# Phase 1 Environmental Site Assessment - Rail Corridor Land for SIMTA Moorebank Intermodal Terminal Facility

SIMTA

SYDNEY INTERMODAL TERMINAL ALLIANCE

Part 3A Concept Plan Application

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# PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

# Rail Corridor Land for SIMTA Moorebank Intermodal Terminal Facility

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REPORT

**Report Number.** 107623148-003-R-Rev5

**Distribution:**

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Golder Associates

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# 1.0 INTRODUCTION

The Sydney Intermodal Terminal Alliance (SIMTA) is a joint venture between Stockland Developments Pty Ltd (Stockland), Qube Logistics and QR National. The SIMTA Moorebank Intermodal Terminal Facility (SIMTA proposal) is proposed to be located on the land parcel currently occupied by the Defence National Storage and Distribution Centre (DNSDC) on Moorebank Avenue, Moorebank, south-west of Sydney. SIMTA proposes to develop the DNSDC occupied site into an intermodal terminal facility and warehouse/distribution facility, which will offer container storage and warehousing solutions with direct rail access. The project will be undertaken in stages.

The SIMTA site is located in the Liverpool Local Government Area, covers approximately 82 hectares, is identified as Lot 1 in DP1048263 and zoned as General Industrial under Liverpool City Council LEP 2008. The parcels of land to the south and southwest that would be utilised for the proposed rail corridor cover approximately 65 hectares and adjoin the Main Southern Railway to the north.

Golder Associates Pty Ltd (Golder) was engaged by Stockland, via Arben Management Pty Ltd (Arben) on behalf of SIMTA to conduct a Phase 1 Environmental Site Assessment (ESA) of the rail corridor lands (the site) located in Moorebank, NSW (as shown on Figure 1).

The Phase 1 ESA was prepared in general accordance with the Golder proposal ref. P17623116 dated 22 June 2011 and the guidelines approved under Section 105 of Contaminated Land Management Act 1997 including the Guidelines for Consultants Reporting on Contaminated Sites (NSW EPA 1997).

## 1.1 Objectives

The objective of this assessment is to address the Project's Director-Generals Requirement (DGRs) that the assessment of potential ground contamination issues that was completed for the project include the rail corridor connection to the Main Southern Railway. To address the DGRs the assessment must include:

- Assessment of potential land contamination, and identification of the need for remediation having regard to the ecological and human health risks posed by past land uses;
- Where remediation is required, presentation of remediation options;
- Natural soil constraints, including potential acid sulfate soils; and
- Taking into account the Acid Sulfate Soils Manual (ASSMAC), and the guidelines approved under Section 105 of Contaminated Land Management Act 1997.

## 1.2 Scope of Services

The scope of the assessment included a review of historical and current conditions at the site that could have resulted in contamination of soil and/or groundwater at the site. The assessment included the following components:

- Review of selected publicly available historical information, including:
  - Historical aerial photographs; and
  - Historical land titles;
- Review of local zoning and planning overlay maps;
- Review of regulatory databases relating to the site, including:
  - Office of Environment and Heritage (OEH) Contaminated Land Register; and
  - OEH POEO Public Register;

- Department of Land and Property Information of groundwater bores registered on the groundwater bore database within 500m of the site;
- Review of relevant publicly available geological, hydrological and hydrogeological information;
- Review of environmental reports prepared by others as described in Section 4.0; and
- An inspection (DNSDC, Glenfield Quarry and Waste Disposal Facility and rail corridor) to identify areas of environmental concern, including an interview with a site representative on the DNSDC site. The active rail corridor was viewed from accessible vantage points, including from within the DNSDC land, from within the Glenfield Quarry and Waste Disposal Facility and from the Moorebank Road overpass, however, without entering the active rail corridor.

# 2.0 SITE DESCRIPTION

The following information regarding the site is based on the information available at the time of the assessment (described in section 1.2) and the site walkover on 25 July 2011 (DNSDC with Site Representative Ken O'Neil including the active rail corridor vantage points) and a site walk over of the Glenfield Quarry and Landfill completed on the 15 November 2011 (including the active rail corridor vantage points).

