2. ..... 3. .....

(F) **TRANSFEREE**

T TS (s713 LGA) TW (Sheriff)	NORLEX HOLDINGS PTY LIMITED (ACN 002 073 145)

(G) TENANCY:

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. DATE 3/7/98
Signed in my presence by the transferor who is personally known to me.

Signature of Witness

JOHN IASSARINO.
Name of Witness (BLOCK LETTERS)

115 Flushcombe Rd. Blacktown NSW 2148.
Address of Witness

R Ruth Y Vic Sammut
Signature of Transferor

Signed in my presence by the transferee who is personally known to me.

Signature of Witness

Name of Witness (BLOCK LETTERS)

Address of Witness

Solicitor Signature of transferee
PATRICIA ANN KAYE-KUCHARZEWSKI
If signed on the transferee's behalf by a solicitor or licensed conveyancer, show the signatory's full name in block letters.

Checked by (LTO use) .....

5654010V

Form: 97-02ND
Licence: 189Y/0874/97

NOTICE OF DEATH

New South Wales
Section 101 Real Property Act 1900

(A) LAND

Whole of the land in certificates of Title folio identifiers
1/30916 15/SP10876 324/874234 144/247829

(B) REGISTERED DEALING
If applicable.

(C) LODGED BY

L.T.O. Box	Name, Address or DX and Telephone
	COLEMAN & GREIG SOLICITORS 189 Y REFERENCE (max.15 characters): SANDSTROM

(D) DECEASED REGISTERED PROPRIETOR JACK LEONARD SANDSTROM......

(E) SURVIVING JOINT TENANT

ND	ANNETTA MAY SANDSTROM

NOW BEING 1/135801

(F) I, the Surviving Joint Tenant, apply to be registered as proprietor of the interest of the Deceased Joint Tenant in the **Land/Registered Dealing** referred to above.

(G) STATUTORY DECLARATION

I solemnly and sincerely declare that the Deceased Joint Tenant died on 14 December 1998 and is identical with the deceased named in the **Death Certificate** No. 44121/1998 accompanying this application.

I make this solemn declaration conscientiously believing the same to be true and by virtue of Oaths Act, 1900, and I certify this application correct for the purposes of the Real Property Act 1900. Made and subscribed at Parramatta. in the State of New South Wales on 24th February, 1999.

in the presence of

CM Cockburn
Signature of Witness

Craig Manners Cockburn
Name of Witness (BLOCK LETTERS)

100 George St Parramatta, Solicitor
Address and Qualification of Witness

a m Sandstrom
Signature of Surviving Joint Tenant

Evidence sighted & returned (LTO use) ....
Checked by (LTO use) ....

eq:R993894 /Doc:DL 6740443 /Rev:02-May-2000 /Sts:NO.OK /Prt:14-Oct-2008 10:24
ef:EIS - ROUSE HILL ALSP /Src:M

Form: 97-01T

Licence: 026CN/0526/96

TRANSFER

(1) New South Wales
Real Property Act 1900

6740443H

Instructions for filling out this form are available from the Land Titles Office

Office of State Revenue use only

NEW SOUTH WALES DUTY
16-12-1999 0000187955-005
SECTION 18(2)
DUTY $ ************2.00

(A) LAND TRANSFERRED
Show no more than 20 titles. If appropriate, specify the share or part transferred.

FOLIO IDENTIFIER 1/135801

(B) LODGED BY

LTO Box	Name, Address or DX and Telephone
29X	HICKSON WISEWOULDS LAWYERS BOX 29X DX 309 REFERENCE (15 character maximum): 00 8817

(C) TRANSFEROR ANNETTA MAY SANDSTROM

(D) acknowledges receipt of the consideration of $1,810,000.00

and as regards the land specified above transfers to the transferee an estate in fee simple.

(E) Encumbrances (if applicable) 1. 2. 3.

(F) TRANSFEREE

T / TS (s713 LGA) / TW (Sheriff)	BALMORAL BOARDSAILING SCHOOL PTY LIMITED ACN 000 552 652 ~~TENANCY:~~

(G)

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. DATE 20/4/2000

Signed in my presence by the transferor who is personally known to me.

CM Cockburn
Signature of Witness

CRAIG MANNERS COCKBURN
Name of Witness (BLOCK LETTERS)

100 GEORGE ST PARRAMATTA
Address of Witness

a m sandstrom
Signature of Transferor

Signed in my presence by the transferee who is personally known to me.

