

Appendix E

Phase 1 ESA – Southern Rail Access Option



Moorebank Intermodal Company

Phase 1 Environmental Site Assessment, Moorebank Intermodal Terminal

Southern Rail Access Option

16 July 2014



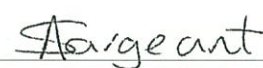


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Abbreviations

ACM	asbestos containing materials
AHD	Australian Height Datum
ASS	acid sulfate soils
DNSDC	Defence National Support and Distribution Centre
EPA	Environment Protection Authority
ESA	environmental site assessment
GWS	Glenfield Waste Services
ha	hectares
IMT	Intermodal Terminal
m	metres
MIC	Moorebank Intermodal Company
m BGL	metres below ground level
m BTOC	metres below top of casing
PASS	potential acid sulfate soils
SME	School of Military Engineering
SSFL	Southern Sydney Freight Line
SWL	standing water level

Executive summary

Introduction

Parsons Brinckerhoff Pty Ltd (Parsons Brinckerhoff) was commissioned by the Moorebank Intermodal Company (MIC) to undertake a Phase 1 environmental site assessment (ESA) for five parcels of land located adjacent to Casula Road, Casula NSW. The parcels of land, which are identified as 'the site' herein, are legally identified Lot 5 in Deposited Plan (DP) 833516, Lot 51 in DP 515696, Lot 52 in DP 517310 and Lots 103 and 104 in DP 1143827.

Purpose and scope

The Phase 1 ESA was completed to assess the potential contamination issues at the site with the purpose of evaluating the feasibility of the site for the future proposed use as the Moorebank Intermodal Terminal (IMT). The Moorebank IMT Project (the Project) includes a rail link connecting the site to the Southern Sydney Freight Line (SSFL) and road entry and exit points from Moorebank Avenue. At the time of preparing this Phase 1 ESA, three separate rail access options are being considered, which are:

- northern rail access option — with rail access from the north-western corner of the Moorebank IMT site, passing through the former Casula Powerhouse Golf Course (which is currently owned by Liverpool City Council (LCC)) and crossing the Georges River and floodplain;
- central rail access option — with rail access from the centre of the western boundary of the Moorebank IMT site, passing through Commonwealth land on the western bank of the Georges River (also referred to as the 'hourglass land'); and
- southern rail access option — rail access from the south-western corner of the Moorebank IMT site, passing through the Glenfield Landfill site (owned by Glenfield Waste Services (GWS)) and crossing the Georges River and floodplain.

The site subject to this Phase 1 ESA is known as the southern rail access option. The Moorebank IMT site and the other rail access options are the subject of separate ESA reports.

The scope of works for the Phase 1 ESA comprised a desktop review including identification of the site, a review of aerial photographs, historical land titles, council records, local geology, hydrology and hydrogeology and preparation of a Phase 1 ESA report.

Site description

The site is owned by LA Kennett Enterprises Pty Ltd and comprises a triangular shaped area of land along the western bank of the Georges River. The site covers approximately 43.6 ha and is an operational waste disposal facility known as Glenfield Waste Services (GWS). Based on the concept design, the construction footprint of the proposed southern rail access would likely impact 8.6 ha of the total site area.

The Georges River flows to the north along the eastern boundary of the site. Based on the historical and ongoing site use as a waste disposal facility, the geology beneath the site is considered to consist of engineered and un-engineered fill up to 30 m in depth, underlain by shale of the Wianamatta Group and Hawkesbury Sandstone. The regional groundwater flow is inferred to be in the direction of the Georges River but locally at the site, standing water levels are likely to be highly disturbed due to a combination of engineered waste cells and stormwater and leachate management systems present at the site. A review of aerial photographs and land title information suggests that the site has been utilised for quarrying and landfilling operations since the 1960s and was previously farmland.

Findings and recommendations

Based on the review of available information and considering its historical and ongoing use as a waste disposal facility, there is high potential for contamination to exist at the site including contaminated fill, soils, groundwater, leachate and generation of landfill gases. The key exposure pathways would likely be via direct contact with soils, surface water, groundwater, leachate and landfill gases (via dermal contact, ingestion and inhalation) by construction/utility workers, site users and potentially future land users.

It is recommended that at subsequent project approval stages (under the NSW *Environmental Planning and Assessment Act 1979*), a targeted intrusive investigation be undertaken within the construction footprint of the southern rail access option in order to gather data on soil and groundwater quality and potential for landfill gas generation so that construction design, management and/or remediation options can be evaluated prior to any development at the site.

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1. Introduction

Parsons Brinckerhoff Pty Ltd (Parsons Brinckerhoff) was commissioned by Moorebank Intermodal Company (MIC) to undertake a Phase 1 environmental site assessment (ESA) for five parcels of land located adjacent to Casula Road, Casula NSW. The parcels of land, which are identified as 'the site' herein, are legally identified Lot 5 in Deposited Plan (DP) 833516, Lot 51 in DP 515696, Lot 52 in DP 517310 and Lots 103 and 104 in DP 1143827.

The Phase 1 ESA was completed to assess the potential contamination issues with the purpose of evaluating the feasibility of the site to be used as the southern rail access option for the Moorebank Intermodal Terminal (IMT). Three separate rail access options are currently being considered, which are:

- northern rail access option — with rail access from the north-western corner of the Moorebank IMT site, passing through the former Casula Powerhouse Golf Course (which is currently owned by Liverpool City Council (LCC)) and crossing the Georges River and floodplain;
- central rail access option — with rail access from the centre of the western boundary of the Moorebank IMT site, passing through Commonwealth land on the western bank of the Georges River (referred to as the 'hourglass land'); and
- southern rail access option — rail access from the south-western corner of the Moorebank IMT site, passing through the Glenfield Landfill site (owned by Glenfield Waste Services) and crossing the Georges River and floodplain.

The site subject to this Phase 1 ESA is known as the southern rail access option. The Moorebank IMT site and the other rail access options are the subject of separate ESA reports.

1.1 Objectives

A review of available site information was undertaken to evaluate the environmental setting and potential contamination concerns at the site. The desktop study included a review of regional and local geological information, hydrological information, topographic and geological maps, local registered groundwater bore records, relevant public and council records. The objectives of the Phase 1 ESA were to:

- assess the site history and historical uses of the site and surrounding land uses;
- identify areas of potential environmental concern;
- assess the potential for any contamination identified to impact human health or environmental; receptors relative to the proposed land use and the potential exposure pathways; and
- provide recommendations for additional works/site assessment.

1.2 Scope of works

The scope of works for the Phase 1 ESA comprised:

- desktop review including:
 - ▶ identification of the site, including location of surrounding infrastructure, area, boundaries and title descriptions;
 - ▶ a review of aerial photographs;
 - ▶ a review of existing environmental reports pertaining to the site;

- ▶ a review of historical land titles;
- ▶ a review of council records (Section 149 Certificates);
- ▶ a review of the local geology, hydrology and hydrogeology;
- ▶ a review of historical report (Phase 1 ESA by Golder, 2011) pertaining to the site;
- a site walkover; and
- preparation of a Phase 1 ESA report.

Due to access restrictions to Glenfield Waste Services land imposed by the landowner, the site walkover element of the works was not completed.

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2. Site setting

2.1 Location

The site comprises a triangular portion of land on the western bank of the Georges River, located approximately 30 km south-west of Sydney. The site is located to the west of the School of Military Engineering (SME) at Moorebank and to the south of the M5 South Western Motorway. The coordinates for the arbitrary central point of the site are easting 306828 and northing 6240157.

The site covers an area of approximately 43.6 ha with a construction footprint of 8.6 ha (based on the concept design for the southern rail access option). The site is currently an active landfill facility operated under license as per the *Protection of the Environment Operations Act 1997*. The Environmental Protection Licence (EPL) number 4614 is held by L.A. Kennett Enterprises Pty Ltd trading as Glenfield Waste Disposals (GWS). A copy of this licence is presented as Appendix A. The approximate extent of the landfill is shown in Figure 2 (refer section 8 of this report).

The EPL stipulates that the landfill is permitted to accept non putrescible general solid waste and waste tyres and permitted activities are non-thermal treatment of general waste, waste storage and waste disposal by application to land, crushing, grinding or separating and land-based extractive activity. The depth of the waste landfilled including capping and any other material placed above the cap must not exceed 30 m.

The Phase 1 ESA, Rail Corridor Land for SIMTA, Moorebank Intermodal Terminal Facility (Golder Associates dated 16 November 2011) which was reviewed as part of this study, reported that each waste cell is lined with HDPE, and leachate and landfill gas collection systems are installed prior to and throughout the filling process. The waste materials are placed in accordance with the 'Filling Plan' with a proposed progression of filling from the south to the north. Prior to placement, the waste materials are shredded and the materials are placed in layers approximately 2 m thick. Each layer includes a daily cover of soil (minimum 15 cm) prior to ceasing daily operations, and an intermediate soil cover of approximately 30 cm thick is placed over areas of waste which are likely to be exposed for greater than 90 days. At completion the waste cells are capped with an engineered cover approximately 2 m thick. Current operations do not receive large volumes of asbestos waste materials; however, on occasion asbestos waste materials are accepted at the facility. These are placed in the lower levels of the waste cells. The landfill is surrounded by a network of groundwater and landfill gas monitoring points. Routine monitoring is completed in accordance with the ELP, which includes annual groundwater monitoring and monthly landfill gas monitoring.

Access to the site is via the GWS site entrance on Cambridge Avenue. Parsons Brinckerhoff did not have the necessary permission to access the site therefore a site walkover was not undertaken as part of this study.

2.2 Surrounding land uses

The land use surrounding the site consists of:

- north – Leacock Regional Park, Casula Powerhouse Arts Centre (formerly a diesel fuelled power station the Casula railway station, M5 South Western Motorway and industrial, commercial and residential land beyond;
- east – Georges River, SME, Moorebank Avenue and the Defence National Storage and Distribution Centre (DNSDC) beyond;
- south – the East Hills Rail Line and Cambridge Avenue with vacant land and residential properties beyond; and

- west – the Main South/Cumberland Rail Line and the SSFL, residential properties of Casula and Hume Highway beyond.

Casula Powerhouse Arts Centre is a former power station that was built in 1953 and fuelled by oil and coal decommissioned in 1976 and disused until 1994, when it was redeveloped as an arts facility. No details are known of the decommissioning.

The site and surrounding features are shown in Figure 2.

2.3 Physical setting

2.3.1 Regional and local geology

The Department of Mineral Resources Penrith 1:100,000 geological series sheet 9030 showed that the underlying geology comprises silts, sands and clays from quaternary fluvial deposition underlain by tertiary clayey sand and clay. The alluvial deposits overlay shales of the Wianamatta group which are typically black to dark grey shales and laminates from the Triassic period.

Due to the nature of known historical quarrying and landfilling activities, it is anticipated that significant disturbance of the surficial geology up to 30 m in depth and reinstatement with fill materials has occurred at the site.

2.3.2 Topography

A review of topographical data provided by the Department of Lands Spatial Information Exchange showed that the site lies at an elevation of approximately 10 m Australian Height Datum (AHD). As the site is an operational landfill, site levels are likely to be dynamic as engineered waste containment cells are completed.

2.3.3 Hydrology

Surface water drainage will be affected by engineered cells and leachate management mechanisms at the site. Golder Associates (2011) reported that leachate and stormwater generated from the site are managed through separate systems to limit the potential for cross contamination. Stormwater is collected through an onsite drainage network and directed to a storage basin located at the northern end of the facility prior to discharge to the Georges River. Overflow discharge from the storage basin is monitored in accordance with the EPL. A levee, with minimum height of 12.4 m AHD, has been constructed along the eastern boundary to prevent surface water from the landfill discharging directly into the Georges River. The facility also has a network of groundwater monitoring points which are routinely monitored in accordance with the EPL.

Based on a review of council records, part of the land is affected by flood inundation and therefore flood related development controls are applicable. Technical Paper 6 – *Surface water assessment* prepared by Parsons Brinckerhoff (June 2014) identified that the impacts from the project on regional flooding are relatively minor and do not significantly affect the existing flood risk associated with the Georges River and its floodplain.

2.3.4 Acid sulfate soils

Acid sulfate soils (ASS) are acidic soil horizons or layers resulting from the aeration of soil materials that are rich in iron sulfides, primarily pyrite (FeS₂). They are likely to be present in marine and estuarine sediments of the recent (Holocene) geological age, soils usually not more than 5 m above mean sea level and in marine or estuarine settings.

Landform elements in which the geomorphic processes have been suitable for the formation of ASS have been classed as having a 'high probability of occurrence'. These landforms include sediments of estuaries, rivers, creeks and lakes. Where environments have not generally been suitable for ASS formation, or where ASS is highly localised or sporadic, they have been classed as having a 'low probability of occurrence'. In general, landforms above 10 m AHD are classed as having no known occurrence of ASS.

A review of the ASS risk maps from the online CSIRO Australian Soil Resource Information System showed that across the site there is generally an extremely low probability of ASS occurrence. Considering that the site has been extensively reworked during its life as an operational landfill, the potential for ASS is considered to be low.