## 2.1 Site Location and Setting

The SIMTA site will be supported by a rail link, which will connect the site with the Main Southern Railway located approximately 1.3km to the west of the site.

The rail link will consist of a rail corridor approximately 3.5 km long (inferred to be approximately 30 metres wide) that will cross from the Main Southern Railway and will enter the SIMTA site from the south. At the time of this assessment, the exact position and layout of the rail link was yet to be determined, however it is understood that the rail link is expected to cross several portions of lands, refer to Table 1 and Figure 1.

**Table 1: Summary of Rail Link Land Parcels**

| Lot / DP | Owner | Description and Current Use* |
|---|---|---|
| 1 / 1048263 | SIMTA | The SIMTA site. The portion of the site where the rail corridor is proposed appeared as vacant grass land. |
| 3001 / 1125930 | The Commonwealth of Australia | Land immediately south and south-west of SIMTA site, including the School of Military Engineering. The land immediately south of the SIMTA site appeared as bushland, and a golf course is located on the land south-west of the SIMTA site. |
| 1 / 825352 | Railcorp NSW | Railway land to north of the East Hills Passenger Line, which appeared as vacant grass land with some areas of bushland. |
| 5 / 833516 | Helen Louise Kennett, Figela Pty Ltd and JC and FW Kennett Pty Ltd | Privately owned land north of East Hills Passenger Line, east of Cumberland and South of Passenger Line and Main Southern Railway and west of Georges River. The land appeared to be used for quarry and landfilling activities, rehabilitation evident on the southern lots. |
| 51 / 515696 | JC and FW Kennett Pty Ltd | |
| 52 / 517310 | | |
| 104 / 1143827 | | |
| 103 / 1143827 | Figela Pty Ltd | |
| 4 / 1130937 | The Commonwealth of Australia | Land west of the Georges River, north of the private properties. |
| 6 / 833516 | Railcorp NSW | Railway land along shared railway line - Cumberland and South Passenger Line and Main Southern Railway. |
| 101 / 1143827 | | |
| 102 / 1143827 | | |

*Current use descriptions are based on recent aerial photographs and observations made during the site inspection of 25 July 2011.

## 2.2 Site Topography and Surface Water

Douglas Partners (2009a) indicate that the overall DNSDC site is relatively flat throughout southern and western areas of the site. This is consistent with the rail corridor land on the eastern side of the Georges River. Which are generally flat, with ground slopes typically less than five degrees and range between approximately 10 and 20m relative to the Australian Height Datum (AHD). Anzac Creek is located about 200m to the south of the SIMTA site and runs from west to east across the eastern portion of the rail corridor lands. Anzac Creek is ephemeral and flows in a northerly eastern to northern direction for about 5km before meeting Lake Moore on the Georges River.

The site of the proposed rail corridor land located on the western portion of the Georges River is currently being used as the Glenfield Quarry and Waste Disposal Facility. The topography of the area has been significantly altered by extractive processes and subsequent filling activities. It is expected that the final landform, at the completion of the extractive/filling processes will generally be flat, with engineered gradients directing surface flow towards the Georges River.

## 2.3 Geology

Douglas Partners (2009a and 2009b) reference the Penrith 1:100 000 geological sheet which indicates that the overall DNSDC site is underlain by tertiary fluvial deposits composed of clayey sand and clay to depths greater than 10m in places. This is also applicable to the rail corridor lands proposed for the eastern side of the Georges River. The Penrith 1:100 000 geological sheet indicated that the western allotments are underlain by quaternary fluvial deposits of medium grained sand, clay and silt.

Douglas Partners (2009b) indicates the southern part of the overall DNSDC site, including the DNSDC area, is comprised of silty sand topsoil to depths of 0.3m overlying clay fill to variable depths of between 0.5m and 1.5m. Silty clay and ironstone indurated silty clay is present beneath the clay fill material (HLA 2002). Two deeper boreholes were advanced by HLA (2002) to construct groundwater monitoring wells (BHHP34002 to 11.80m bsl and BHHP34011 to 10.50m bsl) that were both terminated in clay. Drilling was not extended south of the DNSDC, therefore it is uncertain if the fill materials extend into the rail corridor lands.