Signature of Witness

Name of Witness (BLOCK LETTERS)

Address of Witness

Alan S. Osburg
Signature of Transferee's Solicitor

NB: if signed on the transferee's behalf by a solicitor or licensed conveyancer, show the signatory's full name in block letters.

X 6206194 lapses

X 6206194

STAMP DUTY $1

X613080

TRANSFER
(INCLUDING EASEMENT/COVENANTS)

REAL PROPERTY ACT, 1900
(See Instructions for Completion on back of form)

33 of 4 X
$ 39 C R3 4

DESCRIPTION OF LAND Note (a)

LAND being transferred

Torrens Title Reference	If Part Only, Delete Whole and Give Details	Location
Volume 9990 Folio 75 ~~Now whole F/I 1/747364~~	PART BEING LOT 1 IN ~~WHOLE~~ DEPOSITED PLAN 747364	At Rouse Hill

TENEMENTS PANEL Note (b) This panel also to be completed for covenants by transferor

Servient Tenement (Land burdened by easement)		Dominant Tenement (Land benefited by easement)	
Torrens Title Reference	Torrens Title Reference	Torrens Title Reference	Torrens Title Reference

TRANSFEROR Note (c)

EMMANUEL SCHEMBRI, CATHERINE LOUISE SCHEMBRI and JOSEPH DOMINIC SCHEMBRI

OFFICE USE ONLY N

Note (d) STET. (the abovenamed TRANSFEROR) hereby acknowledges receipt of the consideration of $80,000.00
and transfers an estate in fee simple in the land being transferred above described to the TRANSFEREE

TRANSFEREE Note (c)

NORLEX HOLDINGS PTY. LIMITED of 12 Duff Place, Castle Hill

OFFICE USE ONLY S

TENANCY Note (e)

as joint tenants/tenants in common

PRIOR ENCUMBRANCES Note (f)

subject to the following PRIOR ENCUMBRANCES 1. ....
2. .... 3. ....

Note (g) ~~AND the TRANSFEROR:—~~
~~(i) GRANTS/RESERVES an easement as set out in SCHEDULE ONE hereto~~
~~(ii) COVENANTS with the TRANSFEREE as set out in SCHEDULE TWO hereto~~

Note (g) AND the TRANSFEREE COVENANTS with the TRANSFEROR as set out in SCHEDULE THREE hereto

DATE OF TRANSFER 15th June 1987.

We hereby certify this dealing to be correct for the purposes of the Real Property Act, 1900.

EXECUTION Note (h)

Signed in my presence by the Transferor who is personally known to me.

[signature] Signature of Witness

MARIE SCHEMBRI Name of Witness (BLOCK LETTERS)

49 DENNIS ST GREYSTANES (HOME DUTIES) Address and occupation of Witness

E. Schembri
C L Schembri
[signature] Signature of Transferor

Note (h) Signed in my presence by the Transferee who is personally known to me.

.... Signature of Witness

.... Name of Witness (BLOCK LETTERS)

.... Address and occupation of Witness

[signature] Signature of Transferee
CRAIG ERIC GALLAGHER Solicitor for

TO BE COMPLETED BY LODGING PARTY Notes (i) and (j)

LODGED BY Atkinson Fowden
24J
COMMONWEALTH BANK OF AUSTRALIA BRANCH SECURITIES PITT STREET MARTIN PLACE SYDNEY. 3155 DX. 1020 SYDNEY
Delivery Box Number 1054 AA

LOCATION OF DOCUMENTS

CT	OTHER	
/		Herewith.
		In R.G.O. with ....
		Produced by ....

OFFICE USE ONLY

Extra Fee	Checked by	REGISTERED -19			
	EB6	16 JUN 1988 Registrar General	ON	CV	

box97 b474952 1316-5

CERTIFICATE OF TITLE.

CANCELLED

(C.) **New South Wales.**

REGISTER BOOK,

Appⁿ No 11557 VOL. 1316 FOLIO 5

DIEU ET MON DROIT

John Seath of Rouse Hill Farmer Charles Seath of Rouse Hill Farmer and Jane Ann Seath of Rouse Hill [illegible]