2.3.5 Regional and local hydrogeology

Regional groundwater is likely to be present in the alluvium and deeper shale. Groundwater within the shale is likely to be characterised by more saline conditions. Regionally, the shale generally has a low hydraulic conductivity and thus behaves as an aquitard, restricting groundwater flow into the underlying Hawkesbury Sandstone unit. Locally, groundwater is likely to flow along the interface of the shale and alluvium following the gradient of the shale.

Alluvial deposits occur in valleys, creeks and river beds in the region and are generally shallow, discontinuous and relatively permeable deposits that are responsive to rainfall and are likely to be hydraulically connected to the Georges River. However, usual alluvial groundwater flow is likely to have been disturbed due to extraction and filling activities, waste containment cells and engineered storm water and leachate collection systems associated with the landfill.

During previous works associated with the Moorebank IMT Project undertaken on eastern side of the Georges River (Parsons Brinckerhoff 2011), shallow groundwater was encountered within the alluvium at a minimum depth of 5.2 m below ground level (m BGL). Licensed groundwater bores located within the GWS site are generally screened between depth of 20 m and 30 m with water strikes reported between 8 and 10 m depth (Golder Associates 2011).

2.3.6 Groundwater database search

A search of the NSW Office of Water licensed borehole register showed that 11 registered bores are present within a 1 km radius of the site. A summary is provided in Table 2.1.

Table 2.1 Groundwater database summary

Bore ID	Authorised purpose	Location (distance and direction)	Date installed	SWL (m BTOC)	Total depth (m)
GW108802	Monitoring	400 m south	Apr-2008	Unknown	23.7
GW108803	Monitoring	400 m south	Apr-2008	Unknown	8.0
GW108804	Monitoring	Onsite	Apr-08	Unknown	11.0
GW109798	Monitoring	Onsite	Jan-2007	Unknown	29.8
GW109799	Monitoring	Onsite	Jan-2007	Unknown	22.8
GW109800	Monitoring	Onsite	Jan-2007	Unknown	11.0
GW109801	Monitoring	Onsite	Jan-2007	Unknown	14.0
GW109802	Monitoring	Onsite	Jan-2007	Unknown	10.0
GW109803	Monitoring	Onsite	Feb-2009	Unknown	29.8

Bore ID	Authorised purpose	Location (distance and direction)	Date installed	SWL (m BTOC)	Total depth (m)
GW109804	Monitoring	Onsite	Apr-2008	Unknown	11.0
GW109805	Monitoring	Onsite	Jan-2007	Unknown	12.0

Source: NSW Natural Resource Atlas

m BTOC: metres below top of casing

SWL: standing water level

All bores identified are monitoring bores associated with GWS. Bore search information is provided in Appendix B and a map showing the registered borehole locations is provided as Figure 4.

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3. Site history

3.1 Land titles search

Historical land title information for the lots that comprise the site has been summarised in Table 3.1.

Table 3.1 Titles search summary

Dates	Ownership details
1937–1948	Margaret Ross McClure
1946–1966	Clifford James Kennett, Farmer
1947–1967	Eugene Erskine Claude, orchardist
1948–1952	James Freeland Leacock, retired land valuer
1952–1966	Rural Homes Co-operative Ltd
1967–1979	Robert Alexander Paul, company executive
1966–Present	Helen Louise Kennett, Figela Pty Ltd and JC and FW Kennett Pty Ltd

More detailed title search information (extracted from Golder Associates 2011) is provided in Appendix C.

3.2 Section 149 (2) and (5) planning certificate

A review of the Section 149 (2) and (5) planning certificates (Golder Associates 2011) was undertaken. This review identified that the all lots making up the site were:

- subject to the following local, regional and development plans;
 - ▶ Liverpool Local Environment Plan 2008;
 - ▶ Liverpool Development Control Plan 2008 (as amended);
 - ▶ Greater Metropolitan Regional Environment Plan No. 2- Georges River Catchment; and
- zoned 'RE1 – Public Recreation'.

Relevant information has been summarised in Table 3.2. Copies of the Section 149 certificates (extracted from Golder Associates 2011) are provided in Appendix D.

Table 3.2 S149 search summary

Subject	Lot/DP				
	5/833516	51/515696	52/517310	103/1143827	104/1143827
Comprises/includes critical habitat	No	No	No	No	No
Conservation area	No	No	No	No	No
Item(s) of environmental heritage	No	No	No	No	No
Mine subsidence	No	No	No	No	No
Bushfire prone land	No	Yes	No	No	Part of
Acid sulfate soils	Yes	Yes	Yes	Yes	Yes
Flood related development controls	Yes	Yes	Yes	Yes	Yes
Tree preservation provisions	Yes	Yes	Yes	Yes	Yes
Controlled access road	No	No	No	No	No
Notices	No	No	No	No	No
Environmentally significant land ¹	Yes	Yes	Yes	Yes	Yes
Archaeological management plan	No	No	No	No	No
Unhealthy building land proclamation	No	No	No	No	No
Matters arising to the <i>Contaminated Land Management Act 2009</i>	No	No	No	No	No
Contaminated land	No	No	No	No	No

Source: Liverpool City Council S149 Records

- (1) The subject property is identified as containing environmentally significant land under Division 2 General provisions of the Liverpool Local Environmental Plan 2008. The objectives of this clause are as follows:
- (a) to maintain bushland, wetlands and wildlife corridors of high conservation value
 - (b) to identify areas of significance for revegetation to connect to or buffer bushland, wetlands and wildlife corridors
 - (c) to protect rare and threatened native flora and native fauna
 - (d) to ensure consideration of the significance of vegetation, the sensitivity of the land and the impact of development on the environment prior to the giving of any development consent.

The implications of the proposed development of the environmental significant land designation have been considered in Technical Paper 3- *Ecological Impact Assessment* (Parsons Brinckerhoff, 2014).

Further information in this regard is available from LCC's City Strategy Department or the Liverpool Local Environmental Plan 2008.

3.3 NSW EPA online notice records database search

An online search of the NSW EPA Contaminated Land Records Database returned no notice records for the Project site. One site was identified within notice records for the site a 5km radius the central alignment study area that was subject to notice.

Nine records (eight former and one current) were returned for ABB Transmissions Pty Ltd (ABB) located on Bapaume Road to the North on the eastern side of the Georges River to the North of the main Moorebank IMT Site Area. Notices have been issued under Section 35 of the Environmentally Hazardous Chemicals (EHC) Act 1985. The notices dated between 1990 and 2013 detailed that the premises are reasonably believed to be affected by chemical contamination including polychlorinated biphenyl (PCB) compounds. The site is subject to an ongoing maintenance order associated with PCB contamination. Based on the geographical location in relation to the Phase 1 study area and separation by the Georges River, it is not considered that ABB constitutes an offsite source of contamination to the central alignment area.

A copy of the management order is in Appendix E for reference.

3.4 Dangerous goods

A WorkCover search was not undertaken as a letter of authority from the landowner for this application could not be obtained.

3.5 Aerial photographs

Available historical aerial photographs dating back to 1930 were reviewed to assess any major changes to the site and surrounding areas over time. These are presented in Appendix F. No available aerial photos have been identified prior to 1930. The main features noted for the site and surrounding areas in each of the photographs are summarised in Table 3.3.

Table 3.3 Aerial photograph review summary

Year	Site features and surrounding areas
Current	Land use is similar to the previous description remaining relatively unchanged since 2005.
2005	Land use is similar to the previous description. The site is accessible via a road in the north-western area. The site's boundary is covered with light vegetation. Surrounding land uses remain the same.
1994	Excavation/quarrying activities appear to be well established. The excavations in the south-western and south-eastern corners appear to have been filled. The central portion of the site has been excavated. Surrounding land uses are generally similar to previous photograph. Increased residential development to the west (Casula).
1978	Similar activities to previous description with excavation and filling evident at the site. Increased residential development to the west (Casula).
1970	Open excavations in the southern portion suggestive of quarrying are visible. Mud roads are visible across the site. The eastern boundary which is the western bank of Georges River appears to be covered with dense vegetation.
1965	Development of land on the south-eastern area is evident. It appears that the farmland across the majority of the site has been disturbed. Access roads are visible from the western boundary of the site. Land adjacent to the south of the site still appears to be farmland. Transport infrastructure (road or rail line) has been constructed along the western boundary.
1930	The site appears to be open farmland. The general surrounds appears to be open pasture/farmland and roads are generally absent. The eastern boundary of the site appears to comprise overgrown shrubs and trees.

Source: Historical aerial photographs can be obtained from NSW Land and Property Information.

3.6 Summary of historical land use

3.6.1 Site

From the historical land use records reviewed, it appears that the site has remained generally unchanged since the 1960s, before which it appeared to be vacant land or farmland. Excavation, quarrying and filling appear to be the dominant activities at the site since 1970. Georges River is located to the east of the site, thus there are limited anthropogenic activities in this area.

3.6.2 Surrounding lands

Residential and industrial developments have gradually increased in the area since the 1970s with transport infrastructure increasing with the construction of the M5 Motorway to the north, the East Hills Line to the southwest and the SSFL to the east.

3.7 Previous environmental reports

As part of the Phase 1 study, a report entitled *Preliminary Environmental Site Assessment (ESA) of the SIMTA Site and the Associated Rail Corridor* (Golder Associates (Golder), November 2011) was reviewed by Parsons Brinckerhoff. Pertinent information is summarised in the following section:

The objectives of the study were to assess the potential for ground contamination issues including the rail corridor connection to the Main Southern Railway (similar alignment to the Moorebank IMT southern rail alignment option), to identify the need for remediation with regards to the ecological and human health risks posed by past land uses, to present remediation options (as required) and to address potential constraints for natural soils including potential acid sulfate soils that may be present at the site.

The areas of environmental interest included the Glenfield Quarry and Waste Disposal Facility, where extractive and waste disposal has been undertaken in accordance with an environmental protection licence (EPL) and areas of unidentified buried waste as well as the use of pesticides and herbicides for pest and/or weed control within the existing rail corridor and surrounds.

The potential contaminants of concern identified comprised heavy metals, polycyclic aromatic hydrocarbons (PAH), total recoverable hydrocarbons (TRH), BTEX compounds (benzene, toluene, ethylbenzene and xylene), semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs), phenolic compounds, asbestos, pesticides (such as organochlorine pesticides (OCPs) and organophosphate pesticides (OPPs)) and landfill gases (methane, carbon dioxide and hydrogen sulphide).

On the basis of the information reviewed, Golder concluded that areas of environmental interest exist where soil and to a lesser extent groundwater contamination may have occurred. The report detailed that there was a low probability that the proposed rail corridor lands are underlain by acid sulfate soils (ASS) based on a review of available ASS maps however noted that Council records identified that the land is affected by Liverpool Local Environmental Plan 2008 that restricts the development of the land because of the likelihood of acid sulfate soils. No definitive conclusion was provided in respect of the constraints for natural soils.

The investigation did not identify significant environmental issues which would preclude the proposed development of the site as a rail corridor. Further investigation work was recommended to determine risk that contamination on these areas poses to the proposed development and to inform the appropriate management regime to be implemented during the construction of the rail corridor comprising:

- Undertaking a Phase 2 (intrusive) ESA of the proposed rail corridor to assess the risk posed to the detailed design and construction of the rail link by the areas of environmental concern identified, including a program of soil and groundwater sampling completed in accordance with the guidelines made or approved by the EPA under s 105 of the Contaminated Land Management Act 1997; and
- Development and implementation of a contamination management plan as part of the project construction environmental management plan for managing contaminated materials either expected or unexpectedly encountered during the construction of the rail corridor including detailed procedures on:
 - ▶ handling, stockpiling and assessing potentially contaminated materials encountered during the development works;
 - ▶ assessment, classification and disposal of waste in accordance with relevant legislation;
 - ▶ landfill gas management during the excavation, handling, and stockpiling of waste materials for excavations required in the area of the Glenfield Quarry and Landfill; and
 - ▶ a contingencies plan for unexpected contaminated materials that are encountered.

3.8 Reliance on source information

Historical information has been obtained from government held land use records and is considered reliable. Data gaps identified include the following:

- interpretation of aerial images which are low resolution making it difficult to see all pertinent features;
- lack of WorkCover Dangerous Goods search;
- lack of site inspection; and
- lack of review of site monitoring annual returns that would have been submitted to NSW EPA under EPL 4614 which would provide data of groundwater and landfill gas monitoring and information on contaminant conditions at the site. This information was requested from the operator but was not provided at the time of writing this report.

4. Potential for contamination

4.1 Conceptual site model

The conceptual site model (CSM) has been developed based on the available information to outline the potential sources of impacts, transport mechanisms and receptors based on the site setting including surrounding land uses. For a potential risk to be present, a source, a receptor (human or environmental) and a pathway between the source and receptor must be present for a complete exposure pathway to exist. The CSM is summarised in Table 4.1.

Table 4.1 Conceptual site model

CSM inputs	Factors (contaminants of potential concern)
Potential sources	Buried wastes associated with landfilling activities (including but not limited to total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbon (PAH), heavy metals, PCBs, organochloride pesticides (OCPs), organophosphate pesticides (OPPs), phenols and asbestos).
	Landfill gases (methane, carbon dioxide and hydrogen sulfide).
	Import of potentially contaminated soil materials as part of the waste management process.
	Landfill leachate (including but not limited to TPH, BTEX, PAHs, heavy metals, PCBs, ammonia, nitrogen and dissolved methane).
	Residual contamination associated with the former diesel fuelled power station (TPH and PAH).
Potential pathways	Direct contact with contaminated surface soils (dermal contact, ingestion and inhalation).
	Migration of airborne dust.
	Leaching and migration of contaminants from buried waste to underlying groundwater systems and migration/ seepage including lateral migration of contaminated water through preferential pathways such as drainage lines or geological features.
	Direct contact with surface water or groundwater via pumping to other areas of the site or abstraction of potentially impacted groundwater from the identified registered bores).
	Landfill gas migration from adjacent land via soil or groundwater.
	Migration of potentially contaminated groundwater on Site and from off-site sources.
Potential receptors	Current and future site users and utility/construction personnel involved in ground disturbance activities.
	Groundwater beneath the site and potential down gradient users of abstracted groundwater for domestic use.
	Ecological terrestrial and subsurface (Georges River).

Based on the review of available information for the site and considering its historical and ongoing use as a waste disposal facility, there is high potential for contamination to exist at the site including contaminated fill, soils, groundwater and generation of leachate and landfill gases. The key exposure pathways to these contaminant sources would likely be via direct contact with soils, surface water or groundwater (dermal contact, ingestion and inhalation) by construction/utility workers, users and through the migration of landfill gases to receptors and uptake via dermal contact, ingestion and inhalation.

4.2 Contaminants of concern

The contaminants of potential concern include but are not limited to:

- heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
- polycyclic aromatic hydrocarbons (PAH);
- total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene and xylene (BTEX);
- semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs);
- phenolic compounds;
- asbestos and asbestos containing materials; and
- landfill gases (methane, carbon dioxide and hydrogen sulfide).

4.3 Potential offsite sources of contamination

Offsite sources of contamination that have the potential to affect the site comprise:

- the former diesel fuelled power station that was historically located immediately to the north of the site (now the Casula Powerhouse Arts Centre) where residual contamination may exist.

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5. Conclusions and recommendations

The Phase 1 ESA was completed to identify the potential contamination issues present at the site to evaluate the feasibility of the site for the future proposed use as part of the Moorebank IMT. The scope of works included a review of aerial photographs, council records, public registers, geological and hydrological information and the preparation of this Phase 1 ESA report.

Based on a review of the available information, the site is owned by L.A. Kennett Enterprises and is operated as a waste disposal facility. A review of aerial photographs and land title information suggests that the site has been utilised for quarrying and landfilling operations since the 1960s and was previously farmland. Geology beneath the site comprises engineered and un-engineered fill up to 30 m depth underlain by Shale. Groundwater flow is considered likely to be generally in the direction of the Georges River but is likely to be highly disturbed due to a combination of engineered waste cells and stormwater and leachate management systems utilised at the site.

Based on the review of available information and with reference to the conceptual site model (Table 4.1), there is high potential for contamination to exist at the site including contaminated fill, soils, groundwater, leachate and generation of landfill gases. The key exposure pathways would likely be via direct contact with soils, surface water, groundwater, leachate and landfill gases (via dermal contact, ingestion and inhalation) by construction/utility workers, site users and potentially future land users.

It is recommended that at subsequent project approval stages (under the NSW *Environmental Planning and Assessment Act 1979*), a targeted intrusive investigation be undertaken within the construction footprint of the southern rail access option in order to gather data on soil and groundwater quality and potential for landfill gas generation so that construction design, management and/or remediation options can be evaluated prior to site development. Risks to human health and the environment should be considered during any intrusive works as part of a Phase 2 ESA.

6. Limitations

Scope of services

This environmental site assessment report (the report) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the client and Parsons Brinckerhoff (scope of services). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

Reliance on data

In preparing the report, Parsons Brinckerhoff has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, Parsons Brinckerhoff has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Parsons Brinckerhoff will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Parsons Brinckerhoff.

Environmental conclusions

In accordance with the scope of services, Parsons Brinckerhoff has relied upon the data and has not conducted any environmental field monitoring or testing in the preparation of the report. The conclusions are based upon the data and visual observations and are therefore merely indicative of the environmental condition of the site at the time of preparing the report, including the presence or otherwise of contaminants or emissions.

Within the limitations imposed by the scope of services, the assessment of the site and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

Report for benefit of client

The report has been prepared for the benefit of the client (MIC) and no other party. Parsons Brinckerhoff assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of Parsons Brinckerhoff or for any loss or damage suffered by any other party in relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

Other limitations

Parsons Brinckerhoff will not be liable to update or revise the report to take into account any events, emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to nor ownership of the properties, buildings and structures referred to in the report, nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

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7. References

ANZECC (1992) Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites.

Department of Lands Spatial Information Exchange – <http://gsp.maps.nsw.gov.au>.

Department of Land and Water Conservation (1998) – Guidelines for the use of acid sulfate soils risk maps (2nd Edition) - March 1998.

Department of Mineral Resources (1991), Penrith 1:100,000 Geological Series Sheet 9030.

Golder Associates (2011), *Phase 1 Environmental Site Assessment, Rail Corridor Land for SIMTA, Moorebank Intermodal Terminal Facility* (dated 16 November 2011, Reference107623148-003-R-Rev2).

NSW EPA Contaminated Land Records Database - <http://www.environment.nsw.gov.au/prclmapp/searchregister.aspx>.

NSW Land and Property Information - <http://www.lpi.nsw.gov.au/>.

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

Parsons Brinckerhoff (2014) Moorebank Intermodal Freight Terminal- Ecological Impact Assessment Reference 2103829A-PR-4550-RevF).

Parsons Brinckerhoff (2014), Moorebank Intermodal Terminal Surface Water Assessment (Reference 2103829E-TPT-REP-003 RevA).

8. Figures

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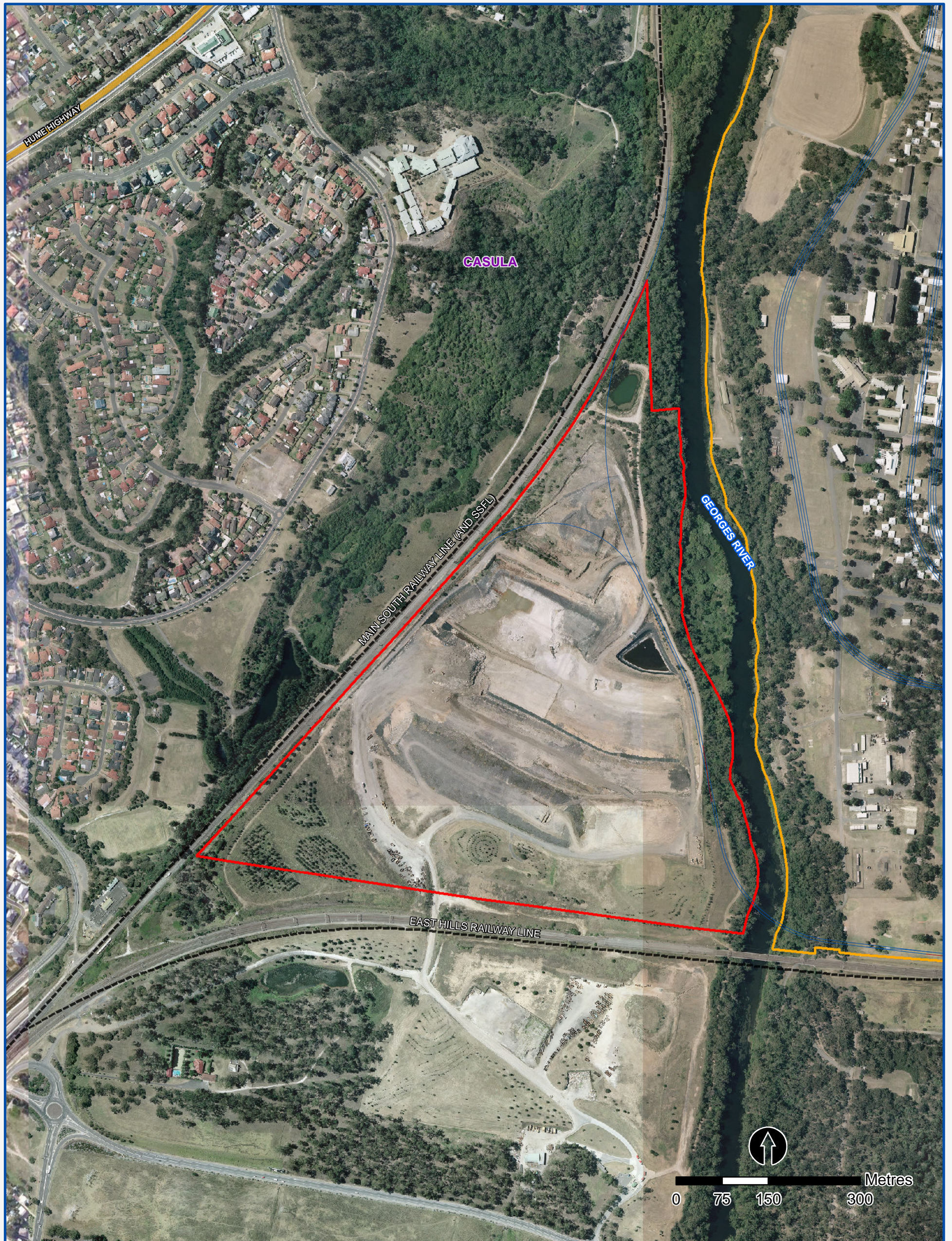
-  Rail line & station
-  Study area

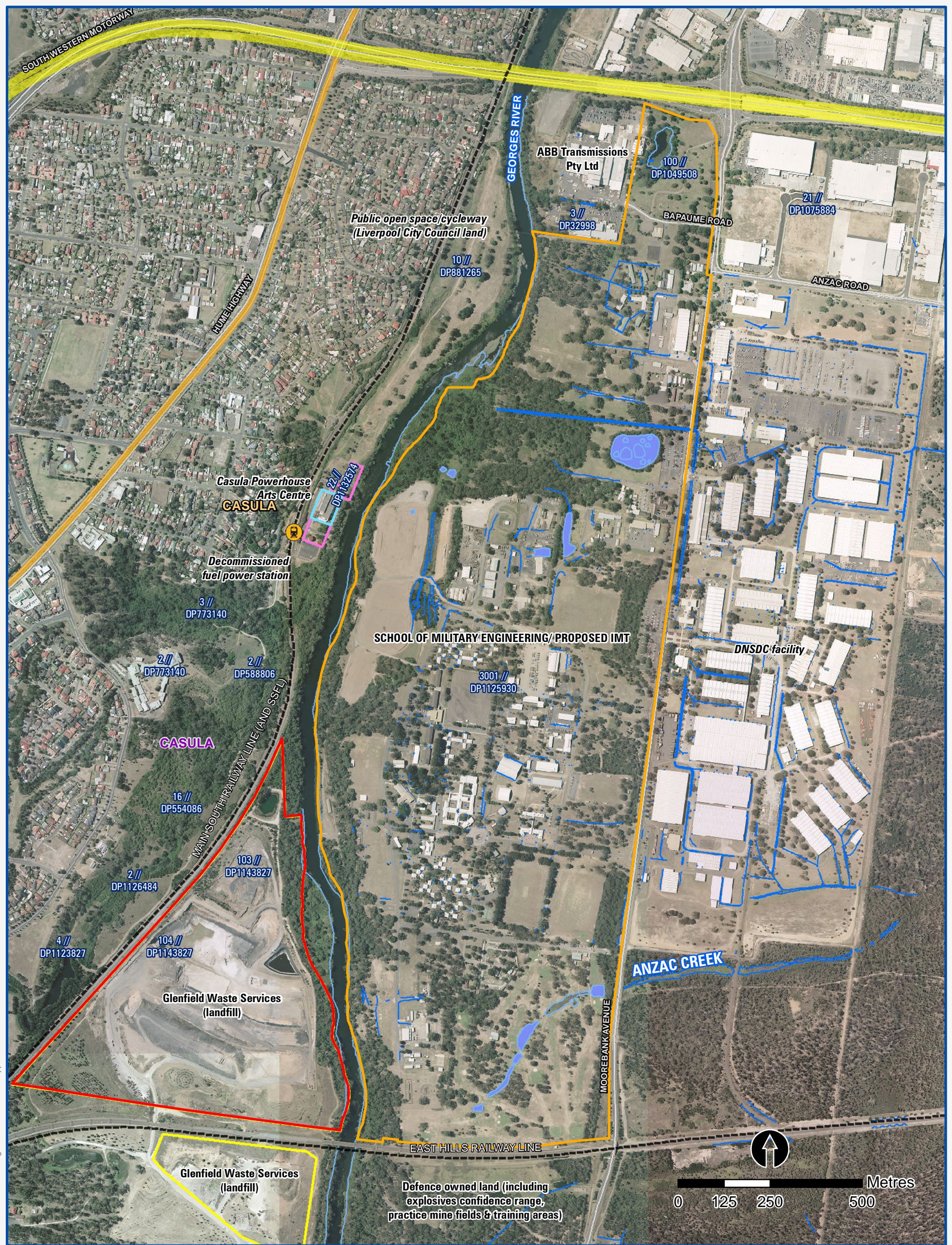
Figure 1: Site location



- Rail line & station
- Proposed Interstate rail tracks
- Proposed IMEX rail tracks
- Study area
- IMT site boundary