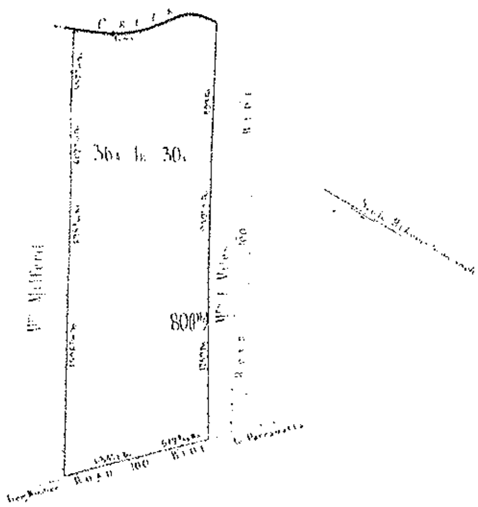
[illegible] that piece of land situated at Rouse Hill in the Parish of Castle Hill and County of Cumberland containing thirty six acres and thirty perches [illegible]

In witness whereof, I have hereunto signed my name and affixed my Seal, this [illegible] day of [illegible] one thousand ~~eight hundred and ninety~~ nine hundred

Signed the [illegible] day of [illegible] 1900 ~~189~~

in the presence of [illegible]

Deputy Registrar General.



NOTIFICATION REFERRED TO.

NOTICE OF CAVEAT DATED [illegible] May 1900 BY THE REGISTRAR GENERAL. PRODUCED AND ENTERED 22 May 1900 AT [illegible] O'CLOCK IN THE [illegible] NOON [illegible] REGR GENL

The within Caveat No. [illegible] is hereby withdrawn.

Dated 11th [illegible] 191[illegible]

[signature] REGISTRAR GENERAL

No. [illegible] Proof having been furnished to me of the death of the said [illegible] the surviving Joint Tenant [illegible] is now registered sole proprietor of the Land within described.

Produced and entered 11 [illegible] 191[illegible]

at [illegible] o'clock in the [illegible] noon.

[signature] REGISTRAR GENERAL

box97 b474952 1316-5

No. [illegible] TRANSFER dated [illegible] 191[illegible]
from the said [illegible]
of the land within described
Produced and entered [illegible] 191[illegible]
at [illegible] o'clock in the [illegible] noon
[illegible signature]
REGISTRAR GENERAL

No. A [illegible] MORTGAGE dated [illegible] 191[illegible]
from the said [illegible]
Produced and entered [illegible] 19[illegible]
at [illegible] o'clock in the [illegible] noon
[illegible signature]
REGISTRAR GENERAL

No. A 182764 [illegible] Mortgage
No. A 261080 [illegible] 22nd March 1921
Produced 11th April 1921 and entered
11th April 1921
at [illegible] o'clock in the [illegible] noon.
[illegible signature]

No. [illegible] TRANSFER dated [illegible] 1941
from the said [illegible] to John Cooper [illegible]
of the land within described
Produced and entered [illegible] 1941
at [illegible]

No. E95598 TRANSFER dated 15th September 1949
from the said John Cooper to Stuart Lester Binns of Yerford [illegible]
Produced and entered 19th October [illegible]
[illegible]
REGISTRAR GENERAL

No. F96221 MORTGAGE dated 12th May 1952
from the said Stuart Lester Binns to Commonwealth Bank of Australia
[illegible] 21st May [illegible] 22nd July [illegible]

PART OF [illegible]
H709057
15th June 1962.

[illegible] F46221 [illegible]
As regards Lot 1 in D.P. 30916
[illegible] J407825 1st October 1963
[illegible signature]

No. J407826 TRANSFER dated 25th July 1963
to Harold John Halsey and Joan Margaret Halsey as joint tenants of Lot 1 in D.P. 30916.
of the land within [illegible]
Entered 1st October 1963
[illegible signature]

[illegible]
[illegible signature]
Registrar General

No. J479[illegible] TRANSFER dated [illegible] October 1963
[illegible]
As to land in this transfer
this deed is cancelled
and new certificate issued
Vol. 9676 Fol. 82
[illegible signature]
Registrar General

No. [illegible] TRANSFER dated [illegible] October 1963
[illegible] AGREEMENT
[illegible] of LOT 2 in DP 30916 of the land within described, together with drainage easement [illegible]
As to land in this transfer
this [illegible] is cancelled
and new certificate issued
Vol. 9676 Fol. 83
[illegible signature]
Registrar General

No. [illegible] TRANSFER [illegible] 1963
[illegible] part of [illegible] the land within described
As to land in this transfer
this deed is cancelled
and new certificate issued
Vol. [illegible] Fol. [illegible]
[illegible signature]
Registrar General

[illegible] 1964
[illegible signature]
Registrar General

9990 [illegible]
[illegible signature]

RH - 3 NOV 2008

WorkCover
NEW SOUTH WALES

Our Ref: D08/110082
Your Ref: Rose Healy

30 October 2008

Attention: Mr Healy
Environmental Investigation Services
PO Box 976
North Ryde BC NSW 1670

Dear Mr Healy

RE SITE: Lot 1022 DP1091484, Lot 1021 DP1091484 Commercial Road & Lot 901 DP1029336 Windsor Road, Rouse Hill NSW 2155

I refer to your site search request received by WorkCover NSW on 27th October 2008, requesting information on licences to keep dangerous goods for the above site.