Figure 2: Southern rail alignment option

Aerial Source: © 2014 Google earth and its data suppliers

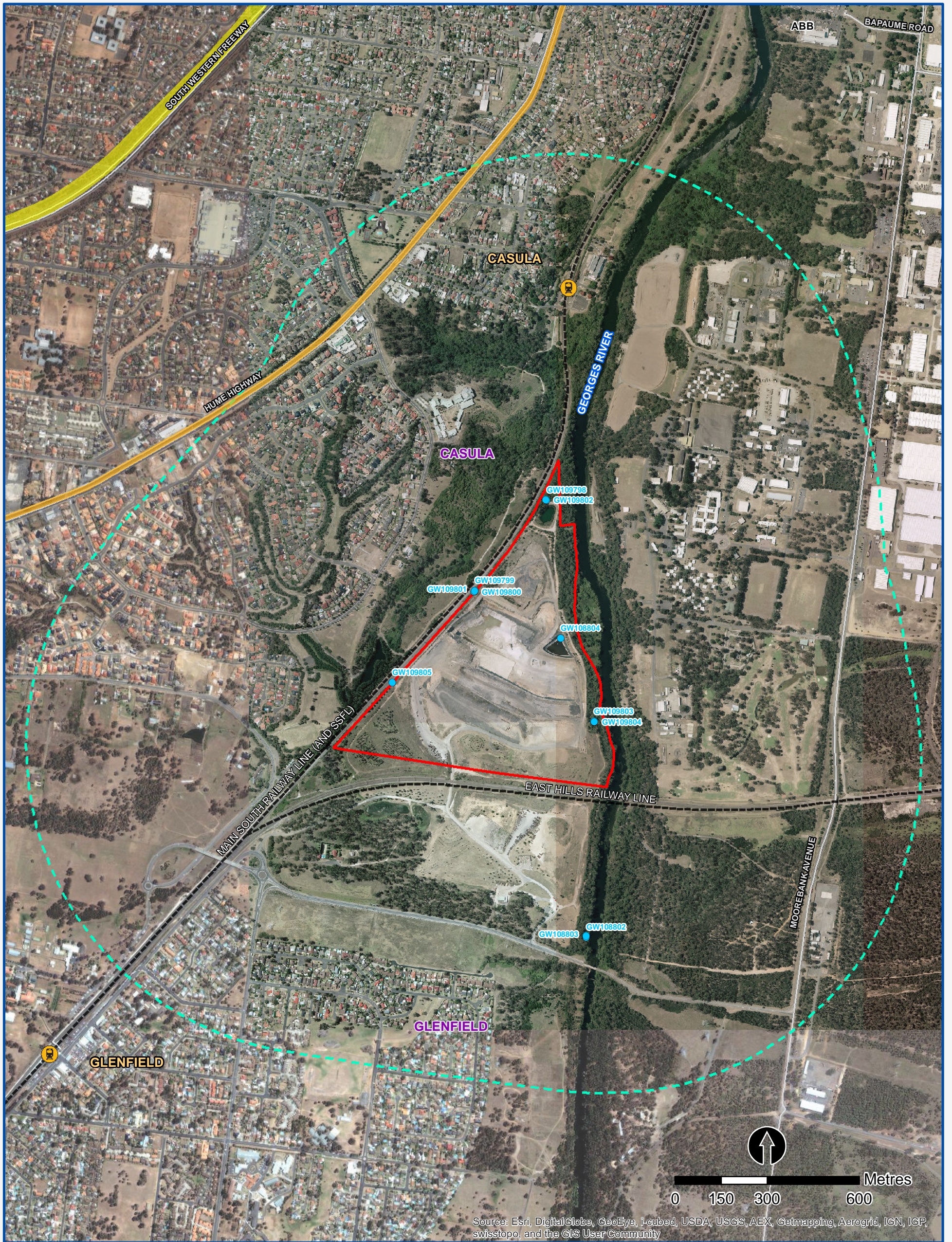


- | | |
|-----------------------------------|-------------------------------|
| Study area | Rail line & station |
| IMT site boundary | Stormwater drainage |
| Casula Powerhouse Arts Centre | Water features / reticulation |
| Decommissioned fuel power station | |
| Extent of landfill | |

Figure 3: Site setting and surrounding features

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Aerial Source: © 2014 Google earth and its data suppliers



- | | |
|---------------------|------------------------------------|
| Rail line & station | Registered monitoring wells |
| Study area | Domestic |
| 1km radius | Industrial |
| | Monitoring well |
| | Waste disposal |

Figure 4: Registered Boreholes

\\Apsyd\fil03\proj\K\KPMG_Australia\2103829A_Moorebank_Intermodal_Terminal\10_GIS\Projects\ESRI\2103829A_GIS_F295_A1.mxd // MitchellEm // 14/05/2014

Appendix A

Glenfield Waste Disposals Environmental Protection Licence



Environment Protection Licence

Licence - 4614

Licence Details

Number:	4614
Anniversary Date:	01-March

Licensee

L.A. KENNETT ENTERPRISES PTY LTD

PO BOX 19

GLENFIELD NSW 2167

Premises

GLENFIELD WASTE DISPOSALS

CAMBRIDGE AVE

GLENFIELD NSW 2167

Scheduled Activity

Crushing, Grinding or Separating

Extractive Activities

Waste Disposal (application to land)

Waste Processing (non-thermal treatment)

Waste Storage

Fee Based Activity

Scale

Crushing, grinding or separating	> 30000-100000 T processed
Land-based extractive activity	> 30000-50000 T extracted, processed or stored
Non-thermal treatment of general waste	> 0 T treated
Waste disposal by application to land	Any annual capacity
Waste storage - other types of waste	> 0 T stored

Region

Waste Operations

59-61 Goulburn Street

SYDNEY NSW 2000

Phone: 02 9995 5000

Fax: 02 9995 5999

PO Box A290 SYDNEY SOUTH

NSW 1232

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Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act); and
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

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The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

L.A. KENNETT ENTERPRISES PTY LTD
PO BOX 19
GLENFIELD NSW 2167

subject to the conditions which follow.

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1 Administrative Conditions

A1 What the licence authorises and regulates

- A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Crushing, Grinding or Separating	Crushing, grinding or separating	> 30000 - 100000 T processed
Extractive Activities	Land-based extractive activity	> 30000 - 50000 T extracted, processed or stored
Waste Processing (non-thermal treatment)	Non-thermal treatment of general waste	> 0 T treated
Waste Disposal (application to land)	Waste disposal by application to land	Any annual capacity
Waste Storage	Waste storage - other types of waste	> 0 T stored

A2 Premises or plant to which this licence applies

- A2.1 The licence applies to the following premises:

Premises Details
GLENFIELD WASTE DISPOSALS
CAMBRIDGE AVE
GLENFIELD
NSW 2167
PART LOT 1 DP 113201, LOT 2 DP 333578, LOT 51 DP 515696, LOT 52 DP 517310, LOT 3 DP 736881, LOT 5 DP 833516, LOT 9 DP 833516, LOT 103 DP 1143827, LOT 104 DP 1143827
NORTH OF CAMBRIDGE AVENUE, GLENFIELD

A3 Information supplied to the EPA

- A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:

- a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998;
- and

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b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

A3.2 The document titled "Landfill Environmental Management Plan for Glenfield Waste Disposals Glenfield Landfill" and dated December 1997 is not to be taken as part of the documentation in A4.1, other than those parts specifically referenced in this licence.

Note: For the purposes of this licence the abbreviation "LEMP" is defined as the document titled Landfill Environmental Management Plan for Glenfield Waste Disposals Glenfield Landfill dated December 1997.

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

P1.2 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Stormwater overflow discharge from the B1 sedimentation dam discharging to Glenfield Creek labelled as 'B1' on map titled 'Site Plan & Borehole Locations' submitted to the EPA 19.6.03.
2	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Stormwater overflow discharge from B7 sedimentation dam discharging to Georges River labelled as 'B7' on map titled 'Site Plan & Borehole Locations' submitted to the EPA 19.6.03.
3	Leachate quality monitoring		Concrete leachate riser labelled as 'LP001A' on diagram titled 'Site Plan showing groundwater bore locations' (CES031101-LAK) submitted in the Figures of the Landfill Environment Management Plan dated September 2007.
4	Leachate quality monitoring		Concrete leachate riser located in the south eastern sector of the Current (Active) Quarrying Area labelled as 'LP003' on map titled 'Site Plan & Borehole Locations' submitted to the EPA 19.6.03.

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5	Leachate quality monitoring	Concrete leachate riser located in the south-western sector of the Current (Active) Quarrying Area labelled as 'LP002' on map titled 'Site Plan & Borehole Locations' submitted to the EPA 19.6.03.
6	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH8A" as identified in Figure 18 and section 4.3.1 of LEMP, December 1997.
7	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH1B" on Figure 2 in "Report on Installation, Replacement and Decommissioning of Groundwater Monitoring Wells at Glenfield Waste Disposal Landfill" (Ref: CES031101-LAK-21-F) dated 22 February 2007.
8	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH7B" on Figure 2 in "Report on the installation, replacement and decommissioning of groundwater monitoring wells at Glenfield Waste Disposal Landfill" (Ref: CES31101-LAK-21-F) dated 22 February 2007.
10	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH9A" on Figure 18 and described in Section 4.3.1 of the LEMP, December 1997.
11	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH10D" on Figure 18 and described in Section 4.3.1 of the LEMP, December 1997.
12	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH13D" on Figure 18 and described in Section 4.3.1 of the LEMP, December 1997.
13	Groundwater monitoring point	Groundwater monitoring point labelled as "BH15S" on Figure 18 and described in Section 4.3.1 of the LEMP, December 1997.
14	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH11" on Figure 18 and described in Section 4.3.1 of the LEMP, December 1997.
15	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH9B" on Figure 18 and described in Section 4.3.1 of the LEMP, December 1997.

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16	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH3G" on Figure 1 in "Parallel Monitoring Report - Glenfield Landfill Facility, Glenfield NSW " February 2011.
17	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH3H" on Figure 1 in "Parallel Monitoring Report - Glenfield Landfill Facility, Glenfield NSW " February 2011.
18	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH3I" on Figure 1 in "Parallel Monitoring Report - Glenfield Landfill Facility, Glenfield NSW " February 2011.
19	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH4A" on Figure 18 and described in Section 4.3.1 of teh LEMP, December 1997.
20	Groundwater monitoring point	Groundwater monitoring bore labelled as "BH4D" on Figure 2 in "Report on the installation, replacement and decommissioning of groundwater monitoring wellsat Glenfield Waste Disposal Landfill" (Ref: CES31101-LAK-21-F) dated 22 February 2007.
21	Groundwater Monitoring	Groundwater monitoring well labelled as "BH7A" in Figure2 in "Report on the installation, replacement and decommissioning of groundwater monitoring wellsat Glenfield Waste Disposal Landfill" (Ref: CES31101-LAK-21-F) dated 22 February 2007.
22	Groundwater Monitoring	Groundwater monitoring well labelled as "BH8B" in Figure 2 of "Report on the installation, replacement and decommissioning of groundwater monitoring wellsat Glenfield Waste Disposal Landfill" (Ref: CES31101-LAK-21-F) dated 22 February 2007.
23	Groundwater monitoring	Groundwater monitoring well labelled as "BH1A" in Figure 2 of "Report on the installation, replacement and decommissioning of groundwater monitoring wellsat Glenfield Waste Disposal Landfill" (Ref: CES31101-LAK-21-F) dated 22 February 2007.

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24	Groundwater monitoring	Groundwater monitoring well labelled as "BH17A" in Figure 2 of "Report on the installation, replacement and decommissioning of groundwater monitoring wells at Glenfield Waste Disposal Landfill" (Ref: CES31101-LAK-21-F) dated 22 February 2007.
25	Groundwater monitoring	Groundwater monitoring well labelled as "BH17B" in Figure 2 of "Report on the installation, replacement and decommissioning of groundwater monitoring wells at Glenfield Waste Disposal Landfill" (Ref: CES31101-LAK-21-F) dated 22 February 2007.
26	Subsurface Gas Monitoring	Subsurface gas monitoring well labelled as "LG1" on Figure 2 of report titled "Report on Installation of Six Sub-surface Gas monitoring Wells at Glenfield Waste Disposals Landfill, Licence Number 4614, Cambridge Avenue, Glenfield NSW.
27	Subsurface Gas Monitoring	Subsurface gas monitoring well labelled as "LG2" on Figure 2 of report titled "Report on Installation of Six Sub-surface Gas monitoring Wells at Glenfield Waste Disposals Landfill, Licence Number 4614, Cambridge Avenue, Glenfield NSW.
28	Subsurface Gas Monitoring	Subsurface gas monitoring well labelled as "LG3" on Figure 2 of report titled "Report on Installation of Six Sub-surface Gas monitoring Wells at Glenfield Waste Disposals Landfill, Licence Number 4614, Cambridge Avenue, Glenfield NSW.
29	Subsurface Gas Monitoring	Subsurface gas monitoring well labelled as "LG4" on Figure 2 of report titled "Report on Installation of Six Sub-surface Gas monitoring Wells at Glenfield Waste Disposals Landfill, Licence Number 4614, Cambridge Avenue, Glenfield NSW.

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30	Subsurface Gas Monitoring	Subsurface gas monitoring well labelled as "LG5" on Figure 2 of report titled "Report on Installation of Six Sub-surface Gas monitoring Wells at Glenfield Waste Disposals Landfill, Licence Number 4614, Cambridge Avenue, Glenfield NSW.
31	Subsurface Gas Monitoring	Subsurface gas monitoring well labelled as "LG7" on Figure 1 in "Parallel Monitoring Report - Glenfield Landfill Facility, Glenfield NSW " February 2011.
32	Leachate Quality Monitoring	Leachate dam located adjacent to eastern wall of the northern quarried void , as per photo 3 of Consulting Earth Scientists letter of 22 May 2008. E306911 N6240098

3 Limit Conditions

L1 Pollution of waters

- L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Waste

- L2.1 The licensee must not cause, permit or allow any waste to be received at the premises, except the wastes expressly referred to in the column titled "Waste" and meeting the definition, if any, in the column titled "Description" in the table below.

Any waste received at the premises must only be used for the activities referred to in relation to that waste in the column titled "Activity" in the table below.

Any waste received at the premises is subject to those limits or conditions, if any, referred to in relation to that waste contained in the column titled "Other Limits" in the table below.

This condition does not limit any other conditions in this licence.

Code	Waste	Description	Activity	Other Limits
NA	General solid waste (non-putrescible)			Volume of waste stored in the transfer station must not exceed 4,000 cubic metres at any one time.
NA	Waste tyres			Volume of waste stored in the transfer station

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		must not exceed 4,000 cubic metres at any one time.
NA	Asbestos waste	NA
NA	Waste	NA

L2.2 The licensee must not dispose of any tyre at the premises unless:

- a) The tyre has a diameter of 1.2 metres or more; and/or
- b) The tyre has been shredded or had its walls removed; and/or
- c) The tyre was delivered to the premises as part of a domestic load.

L2.3 For the purposes of this condition:

- a) Tyres are taken to be shredded only if the tyres are in pieces measuring no more than 250mm in any direction; and
- b) Domestic load means a load containing no more than 5 tyres having a diameter of less than 1.2 metres.

L3 Noise limits

- L3.1 Noise from the premises must not exceed an noise emission criterion of 50 dB(A), $L_{A10(15 \text{ minute})}$ except as previously provided by this licence.
- L3.2 Noise from the premises is to be measured at any point within one metre of the nearest affected residence or other noise sensitive areas to determine compliance with Condition L3.1. 5 dB(A) must be added if the noise is tonal or impulsive in character.

L4 Potentially offensive odour

- L4.1 No condition of this licence identifies a potentially offensive odour for the purposes of section 129 of the Protection of the Environment Operations Act 1997.

Note: Section 129 of the Protection of the Environment Operations Act 1997, provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

- O1.1 Licensed activities must be carried out in a competent manner.
This includes:

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Licence - 4614



- a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
- b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

- O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
 - a) must be maintained in a proper and efficient condition; and
 - b) must be operated in a proper and efficient manner.

O3 Processes and management

- O3.1 The licensee must take all practicable steps to control entry to the premises.
- O3.2 All operations and activities occurring at the premises must be carried out in a manner that will prevent and minimise fire at the premises
- O3.3 There must be no incineration or burning of any waste at the premises.

O4 Waste management

- O4.1 Cover material must be virgin excavated natural material.
 - a) Daily cover
Cover material must be applied to a minimum depth of 15 centimetres over all exposed landfilled waste prior to ceasing operations at the end of each day.
 - b) Intermediate cover
Cover material must be applied to a depth of 30 centimetres over surfaces of the landfilled waste at the premises which are to be exposed for more than 90 days.
 - c) Cover material stockpile
At least two weeks cover material must be available at the premises under all weather conditions. This material may be won on site, or alternatively a cover stockpile must be maintained adjacent to the tip face.
- O4.2 Where wastes are received at the premises for purposes of reuse, processing, recovery, recycling or transfer to another premises, then such wastes are not required to be covered on a daily basis provided that:
 - a) Such wastes are stored and managed so as not to cause or be likely to cause any off-site environmental effects; and
 - b) Such wastes are stored in a clearly defined area of the premises away from the tipping face.
- O4.3 The licensee must only dispose of waste at the premises in Landfill Cell A1 and Landfill Cell A2. No waste within 20 metres of the eastern extremity or Haul Road end of Cell A2 may be landfilled above 11.7m AHD.

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- O4.4 The depth of the waste landfilled in Cell A1 and A2, including capping and any other material placed above the cap must not exceed 30 metres.
- O4.5 The licensee must not exhume any landfilled waste unless approved in writing by the EPA.
- O4.6 The licensee must maintain an earthen bund wall nominally parallel with and at a suitable distance from the northern and eastern extremities of Cell A1. The bunded area must form an enclosure to contain and isolate fugitive leachate emissions from the batter of Cell A1.
- O4.7 The licensee must obtain approval from the EPA prior to constructing any landfill cells at the premises other than Landfill Cell A2.
- O4.8 The licensee must ensure that an operational freeboard of 0.5 metres is maintained within the leachate dam.
- O4.9 If the height of leachate in the risers for cells A1 exceeds -5m AHD and/or the height of the leachate in the riser for the LCD exceeds -6 metres AHD and/or if the leachate dam's freeboard is exceeded, the licensee must within 7 days of either of these events occurring submit a report to the EPA.
- O4.10 The report required by condition O4.10 must propose how the licensee will lower the leachate level in the riser serving the Cell A1 below -5 metres AHD and/or the leachate level in the riser serving the LCD below -6 metres AHD whilst still maintaining the leachate storage dam's operational freeboard of 0.5 metres.
- O4.11 The licensee must operate and maintain a system comprising:
- a) An automated pump out from the riser in Cell A1 configured such that the leachate level in the riser is maintained below -6 metres AHD;
 - b) A high level alarm configured to activate when the leachate level in the riser serving Cell A1 exceeds -5 metres AHD;
 - c) An automated pump out from the leachate collection drain (LCD) configured such that the leachate level in the riser serving the LCD is maintained below -7 metres AHD;
 - d) A high level alarm configured to activate when the leachate level in the riser serving the LCD exceeds -6 metres AHD; and
 - e) A leak detection and interlock system configured such that leachate transfer from Cell A1 and/or the LCD is shut down when:
 - i) There is any leakage from the transfer pipe system; and or
 - ii) The freeboard in the leachate holding dam is less than 0.5 metres.
- O4.12 Leachate must be disposed of by:
- a) evaporation from the leachate storage dam;
 - b) irrigation onto the tipping face (cell A1);
 - c) re-injection into cell A1; or
 - d) tanker transfer off-site for disposal at a suitably licenced facility.
- O4.13 The licensee must not remove water from the remainder of the void space depicted in Figure 3 of the LMP and manage it in a manner which is not in compliance with O4.12 unless the water is not contaminated by leachate and has a total ammonia concentration of less than 0.9 mg/L.
- O4.14 The licensee must sample and analyse for total ammonia any liquid removed out of the void space depicted in Figure 3 of the LMP and which is not managed as required by O4.12. The frequency of monitoring must be at least once per every 100,000 litres removed.

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O4.15 If the rainfall is greater than or equal to 1252 mm per year (1976 wettest year) at any time within any 12 month period from when waste is first disposed of in cell A1 the licensee must submit a report to the EPA within 60 days proposing how it will manage leachate volumes in such a manner that the leachate head in cell A1 will be maintained below -6m AHD and the leachate dam's 0.5 metre freeboard is not exceeded.

Definition: Leachate is taken as water which has come into contact with waste (other than daily cover which is VENM).

O4.16 The total quantity of used, rejected or unwanted tyres (including shredded tyres and tyre pieces) stockpiled at the premises must not exceed 50 tonnes.

O4.17 The licensee must ensure that stockpiles of used, rejected or unwanted tyres (including shredded tyres and tyre pieces) are located in a clearly defined area.

O4.18 The licensee must ensure that stockpiles of used, rejected or unwanted tyres (including shredded tyres and tyre pieces) are managed so as not to cause or to be likely to cause the spread of disease by vermin.

O4.19 The licensee must ensure that measures are taken to prevent stockpiles of used, rejected or unwanted tyres (including shredded tyres and tyre pieces) from catching on fire.

O4.20 Stockpiling of unshredded and shredded garden waste and wood waste (as defined in the EPA Waste Classification Guidelines) at the premises must not exceed 10,000 cubic metres (m3) at any one time.

O4.21 The licensee must maintain a filing plan that identifies areas to be used in the future for the disposal of waste. The filing plan must be updated at intervals of no greater than twelve months.

O4.22 Recycling facilities at the premises must be clearly marked and be available for access by the public.

O4.23 The licensee must ensure that the landfill cells are capped progressively during operations and specifically at times when the level of waste reaches final heights.

O4.24 The licensee must prepare and submit to the EPA, twelve months prior to the last load of waste being landfilled, a closure plan in accordance with section 76 of the Protection of the Environment Operations Act 1997.

5 Monitoring and Recording Conditions

M1 Monitoring records

M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.

M1.2 All records required to be kept by this licence must be:

- a) in a legible form, or in a form that can readily be reduced to a legible form;
- b) kept for at least 4 years after the monitoring or event to which they relate took place; and
- c) produced in a legible form to any authorised officer of the EPA who asks to see them.

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M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:

- a) the date(s) on which the sample was taken;
- b) the time(s) at which the sample was collected;
- c) the point at which the sample was taken; and
- d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Water and/ or Land Monitoring Requirements

POINT 1,2

Pollutant	Units of measure	Frequency	Sampling Method
Ammonia	milligrams per litre	Special Frequency 1	Grab sample
Conductivity	microsiemens per centimetre	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	Grab sample
Total organic carbon	milligrams per litre	Special Frequency 1	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

POINT 3,4,5,32

Pollutant	Units of measure	Frequency	Sampling Method
Alkalinity (as calcium carbonate)	milligrams per litre	Yearly	Grab sample
Aluminium	milligrams per litre	Yearly	Grab sample
Arsenic	milligrams per litre	Yearly	Grab sample
Barium	milligrams per litre	Yearly	Grab sample
Benzene	milligrams per litre	Yearly	Grab sample
Cadmium	milligrams per litre	Yearly	Grab sample
Calcium	milligrams per litre	Yearly	Grab sample
Chloride	milligrams per litre	Yearly	Grab sample
Chromium (hexavalent)	milligrams per litre	Yearly	Grab sample
Cobalt	milligrams per litre	Yearly	Grab sample
Conductivity	microsiemens per centimetre	Quarterly	Probe
Copper	milligrams per litre	Yearly	Grab sample
Ethyl benzene	milligrams per litre	Yearly	Grab sample

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Fluoride	milligrams per litre	Yearly	Grab sample
Lead	milligrams per litre	Yearly	Grab sample
Magnesium	milligrams per litre	Yearly	Grab sample
Manganese	milligrams per litre	Yearly	Grab sample
Mercury	milligrams per litre	Yearly	Grab sample
Nitrate	milligrams per litre	Yearly	Grab sample
Nitrite	milligrams per litre	Yearly	Grab sample
Nitrogen (ammonia)	milligrams per litre	Yearly	Grab sample
Organochlorine pesticides	milligrams per litre	Yearly	Grab sample
Organophosphate pesticides	milligrams per litre	Yearly	Grab sample
pH	pH	Yearly	Grab sample
Phosphate	milligrams per litre	Yearly	Grab sample
Phosphorus (total)	milligrams per litre	Yearly	Grab sample
Polycyclic aromatic hydrocarbons	milligrams per litre	Yearly	Grab sample
Potassium	milligrams per litre	Yearly	Grab sample
Sodium	milligrams per litre	Yearly	Grab sample
Standing Water Level	metres	Yearly	In situ
Sulfate	milligrams per litre	Yearly	Grab sample
Toluene	milligrams per litre	Yearly	Grab sample
Total chromium	milligrams per litre	Yearly	Grab sample
Total dissolved solids	milligrams per litre	Yearly	Grab sample
Total organic carbon	milligrams per litre	Yearly	Grab sample
Total petroleum hydrocarbons	milligrams per litre	Yearly	Grab sample
Total Phenolics	milligrams per litre	Yearly	Grab sample
Xylene	milligrams per litre	Yearly	Grab sample
Zinc	milligrams per litre	Yearly	Grab sample

POINT 6,7,8,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25

Pollutant	Units of measure	Frequency	Sampling Method
Alkalinity (as calcium carbonate)	milligrams per litre	Quarterly	Grab sample
Aluminium	milligrams per litre	Yearly	Grab sample
Arsenic	milligrams per litre	Yearly	Grab sample
Barium	milligrams per litre	Yearly	Grab sample
Benzene	milligrams per litre	Yearly	Grab sample
Cadmium	milligrams per litre	Yearly	Grab sample
Calcium	milligrams per litre	Quarterly	Grab sample
Chloride	milligrams per litre	Quarterly	Grab sample
Chromium (hexavalent)	milligrams per litre	Yearly	Grab sample
Chromium (total)	milligrams per litre	Yearly	Grab sample