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by WorkCover NSW has not located any records pertaining to the above-mentioned premises.

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours sincerely

M A Kidd

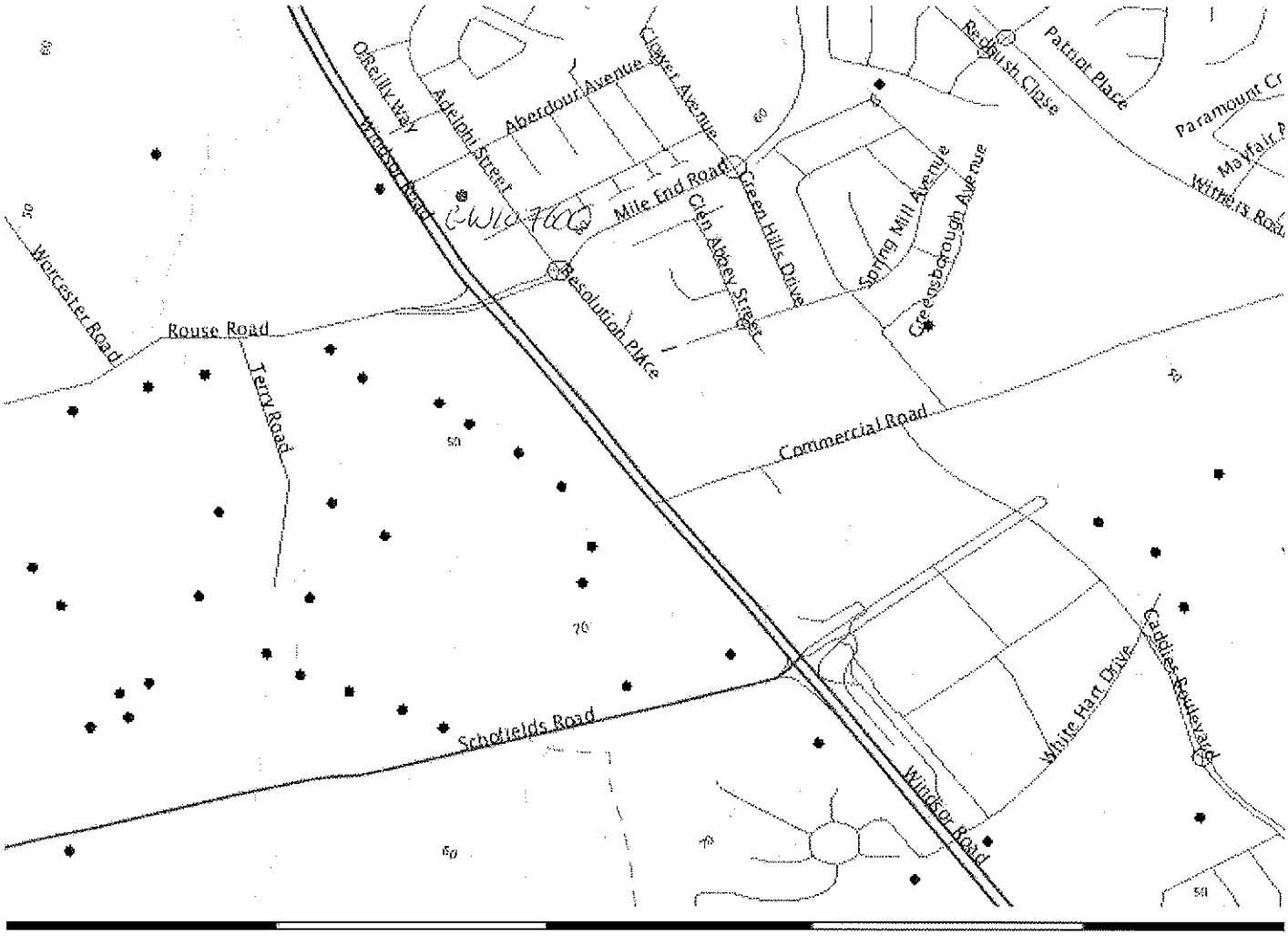
Michelle Kidd

Senior Licensing Officer
Dangerous Goods Team

Custom map

Add to map | Sort map

Map tools



Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Friday, October 17, 2008

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW107600

Works Details (top)