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Cobalt	milligrams per litre	Yearly	Grab sample
Copper	milligrams per litre	Yearly	Grab sample
Ethyl benzene	milligrams per litre	Yearly	Grab sample
Fluoride	milligrams per litre	Yearly	Grab sample
Lead	milligrams per litre	Yearly	Grab sample
Magnesium	milligrams per litre	Quarterly	Grab sample
Manganese	milligrams per litre	Yearly	Grab sample
Mercury	milligrams per litre	Yearly	Grab sample
Nitrate	milligrams per litre	Yearly	Grab sample
Nitrite	milligrams per litre	Yearly	Grab sample
Nitrogen (ammonia)	milligrams per litre	Quarterly	Grab sample
Organochlorine pesticides	milligrams per litre	Yearly	Grab sample
Organophosphate pesticides	milligrams per litre	Yearly	Grab sample
pH	pH	Quarterly	Grab sample
Polycyclic aromatic hydrocarbons	milligrams per litre	Yearly	Grab sample
Potassium	milligrams per litre	Quarterly	Grab sample
Sodium	milligrams per litre	Quarterly	Grab sample
Standing Water Level	metres	Quarterly	In situ
Sulfate	milligrams per litre	Quarterly	Grab sample
Toluene	milligrams per litre	Yearly	Grab sample
Total dissolved solids	milligrams per litre	Quarterly	Grab sample
Total organic carbon	milligrams per litre	Quarterly	Grab sample
Total petroleum hydrocarbons	milligrams per litre	Yearly	Grab sample
Total Phenolics	milligrams per litre	Yearly	Grab sample
Xylene	milligrams per litre	Yearly	Grab sample
Zinc	milligrams per litre	Yearly	Grab sample

POINT 27,29,31,26

Pollutant	Units of measure	Frequency	Sampling Method
Methane	parts per million by volume	Quarterly	Special Method 1

POINT 28,30

Pollutant	Units of measure	Frequency	Sampling Method
Methane	parts per million by volume	Monthly	Special Method 1

M2.3 For the purposes of the table(s) above Special Frequency 1 means the collection of samples monthly during discharge. Sampling must commence on the first day of discharge.

M2.4 For the purposes of the table(s) above, Special Method 1 means monitoring undertaken in accordance

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with Benchmark Technique 16 of the EPA's Environmental Guidelines: Solid Waste Landfills (1996).

M3 Testing methods - concentration limits

- M3.1 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

M4 Weather monitoring

- M4.1 The licensee must monitor daily rainfall at the Premises

M5 Recording of pollution complaints

- M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.
- M5.2 The record must include details of the following:
- a) the date and time of the complaint;
 - b) the method by which the complaint was made;
 - c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
 - d) the nature of the complaint;
 - e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
 - f) if no action was taken by the licensee, the reasons why no action was taken.
- M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.
- M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

- M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.
- M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.
- M6.3 The preceding two conditions do not apply until 3 months after:
- a) the date of the issue of this licence or
 - b) if this licence is a replacement licence within the meaning of the Protection of the Environment

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Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.

M7 Requirement to monitor volume or mass

M7.1 The licensee must monitor and record:

- a) On a weekly basis, the level of leachate within the storage dam adjoining cell A1 and be able to estimate the volume of leachate in the dam from that;
- b) The volume of leachate transferred from cell A1 to the storage dam during pumping;
- c) The volume of leachate removed from the storage dam by pumping and its method of disposal; and
- d) On a daily basis, the leachate level in the riser in Cell A1.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:

- a) a Statement of Compliance; and
- b) a Monitoring and Complaints Summary.

At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

R1.3 Where this licence is transferred from the licensee to a new licensee:

- a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
- b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:

- a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
- b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and

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Complaints Summary must be signed by:

- a) the licence holder; or
- b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

R1.8 A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

R2.3 The licensee must notify the EPA within 24 hours of detecting methane concentrations above 1.25% v/v in any of the subsurface gas monitoring bores at the premises.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:

- a) where this licence applies to premises, an event has occurred at the premises; or
 - b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
- and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:

- a) the cause, time and duration of the event;
- b) the type, volume and concentration of every pollutant discharged as a result of the event;
- c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
- d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after

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making reasonable effort;

e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;

f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and

g) any other relevant matters.

- R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

R4 Other reporting conditions

- R4.1 The licensee must notify the EPA of the occurrence of all fires on the premises in accordance conditions R2.1 and R2.2 as soon as practical after becoming aware of the fire.
- R4.2 The Licensee must notify the EPA within 24 hours of detecting methane concentrations above 1.25% v/v in any of the subsurface gas monitoring bores at the Premises.

7 General Conditions

G1 Copy of licence kept at the premises or plant

- G1.1 A copy of this licence must be kept at the premises to which the licence applies.
- G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.
- G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

8 Pollution Studies and Reduction Programs

U1 Transfer of temporarily landfilled waste to cell

- U1.1 The licensee must transfer all waste temporarily landfilled on top of the existing landfill cells to Cell A1 by 31 October 2009.

9 Special Conditions

E1 Financial assurance

- E1.1 A financial assurance, in favour of the EPA, in the amount of nine hundred and sixty thousand dollars (\$960,000) must be maintained during the operation of the facility and thereafter until such time as the

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EPA is satisfied the premises are environmentally secure.

This assurance must be replenished to the full amount should the EPA have any reason to call up the financial assurance or any part thereof to correct environmental problems which have not been remedied by the occupier upon being given notice to do so.

Failure to maintain the assurance at the full amount will result in suspension of this Licence.

This financial assurance shall be indexed to the Consumer Price Index (CPI). The EPA reserves the right to vary the magnitude of the bank guarantee at any time depending upon any reassessment of possible cost(s) of rehabilitation of the premises.

E2 Leachate barrier system -eastern wall of Cell A2

- E2.1 The licensee must construct a leachate barrier and leachate collection and conveyance system (LCCS) on the eastern wall of landfill Cell A2, from the haul road (at 11.7m to 12.5 AHD) to the top of the cell wall, in accordance with the proposal detailed in Sections 5.4, 5.5 and 5.6.2.1 of the document titled "Leachate Management Plan (LMP) Cells A to F, Glenfield Waste Disposal Solid Waste Landfill, Consulting Earth Scientists, February 2007" ("the LMP") and in accordance with any other relevant conditions of this licence.
- E2.2 The specifications of the materials of the installed leachate barrier and LCCS referred to in Condition E3.1 above must be in accordance with Appendix 3 of the LMP, with the exception that:
- a) The 400m thick padding layer depicted in Figure 7 of the LMP must be installed in accordance with the procedures and tests detailed in section 5.4 of the LMP;
 - b) The upper and basal geo-textile of the geo-net (Tenax Tendrain 2200/1) geo-composite component of the LCCS must be:
 - i) Geomac 330 (also known as Terrastop 453GM); or
 - ii) An alternative geo-textile, provided that the licensee provides the EPA with hydraulic conductivity ratio and transmissivity test results which demonstrate the adequacy of the alternative;
 - c) The leachate collection pipes must meet the specification detailed in Appendix 5 contained in the LMP.
- E2.3 The licensee must engage a suitably qualified person to prepare the report to oversee the general conditions and the conditions for the construction and installation of the leachate barrier and leachate collection and conveyance system for the upper eastern wall of landfill Cell A2.
- E2.4 Within 60 days of completion of installation of the leachate barrier and LCCS on the upper eastern wall of Cell A2, the licensee must provide the EPA with a report which includes:
- a) A Construction Quality Assurance ("CQA") Report in accordance with the requirements of Sections 5.14 and 6, and Appendix 7 of the LMP;
 - b) Confirmation that the works required by the general conditions and the conditions for the construction and installation of the leachate barrier and the leachate collection and conveyance system were installed;
 - c) The design and installation details for the GCLs anchor trenches; and
 - d) 'As constructed' survey plans which include, inter alia, plans of all installed leachate collection pipes, including the geo-textile above the LCD and the installed upper surfaces of the GCL, the geo-composite component of the drainage system (i.e. the upper Geomac 300) and the sand layer overlaying the geo-composite.

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- E2.5 Approval to dispose of waste in Cell A2 above RLxx, if granted, will be subject to the EPA being provided with the CQA Report and being satisfied that based on the information provided, the leachate barrier, the LCCS and the leachate extraction and transfer systems have been installed in accordance with all relevant licence conditions.

E3 Operational water balance monitoring

- E3.1 The licensee must submit to the Manager Waste Operations, Department of Environment and Conservation PO Box A290 Sydney South NSW 1232 by 30 June 2009 a water balance which:
- a) provides in monthly time steps over the 12 month period from when waste is first disposed of in cell A1:
 - i) data on the volume of leachate transferred from cell A1 to the storage dam adjoining cell A1, and any other cell, based on data from leachate monitoring;
 - ii) data on volume of leachate removed from the storage dam by pumping and its method of disposal, based on data from leachate monitoring;
 - iii) an estimate of the volume added to the storage dam due to rainfall directly into the dam and run off from into the storage dam, based on on-site rainfall data;
 - iv) an estimate of the volume removed from the storage dam due to evaporation, based on data from the nearest weather station; and
 - v) rainfall and evaporation data for the premises, based on on-site rainfall data and evaporation data from the nearest weather station.
 - b) based on the data in a) provide an estimate of the total volume of leachate generated from cell A1 (as two components, 1 pumped from the cell and the other derived from run-off) as a percentage of monthly rainfall;
 - c) based on the data in b), provide a determination as to whether the leachate dam adjoining cell A1 has sufficient capacity to:
 - i) contain leachate generated from cell A1, assuming on-going 90th percentile rainfall years, until cell A1 is capped;
 - ii) maintain a freeboard more than 0.18 metres;
 - ii) maintain the leachate level in cell A1 riser below -6 metres AHD; and
 - iii) maintain the leachate level in the LCD riser below -7 metres AHD; and
 - d) based on the findings from the requirements of this condition, propose (with supporting information) the size of the dam needed for cell A2, assuming cell A1 is capped, leachate from other cells (other than the LCD) at the site is not transferred into the dam and meet the requirements of parts c) ii) and iii) of this condition, with the same height restriction for leachate in cell A2.

E4 Cell B1 Construction

- E4.1 Cell B1 must be constructed generally in accordance with Sections 3.4 to 3.9 inclusive and Figures 2, 4, 5, 7 and 8 of the document "Cell B1 Design and Supplementary Leachate Management Plan, Glenfield Waste Services Landfill Facility, Environmental Protection Licence 4614, Geo-Environmental Engineering, 7 May 2012" (the Cell B1 Design Report).

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- E4.2 A construction quality assurance program must be prepared and submitted for the proposed construction of any new landfill cells at the premises. The construction quality assurance program is required to ensure that any proposed landfill cell is constructed in accordance with its design. The construction quality assurance program must be provided in writing to the EPA within 2 months of any new landfill cell having been constructed at the premises, and before any waste is landfilled in that landfill cell. The EPA will then, subject to the CQA program report demonstrating (to the satisfaction of the EPA) that landfill cell was constructed in accordance with its design, vary this licence to allow the landfilling of waste in that landfill cell.
- E4.3 The CQA program report must include, but need not be limited to, the following information:
- a) The provision (after the cell is constructed) of “as constructed” drawings (prepared from field surveys) which depict in plan view the prepared basal layer (determined prior to placement of the liner);
 - b) Sampling (using the appropriate Australian Standard) and testing of the appropriate leachate drainage material in order to:
 - i) Establish its permeability (using the appropriate Australian Standard);
 - ii) Establish that its granular size is greater than 20mm (that is by demonstrating that not greater than 10% is smaller than 20mm in size and that not be greater than 3% is smaller than the 0.075mm in size (using the appropriate Australian Standard); and
 - iii) Establish the reactivity of the leachate drainage material for each source. The EPA will accept one set of tests per source and no less than one set of tests per 2500 tonnes of materials from any particular source. Relativity tests are not needed for river gravel.
 - c) The provision of a report in the EPA with documentary evidence that the works and testing required by the above parts of this condition have been completed, with the report reviewed and approved by a suitability qualified person (eg. a chartered professional engineer with the Institution of Engineers Australia).
- E4.4 No waste is to be disposed of in Cell B1 until:
- (a) The CQA program report required by Conditions O4.26 and O4.27 is received by the EPA, and
 - (b) EPA has confirmed in writing that waste disposal may commence.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

Environment Protection Licence

Licence - 4614



flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .

Environment Protection Licence

Licence - 4614



TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non - putrescible), special waste or hazardous waste

Ms Nadia Kanhoush

Environment Protection Authority

(By Delegation)

Date of this edition: 12-April-2001

Environment Protection Licence

Licence - 4614



End Notes

- 1 Licence varied by notice 1029056, issued on 20-Aug-2003, which came into effect on 14-Sep-2003.
- 2 Licence varied by notice 1053139, issued on 23-Jan-2006, which came into effect on 17-Feb-2006.
- 3 Licence varied by notice 1063048, issued on 22-Sep-2006, which came into effect on 22-Sep-2006.
- 4 Licence varied by notice 1066628, issued on 31-Oct-2006, which came into effect on 31-Oct-2006.
- 5 Licence varied by notice 1070981, issued on 14-Mar-2007, which came into effect on 14-Mar-2007.
- 6 Licence varied by notice 1076171, issued on 26-Oct-2007, which came into effect on 26-Oct-2007.
- 7 Licence varied by notice 1081090, issued on 14-Dec-2007, which came into effect on 14-Dec-2007.
- 8 Licence varied by notice 1081817, issued on 09-Jan-2008, which came into effect on 09-Jan-2008.
- 9 Licence varied by notice 1087536, issued on 09-Sep-2008, which came into effect on 09-Sep-2008.
- 10 Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
- 11 Licence varied by notice 1092081, issued on 30-Jan-2009, which came into effect on 30-Jan-2009.
- 12 Licence varied by notice 1098546, issued on 08-Jul-2009, which came into effect on 08-Jul-2009.
- 13 Licence varied by notice 1107147, issued on 27-Oct-2009, which came into effect on 27-Oct-2009.
- 14 Licence varied by notice 1108130, issued on 19-Nov-2009, which came into effect on 19-Nov-2009.
- 15 Licence varied by Correction to EPA Region data record., issued on 28-Jun-2010, which came into effect on 28-Jun-2010.
- 16 Licence varied by correction to DECCW Region data record, issued on 07-Jul-2010, which came into effect on 07-Jul-2010.
- 17 Licence varied by notice 1501143 issued on 29-Sep-2011
- 18 Licence varied by notice 1507405 issued on 31-Jul-2012
- 19 Licence varied by notice 1508758 issued on 20-Sep-2012

Environment Protection Licence

Licence - 4614



Appendix B

Registered groundwater bore search information



Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
Document Generated on Friday, May 16, 2014

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Work Requested -- GW108802

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW108802
LIC-NUM	10BL601723
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	Equipped - bore used for obs
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2008-04-21
FINAL-DEPTH (metres)	23.70
DRILLED-DEPTH (metres)	23.70
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6239299.00
EASTING	307099.00
LATITUDE	33 58' 9"
LONGITUDE	150 54' 43"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
PARISH MINTO
PORTION-LOT-DP 2//333578

Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH MINTO
PORTION-LOT-DP 2 333578

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	4.00	100			Auger - Solid Flight
1		Hole	Hole	4.00	23.70	100			Other
1	1	Casing	P.V.C.	0.70	14.70	50			Screwed
1	1	Opening	Screen	14.70	23.70	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 1000m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	3.20	3.20	FILL,CLAY,GRAVELS AND SAND		
3.20	7.00	3.80	SANDY CLAY,BROWN DRY		
7.00	7.50	0.50	SANDY CLAY,BROWN,RED,GREY CLAY,GRAVELS		
7.50	8.00	0.50	WEATHERED SANDSTONE L/GREY		
8.00	11.30	3.30	WEATHERED SHALE.SANDSTONE		
11.30	12.00	0.70	SAND,COARSE GRAINED,ORANGE,BLACK		
12.00	23.70	11.70	SANDSTONE. L/GREY, MEDIUM GRAINED		

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW108803

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW108803
LIC-NUM	10BL601723
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	Equipped - bore used for obs
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2008-04-21
FINAL-DEPTH (metres)	8.00
DRILLED-DEPTH (metres)	8.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6239304.00
EASTING	307099.00
LATITUDE	33 58' 9"
LONGITUDE	150 54' 43"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
PARISH MINTO
PORTION-LOT-DP 2//333578

Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH MINTO
PORTION-LOT-DP 2 333578

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	8.00	100			Auger - Solid Flight
1	1	Casing	P.V.C.	-0.80	3.00	50			Screwed
1	1	Opening	Screen	3.00	7.00	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 2800m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	2.80	2.80	FILL,CLAY,GRAVELS,GLASS		
2.80	5.50	2.70	SANDY CLAY,BROWN,FINE TO MEDIUM GR.		
5.50	7.50	2.00	SANDY CLAY, RED BROWN		
7.50	8.00	0.50	LAMINATED SANDSTONE,SHALE,GREY		

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

Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW108804

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW108804
LIC-NUM	10BL601719
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	Equipped - bore used for obs
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2008-04-22
FINAL-DEPTH (metres)	11.00
DRILLED-DEPTH (metres)	11.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6240274.00
EASTING	307015.00
LATITUDE	33 57' 37"
LONGITUDE	150 54' 41"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 50//229438

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 50 229438

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	11.00	100			Auger - Solid Flight
1	1	Casing	P.V.C.	-0.75	5.00	50			Screwed
1	1	Opening	Screen	5.00	11.00	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 4500m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	7.50	7.50	SAND,BROWN,FINE TO MEDIUM GRAINED		
7.50	10.00	2.50	CLAY,ORANGE,GREY,CLAYEY SAND,DRY		
10.00	11.00	1.00	WEATHERED SHALE.DARK GREY		

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109798

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109798
LIC-NUM	10BL601720
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2007-01-29
FINAL-DEPTH (metres)	29.80
DRILLED-DEPTH (metres)	29.80
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6240724.00
EASTING	306970.00
LATITUDE	33 57' 23"
LONGITUDE	150 54' 40"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 22//230435

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 22 230435

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	10.00	100			Auger - Solid Flight
1		Hole	Hole	10.00	29.80	100			Auger - Solid Flight
1	1	Casing	P.V.C.	-0.70	23.80	50			Screwed
1	1	Opening	Screen	23.80	29.80	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	3.50	3.50	SANDY CLAY, BROWN,FINE TO MEDIUM GRAINED		
3.50	9.00	5.50	SANDY CLAY,LIGHT GREY,DRY TO MOIST		
9.00	10.00	1.00	SILTY SAND,WET BROWN,DARK GREY,COURSE GRAINED		
10.00	20.50	10.50	SHALE,DARK GREY,MEDIUM STRENGTH,TRACE CLAY		

20.50	22.50	2.00	SHALE.LAMINATED SANDSTONE,DARK GREY
22.50	29.80	7.30	SANDSTONE,LIGHT GREY,MEDIUM GRAINED

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109799

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109799
LIC-NUM	10BL601720
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2007-01-29
FINAL-DEPTH (metres)	22.80
DRILLED-DEPTH (metres)	22.80
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6240430.00
EASTING	306736.00
LATITUDE	33 57' 32"
LONGITUDE	150 54' 30"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 22//230435

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 22 230435

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	8.80	100			Auger - Solid Flight
1		Hole	Hole	8.80	22.80	100			Auger - Solid Flight
1	1	Casing	P.V.C.	-0.40	17.00	50			Screwed
1	1	Opening	Screen	17.00	22.80	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 6800m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	3.00	3.00	SANDY CLAY LOAM,BROWN,FINE TO MEDIUM GRAIN,DRY		
3.00	7.50	4.50	SILTY SANDY CLAY,BROWN,MEDIUM GRAINED,DRY		
7.50	8.50	1.00	CLAYEY SAND,LIGHT GREY,MEDIUM GRAINED,DRY TO MOIST		
			SHALE,DARK GREY,MEDIUM		

8.50	13.00	4.50	STRENGTH,WATER FROM 8m
13.00	15.00	2.00	WEATHERED SHALE AND LAMINATED SANDSTONE,GREY
15.00	22.80	7.80	SANDSTONE,LIGHT GREY,FINE TO MEDIUM GRAINED

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109800

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109800
LIC-NUM	10BL601720
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2007-01-29
FINAL-DEPTH (metres)	11.00
DRILLED-DEPTH (metres)	11.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6240426.00
EASTING	306733.00
LATITUDE	33 57' 32"
LONGITUDE	150 54' 30"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 22//230435

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 22 230435

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	11.00	100			Auger - Solid Flight
1	1	Casing	P.V.C.	-0.75	7.00	50			Screwed
1	1	Opening	Screen	7.00	11.00	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 6300m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	2.00	2.00	SILTY CLAY LOAM,BROWN,FINE TO MEDIUM GRAIN,DRY		
2.00	3.50	1.50	SILTY CLAY,DARK BROWN,FIRM		
3.50	4.30	0.80	SILTY SAND,DARK GREY MEDIUM TO COARSE GRAINED,MOIST		
4.30	10.50	6.20	CLAYEY SAND,LIGHT GREY,MEDIUM GRAINED,DRY TO MOIST		
10.50	11.00	0.50	WEATHERED SHALE,DARK GREY,HARDER WITH DEPTH		

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

Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109801

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109801
LIC-NUM	10BL601720
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2007-01-30
FINAL-DEPTH (metres)	14.00
DRILLED-DEPTH (metres)	14.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6240429.00
EASTING	306735.00
LATITUDE	33 57' 32"
LONGITUDE	150 54' 30"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 22//230435

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 22 230435

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	14.00	100			Auger - Solid Flight
1	1	Casing	P.V.C.	-0.75	10.00	50			Screwed
1	1	Opening	Screen	10.00	14.00	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 5000m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	3.00	3.00	SANDY CLAY LOAM,BROWN,FINE TO MEDIUM GRAIN,DRY		
3.00	4.00	1.00	SILTY SANDY CLAY,BROWN,MEDIUM GRAINED,DRY		
4.00	7.50	3.50	SAND,GREY,FINE TO MEDIUM GRAINED		
7.50	8.50	1.00	CLAYEY SAND,LIGHT GREY,MEDIUM GRAINED,DRY TO MOIST		
8.50	10.00	1.50	WEATHERED SHALE,DARK GREY,HARDER WITH DEPTH		

10.00 14.00 4.00

SHALE,DARK GREY

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109802

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109802
LIC-NUM	10BL601720
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2007-01-29
FINAL-DEPTH (metres)	10.00
DRILLED-DEPTH (metres)	10.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6240725.00
EASTING	306967.00
LATITUDE	33 57' 23"
LONGITUDE	150 54' 39"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
PARISH MINTO
PORTION-LOT-DP 22//230435

Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH MINTO
PORTION-LOT-DP 22 230435

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	10.00	100			Auger - Solid Flight
1	1	Casing	P.V.C.	-0.60	6.00	50			Screwed
1	1	Opening	Screen	6.00	10.00	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 4000m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	3.50	3.50	SANDY CLAY,BROWN,FINE TO MEDIUM GRAINED,TRACE CLAY,DRY		
3.50	9.00	5.50	SANDY CLAY,LIGHT GREY,DRY TO MOIST		
9.00	10.00	1.00	SILTY SAND,WET,BROWN,DARK GREY		

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

Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109803

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109803
LIC-NUM	10BL601722
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2009-02-10
FINAL-DEPTH (metres)	29.80
DRILLED-DEPTH (metres)	29.80
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6240002.00
EASTING	307124.00
LATITUDE	33 57' 46"
LONGITUDE	150 54' 45"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 5//833516

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 5 833156

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	7.50	100			Auger - Solid Flight
1		Hole	Hole	7.50	29.80	100			Other
1	1	Casing	P.V.C.	-0.82	20.80	50			Screwed
1	1	Opening	Screen	20.80	29.80	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 11800m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	0.40	0.40	FILL,CLAY,(REWORKED NATURAL) DRY, STIFF		
0.40	7.50	7.10	SAND AND SANDY CLAY,DARK BROWN WITH CLAY LENSES FROM 4.5m		
7.50	10.90	3.40	SHALE,LAMINATED SANDSTONE,DARK GREY,MEDIUM STRENGTH		
10.90	29.80	18.90	SANDSTONE,LIGHT GREY/WHITE,MEDIUM GRAINED		

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109804

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109804
LIC-NUM	10BL601722
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2009-02-10
FINAL-DEPTH (metres)	7.50
DRILLED-DEPTH (metres)	7.50
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6240002.00
EASTING	307125.00
LATITUDE	33 57' 46"
LONGITUDE	150 54' 45"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
PARISH MINTO
PORTION-LOT-DP 5//833516

Licensed [\(top\)](#)

COUNTY CUMBERLAND
PARISH MINTO
PORTION-LOT-DP 5 833156

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	7.50	100			Auger - Solid Flight
1	1	Casing	P.V.C.	-0.78	4.00	50			Screwed
1	1	Opening	Screen	4.00	7.00	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 3500m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	0.40	0.40	FILL,CLAY,(REWORKED NATURAL) DRY STIFF		
0.40	1.50	1.10	SAND,BROWN,FINE GRAINED		
1.50	4.00	2.50	SAND,GREY/BROWN,FINE GRAINED		
4.00	7.50	3.50	SANDY CLAY,DARK BROWN WITH CLAY LENSES FROM 4.5m.		