GROUNDWATER NUMBER	GW107600
LIC-NUM	10BL161251
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	
OWNER-TYPE	
COMMENCE-DATE	
COMPLETION-DATE	2002-11-01
FINAL-DEPTH (metres)	29.40
DRILLED-DEPTH (metres)	29.40
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	LOT101
GWMA	- SYDNEY BASIN
GW-ZONE	- MURRAY - SHEPPARTON
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6271126.00
EASTING	306850.00
LATITUDE	33 40' 56"
LONGITUDE	150 54' 59"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CUMBERLAND
PARISH	CASTLE HILL
PORTION-LOT-DP	101 1003626

Licensed (top)

COUNTY	CUMBERLAND
PARISH	CASTLE HILL
PORTION-LOT-DP	101 1003626

›nstruction (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	29.40	70			
1	1	Casing	P.V.C.	0.00	29.40	50			C: 0-.4m; Glued; Seated on Bottom; Casing Shoe
1	1	Opening	Slots - Horizontal	0.00	29.40	50			PVC; SL: .5mm

Water Bearing Zones (top)

› details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	3.05	3.05	CLAYEY SILT		
3.05	10.83	7.78	SHALE		
10.83	29.40	18.57	SANDSTONE		

APPENDIX D

SOIL AND GROUNDWATER SAMPLING PROTOCOLS

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by Environmental Investigation Services. The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

SOIL SAMPLING

(i) prepare a test pit/borehole log.

(ii) Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill/rig excavator such that the drill rig/excavator can operate in a safe manner.

(iii) Ensure all sampling equipment has been decontaminated prior to use.

(iv) Remove any surface debris from the immediate area of the sampling location.

(v) Collect samples and place in a glass jar with a Teflon sea. This should be undertaken as quickly as possibly to prevent the loss of volatiles. If possible, fill the glass jars completely.

(vi) Label the jar with the EIS job number, sample location (eg. TP1), sampling interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).

(vii) Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled glass jars. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.

(viii) Record the lithology of the sample and sample depth on the borehole/test pit log in accordance with AS1726-1993.

(ix) Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab.

(x) Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.

(xi) Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

DECONTAMINATION PROCEDURES FOR SOIL SAMPLING EQUIPMENT

(i) All of the equipment associated with the soil sampling procedure should be decontaminated between every sampling location.

(ii) The following equipment and materials are required for the decontamination procedure:

- Phosphate free detergent (Extran 100)
- Tap water
- Two buckets
- Stiff brushes
- Plastic sheets

(iii) Ensure the decontamination materials are clean prior to proceeding with the decontamination.

(iv) Fill both buckets with clean tap water and add phosphate free detergent to one bucket.

(v) In the bucket containing the detergent scrub the sampling equipment until all the material attached to the equipment has been removed.

(vi) Rinse sampling equipment in the bucket containing tap water.

(vii) Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes that equipment should not be used until it has been thoroughly cleaned.

GROUNDWATER SAMPLING

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations details in AS2306.1 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed piezometers.

(i) After piezometer installation, at least four bore volumes should be pumped from the piezometers to remove any water introduced during the drilling process. Piezometers should then be left to recharge for at least five days before purging and sampling. Prior to purging or sampling the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.

(ii) Take the groundwater level from the collar of the piezometer using an electronic dipmeter. The collar level should be taken during the site visit using a dumpy level and staff.

(iii) Purging and sampling of piezometers should generally be done on the same site visit. Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:

- New disposable polyethylene bailer and sufficient cord OR submersible pump.
- Micropore filtration system (for heavy metals samples).
- Filter paper (glass fibre and 0.45(m).
- Buckets with volume increments.
- Sample containers – at least 1 x Teflon bottle with 1ml nitric acid, 1 x 75mL glass vial and 2 x 1L amber glass bottles for each piezometer.
- pH/Cond/Eh/T meters.
- Glass jars for purged samples.
- Esky and ice.
- Latex gloves.
- Distilled water (for cleaning).
- Electronic dipmeter.
- Groundwater sampling forms and notebook.
- Aluminium foil and labels.

(iv) Clean the Micropore filtration system thoroughly with distilled water prior to use and between each sample. Filter paper should be changed between samples. 0.45um filter paper should be placed below the glass fibre filter paper in the filtration system.

(v) Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.

(vi) Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.

(vii) Purge at least four bore volumes from the well. Take pH, conductivity, redox potential, and temperature measurements of the purged groundwater at regular intervals during purging. (Say, every 5-10 litres if abundant groundwater and every 1 litre if only limited groundwater is encountered). Groundwater condition measurements should be taken from a sample in a clean glass jar which has been taken directly from the sampling equipment (either pump or bailer). Electrodes should be placed in the sample after the electrodes have been rinsed with distilled water. Purged volumes and groundwater measurements should be recorded on the field sampling sheet. An assessment of the turbidity of the sample should also be made based on three categories: silty, opaque and clear.

(viii) Prepare all sample bottles. Label bottles with EIS job number, borehole number and date of collection.

(ix) Fill amber sample bottles and BTEX vial directly from pump or bailer. Ensure sampling equipment does not touch sample containers. Sample bottles and vials must be filled to the brim, so that a reverse meniscus is formed, seal with aluminium foil and then cap. Check that no air has entered the sample invert and check for bubbles.

(x) Fill vacuum filtration system and turn on filter pump.

(xi) Undertake pH/Cond/Eh/T of a sample taken in a clean glass jar used only for groundwater condition measurements. Turn the meters on and insert the electrodes into the sample. Record the measurements when the instruments have stabilized, then discard the sample. Clean the electrodes with distilled water between measurements.

(xii) When the sample filtering is complete (note: at least 50mL of filtered sample is required for heavy metal analysis), decant the filtered sample into a Teflon bottle containing nitric acid. Check label of sample bottle to ensure container has been treated with nitric acid and not sulfuric acid. Clean the filtration system with distilled water and replace the filters ready for the next sample.

(xiii) Photoionisation detector (PID) screening of volatile organic compounds (VOC) should be undertaken on groundwater samples using the sample headspace method during fieldwork. VOC data is obtained from partly filled glass jar samples following equilibration of the headspace gases. The PID headspace data should be included on the chain of custody forms and borehole logs.

(xiv) Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab.

(xv) Record the sample on the appropriate log in accordance with AS1726-1993. At the end of each water sampling complete a chain of custody form.

DECONTAMINATION PROCEDURE FOR GROUNDWATER SAMPLING EQUIPMENT

(i) All of the equipment associated with the groundwater sampling procedure should be decontaminated between every sampling location.

(ii) The following equipment and materials are required for the decontamination procedure:

- Phosphate free detergent (Extran 100).
- Tap water.
- Distilled water.
- Two buckets.
- Plastic sheets.

(iii) Fill one bucket with clean tap water and phosphate free detergent, and one bucket with distilled water.

(iv) Flush tap water and detergent through pump. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.

(v) Flush pump with distilled water.

(vi) Change water and detergent solution after each sampling location.

(vii) Rinse sampling equipment in the bucket containing distilled water.

(viii) Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned.

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with current US EPA SW-846 (1994) methods and those described in Environmental Sampling and Analysis, A Practical Guide, (H. Keith 1991).

Practical Quantitation Limit (PQL), Limit of Reporting (LOR) and Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection limit (MDL) for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations.
"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit", Keith (1991).

Accuracy

The proximity of an averaged result to the true value, where all random errors have been statistically removed. Accuracy is measured by percent recovery. Acceptable limits for accuracy generally lie between 70% to 130% recoveries. Certain laboratory methods may allow for values that lie outside these limits.

Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD). Acceptable targets for precision in this report will be less than 50% RPD for concentrations greater than ten times the PQL, less than 75% RPD for concentrations between five and ten times the PQL and less than 100% RPD for concentrations that are less than five times the PQL.

Blanks

The purpose of laboratory and field blanks is to check for artifacts and interferences that may arise during sampling and analysis.

Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples

may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula;

$$\frac{(\text{spiked sample result} - \text{sample result})}{\text{concentration of spike added}} \times 100$$

Acceptable recovery limits are 70% to 130%.

Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula:

$$\frac{|\ D1 - D2\ |}{|\ (D1 + D2)/2\ |} \times 100$$

where D1 is the sample concentration and D2 is the duplicate sample concentration.

FLORA AND FAUNA ASSESSMENT FOR THE COMMERCIAL ROAD REZONING, ROUSE HILL

Flora and Fauna Assessment

For:

ROUSE HILL COMMERCIAL ROAD DEVELOPMENT CO PTY LTD

November 2008

Final Report

Cumberland Ecology
PO Box 2474, Carlingford Court 2118