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Groundwater Works Summary

For information on the meaning of fields please see [Glossary](#)
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Work Requested -- GW109805

Works Details [\(top\)](#)

GROUNDWATER NUMBER	GW109805
LIC-NUM	10BL601722
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2007-01-29
FINAL-DEPTH (metres)	12.00
DRILLED-DEPTH (metres)	12.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	GLENFIELD WASTE DISPOSALS
GWMA	-
GW-ZONE	-
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	6240130.00
EASTING	306467.00
LATITUDE	33 57' 42"
LONGITUDE	150 54' 20"
GS-MAP	

AMG-ZONE 56
 COORD-SOURCE
 REMARK

Form-A [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP //999999

Licensed [\(top\)](#)

COUNTY CUMBERLAND
 PARISH MINTO
 PORTION-LOT-DP 5 833156

Construction [\(top\)](#)

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

HOLE- NO	PIPE- NO	COMPONENT- CODE	COMPONENT- TYPE	DEPTH- FROM (metres)	DEPTH- TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1		Hole	Hole	0.00	12.00	100			Auger - Solid Flight
1	1	Casing	P.V.C.	-0.75	5.10	50			Screwed
1	1	Opening	Screen	5.10	12.00	50			PVC; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2- 5mm; Q: 6900m ³

Water Bearing Zones [\(top\)](#)

no details

Drillers Log [\(top\)](#)

FROM	TO	THICKNESS	DESC	GEO- MATERIAL	COMMENT
0.00	1.80	1.80	SILTY CLAY LOAM,BROWN,DRY		
1.80	2.80	1.00	SANDY LOAM,TRACE SILT, GREY/BROWN		
2.80	9.80	7.00	SAND,LIGHT BROWN, MEDIUM GRAINED,TRACE SILT		
9.80	12.00	2.20	SAND,GREY,MEDIUM GRAINED,WET,WEATHERED SHALE AT 12m		

Warning To Clients: This raw data has been supplied to the Department of Infrastructure, Planning and Natural Resources

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Appendix C

Land titles



Table 1 - Lot 5 in DP 833516

Year of Title	Volume and Folio	Registered Owner
29/09/1993 - 20/12/2010	Lot 5 DP 833516	Helen Louise Kennett, Figela Pty Ltd and JC and FW Kennett Pty Ltd
29/09/1993 - 20/12/2010	Vol 8646 Fol 169	Helen Louise Kennett
29/09/1993 - 20/12/2010	Vol 8646 Fol 170	Figela Pty Ltd
29/09/1993 - 20/12/2010	Vol 8646 Fol 171	JC and FW Kennett Pty Ltd (<i>commercial and industrial builder since 1914</i>)
26/06/1964 - 29/09/1993	Vol 9738 Fol 13A	Helen Louise Kennett
26/06/1964 - 29/09/1993	Vol 9738 Fol 13B	Figela Pty Ltd
03/03/1966 - 29/09/1993	Vol 9738 Fol 13C	JC and FW Kennett Pty Ltd
05/05/1952 - 03/03/1964	Vol 6486 Fol 47	Clifford James Kennett, Farmer
28/06/1946 - 05/05/1952	Vol 5585 Fol 160	Clifford James Kennett, Farmer

Table 2 - Lot 51 in DP 515696

Year of Title	Volume and Folio	Registered Owner
09/12/1993 - Current	Lot 51 DP 515696	JC and FW Kennett Pty Ltd
22/05/1969 - 09/12/1993	Vol 10102 Fol 134	JC and FW Kennett Pty Ltd
31/08/1965 - 22/05/1969	Vol 10102 Fol 134	Rural Homes (Glenfield) Co-operative Ltd
03/09/1952 – 31/08/1965	Vol 6555 Fol 231	Rural Homes (Glenfield) Co-operative Ltd
16/06/1948 - 03/09/1952	Vol 5838 Fol 227	James Freeland Leacock, Retired Land Valuer
25/09/1937 - 16/06/1948	Vol 4649 Fol 84	James Freeland Leacock, Retired Land Valuer
18/02/1946 - 16/06/1948	Vol 5555 Fol 64	Margaret Ross McClure

Table 3 - Lot 52 in DP 517310

Year of Title	Volume and Folio	Registered Owner
28/03/1988 - Current	Lot 52 DP 517310	JC and FW Kennett Pty Ltd
25/01/1966 – 28/03/1988	Vol 10215 Fol 216	JC and FW Kennett Pty Ltd
03/09/1952 – 25/01/1966	Vol 6555 Fol 231	Rural Homes (Glenfield) Co-operative Ltd
16/06/1948 - 03/09/1952	Vol 5838 Fol 227	James Freeland Leacock, Retired Land Valuer
25/09/1937 - 16/06/1948	Vol 4649 Fol 84	James Freeland Leacock, Retired Land Valuer
18/02/1946 - 16/06/1948	Vol 5555 Fol 64	Margaret Ross McClure

Table 4 - Lot 103 in DP 1143827

Year of Title	Volume and Folio	Registered Owner
06/11/2009 - Current	Lot 103 DP 1143827	Figela Pty Ltd
05/06/1987- 06/11/2009	Lot 22 DP 230435	Figela Pty Ltd
07/06/1979 - 05/06/1987	Vol 10470 Fol 184	Stantavus Pty Ltd
04/01/1967 - 07/06/1979	Vol 10470 Fol 184	Robert Alexander Paul of Centennial Park, Company Executive
20/03/1947 - 04/01/1967	Vol 5655 Fol 2	Eugene Erskine Claud White of Casula, Orchardist

Table 5 - Lot 104 in DP 1143827

Year of Title	Volume and Folio	Registered Owner
06/11/2009 - Current	Lot 104 DP 1143827	JC and FW Kennett Pty Ltd
05/06/1987- 06/11/2009	Lot 50 DP 229438	JC and FW Kennett Pty Ltd
06/11/2009 - 29/11/1968	Vol 10373 Fol 156	JC and FW Kennett Pty Ltd
12/08/1966 -29/11/1968	Vol 10373 Fol 156	Rural Homes (Glenfield) Co-operative Ltd
03/09/1952 – 31/08/1965	Vol 6555 Fol 231	Rural Homes (Glenfield) Co-operative Ltd
16/06/1948 - 03/09/1952	Vol 5838 Fol 227	James Freeland Leacock, Retired Land Valuer
25/09/1937 - 16/06/1948	Vol 4649 Fol 84	James Freeland Leacock, Retired Land Valuer
18/02/1946 - 16/06/1948	Vol 5555 Fol 64	Margaret Ross McClure

Extracted from Golder Associates (2011), *Phase 1 Environmental Site Assessment, Rail Corridor Land for SIMTA, Moorebank Intermodal Terminal Facility* (dated 16 November 2011, Reference107623148-003-R-Rev2)



APPENDIX A

Year of Title	Volume and Folio	Registered Owner
09/12/1993 - Current	Lot 1 DP 825352	Rail Corporation NSW
19/10/1925 - 09/12/1993	Vol 3788 Fol 87	The Commonwealth of Australia

Table A-4: Historical Ownership Lot 5 in DP 833516 (portion of the Glenfield Quarry and Waste Disposal Facility)

Year of Title	Volume and Folio	Registered Owner
29/09/1993 - 20/12/2010	Lot 5 DP 833516	Helen Louise Kennett, Figela Pty Ltd and JC and FW Kennett Pty Ltd
29/09/1993 - 20/12/2010	Vol 8646 Fol 169	Helen Louise Kennett
29/09/1993 - 20/12/2010	Vol 8646 Fol 170	Figela Pty Ltd
29/09/1993 - 20/12/2010	Vol 8646 Fol 171	JC and FW Kennett Pty Ltd (<i>commercial and industrial builder since 1914</i>)
26/06/1964 - 29/09/1993	Vol 9738 Fol 13A	Helen Louise Kennett
26/06/1964 - 29/09/1993	Vol 9738 Fol 13B	Figela Pty Ltd
03/03/1966 - 29/09/1993	Vol 9738 Fol 13C	JC and FW Kennett Pty Ltd
05/05/1952 - 03/03/1964	Vol 6486 Fol 47	Clifford James Kennett, Farmer
28/06/1946 - 05/05/1952	Vol 5585 Fol 160	Clifford James Kennett, Farmer

Table A-5: Historical Ownership Lot 51 in DP 515696 (portion of the Glenfield Quarry and Waste Disposal Facility)

Year of Title	Volume and Folio	Registered Owner
09/12/1993 - Current	Lot 51 DP 515696	JC and FW Kennett Pty Ltd
22/05/1969 - 09/12/1993	Vol 10102 Fol 134	JC and FW Kennett Pty Ltd
31/08/1965 - 22/05/1969	Vol 10102 Fol 134	Rural Homes (Glenfield) Co-operative Ltd
03/09/1952 – 31/08/1965	Vol 6555 Fol 231	Rural Homes (Glenfield) Co-operative Ltd
16/06/1948 - 03/09/1952	Vol 5838 Fol 227	James Freeland Leacock, Retired Land Valuer
25/09/1937 - 16/06/1948	Vol 4649 Fol 84	James Freeland Leacock, Retired Land Valuer
18/02/1946 - 16/06/1948	Vol 5555 Fol 64	Margaret Ross McClure



APPENDIX A

Table A-6: Historical Ownership Lot 52 in DP 517310 (portion of the Glenfield Quarry and Waste Disposal Facility)

Year of Title	Volume and Folio	Registered Owner
28/03/1988 - Current	Lot 52 DP 517310	JC and FW Kennett Pty Ltd
25/01/1966 – 28/03/1988	Vol 10215 Fol 216	JC and FW Kennett Pty Ltd
03/09/1952 – 25/01/1966	Vol 6555 Fol 231	Rural Homes (Glenfield) Co-operative Ltd
16/06/1948 - 03/09/1952	Vol 5838 Fol 227	James Freeland Leacock, Retired Land Valuer
25/09/1937 - 16/06/1948	Vol 4649 Fol 84	James Freeland Leacock, Retired Land Valuer
18/02/1946 - 16/06/1948	Vol 5555 Fol 64	Margaret Ross McClure

Table A-7: Historical Ownership Lot 104 in DP 1143827 (portion of the Glenfield Quarry and Waste Disposal Facility)

Year of Title	Volume and Folio	Registered Owner
06/11/2009 - Current	Lot 104 DP 1143827	JC and FW Kennett Pty Ltd
05/06/1987- 06/11/2009	Lot 50 DP 229438	JC and FW Kennett Pty Ltd
06/11/2009 - 29/11/1968	Vol 10373 Fol 156	JC and FW Kennett Pty Ltd
12/08/1966 -29/11/1968	Vol 10373 Fol 156	Rural Homes (Glenfield) Co-operative Ltd
03/09/1952 – 31/08/1965	Vol 6555 Fol 231	Rural Homes (Glenfield) Co-operative Ltd
16/06/1948 - 03/09/1952	Vol 5838 Fol 227	James Freeland Leacock, Retired Land Valuer
25/09/1937 - 16/06/1948	Vol 4649 Fol 84	James Freeland Leacock, Retired Land Valuer
18/02/1946 - 16/06/1948	Vol 5555 Fol 64	Margaret Ross McClure

Table A-8: Historical Ownership Lot 103 in DP 1143827 (portion of the Glenfield Quarry and Waste Disposal Facility)

Year of Title	Volume and Folio	Registered Owner
06/11/2009 - Current	Lot 103 DP 1143827	Figela Pty Ltd
05/06/1987- 06/11/2009	Lot 22 DP 230435	Figela Pty Ltd
07/06/1979 - 05/06/1987	Vol 10470 Fol 184	Stantavus Pty Ltd
04/01/1967 - 07/06/1979	Vol 10470 Fol 184	Robert Alexander Paul of Centennial Park, Company Executive



APPENDIX A

Year of Title	Volume and Folio	Registered Owner
20/03/1947 - 04/01/1967	Vol 5655 Fol 2	Eugene Erskine Claud White of Casula, Orchardist

Table A-9: Historical Ownership Lot 4 in DP 1130937 (land north of the Glenfield Quarry and Waste Disposal Facility)

Year of Title	Volume and Folio	Registered Owner
17/10/2008 - Current	Lot 4 DP 1130937	The Commonwealth of Australia
05/06/1987- 17/10/2008	Lot 21 DP 230435	The Commonwealth of Australia
04/01/1967 - 05/06/1987	Vol 10470 Fol 183	The Commonwealth of Australia
20/03/1947 - 04/01/1967	Vol 5655 Fol 2	Eugene Erskine Claud White of Casula, Orchardist
30/06/1965 - 04/01/1967	Vol 6049 Fol 69	The Commonwealth of Australia
02/11/1949 - 30/06/1965	Vol 6049 Fol 69	Brian Norman de Meyrick, Grazier

Table A-10: Historical Ownership Lot 6 in DP 833516 (portion of the east hill passenger rail line)

Year of Title	Volume and Folio	Registered Owner
29/09/1993 - Current	Lot 6 DP 833516	Rail Corporation NSW
10/01/1980 - 29/09/1993	Vol 14018 Fol 92	Rail Corporation NSW
30/04/1952 - 10/01/1980	Vol 6484 Fol 159	JC and FW Kennett Pty Ltd
28/06/1946 - 30/04/1952	Vol 5585 Fol 160	Clifford James Kennett, Farmer
21/01/1930 - 28/06/1946	Vol 4371 Fol 49	Clifford James Kennett, Farmer

Table A-11: Historical Ownership Lot 101 in DP 1143827 (portion of the Southern Freight Rail Corridor)

Year of Title	Volume and Folio	Registered Owner
06/11/1993 - Current	Lot 101 DP 1143827	Rail Corporation NSW
05/06/1987 - 06/11/1993	Lot 50 DP 229438	Rail Corporation NSW
12/08/1966 - 05/06/1987	Vol 10373 Fol 156	JC and FW Kennett Pty Ltd
03/09/1952 – 31/08/1965	Vol 6555 Fol 231	Rural Homes (Glenfield) Co-operative Ltd