The quarry activities undertaken on the western side of the Georges River has significantly changed the local geology. A significant portion of the quaternary sand deposits appear to have been removed and the resultant excavations filled with waste materials, including building demolition, shredded car tyres and asbestos waste materials. Licensed groundwater bores completed on the Glenfield Waste Facility (west of the Georges River), recorded the geology around the perimeter of the site to be sandy clay and sands to approximately 10m depth, overlying shale to approximately 20m depth, overlying sandstone to approximately 30m depth.

The National Acid Sulfate Soils Atlas indicates there is a low probability that the proposed rail corridor lands are underlain by acid sulfate soils (http://www.asris.csiro.au viewed on 12 August 2011).

## 2.4 Hydrogeology

On a regional scale, groundwater flows within the shale and quaternary alluvial deposits, in a north and westerly direction towards the Georges River. Douglas Partners (2009a) indicates that URS (2002)[1] note two aquifers as present, a shallow one and a deeper one, with groundwater depths about 6m to 11m below ground level (m bgl).

The extraction and filling activities on the western side of the Georges River are likely to have a short term impact on the groundwater flows, however it is expected that groundwater will flow in an easterly direction across the site towards the Georges River. Licensed groundwater bores located on the Glenfield Waste Facility were generally screened between 20 and 30m depth, however initial water strikes were reported between 8 and 10m depth.

[1] URS (2002) acting as Principal Environmental Advisor to the Department of Defence provided the interpretation of the soil and groundwater investigation completed by HLA (2002).

# 3.0 HISTORICAL RECORDS REVIEW

The following information for historical records is adopted from the Egis (2000) Stage 1, the HLA (2002) Soil and Groundwater Investigation and updated to reflect currently available information.

## 3.1 Aerial Photographs

Egis (2000) provides a review of aerial photographs from 1949 to 1998 for the entire Moorebank Defence Lands. This included the rail corridor lands nominated south of the DNSDC and portions of the golf course, located south-west of the SIMTA site. The following information, taken from Egis (2000), is for the rail corridor land only.

- 1949 – Land clearing activities are evident in the area immediately south of the DNSDC with several bare patches of earth evident. The remaining land south and south-west of the DNSDC area appeared as bushland with several small access tracks. The land west of the Georges River, appeared to be open farmland with crops and orchards evident.
- 1961 – The areas south and south west of the DNSDC appear relatively unchanged from the 1949 photo, consisting of bushland with several small access tracks evident. The land west of the Georges River appears to be continuing to be used as farmland however the western most portions of the land are not visible in the photograph presented in the Egis (2000) report.
- 1974 – The area south of the DNSDC development area appears unchanged however the Military Engineers Golf Course has been constructed to the west of the DNSDC. Quarry activities appear to have commenced on the land west of the Georges River, with flooded excavations evident immediately west of the Georges River.
- 1994 – The area immediately south of the DNSDC appears relatively unchanged with the exception of increased use evident along the access track running parallel with Anzac Creek. The East Hills passenger rail line, including a rail siding entering the centre of the DNSDC site, is evident south of the DNSDC. An area of cleared vegetation, potentially containing infrastructure associated with the passenger railway is also evident south of the DNSDC development area. The quarry activities west of the Georges River appear well established with several pits and processing areas evident in the photograph
- 1998 – The areas remain relatively unchanged compared to the 1994 photograph.

Golder have reviewed the 2011 aerial image to evaluate potential changes in land use since the 1998 image. No discernable change of land use between 1998 and 2011 is apparent, with the exception that filling activities have been undertaken on the quarry, west of Georges River, with several areas appearing to have been rehabilitated and covered with vegetation.

## 3.2 Certificates of Title

Copies of Land titles and transfers obtained from the Land and Property NSW were reviewed in order to identify historical Site ownership. A summary of the historical site ownership is presented in Table 2. Summary tables and copies of the Certificates of Title are included as Appendix A.

**Table 2: Summary of Historical Ownership**

| Lot / DP | Current Owner | Historical Ownership |
|---|---|---|
| 1 / 1048263 | SIMTA (The Trust Company) | From 1889 – 1993 the land was owned by the Commonwealth of Australia. |
| 3001 / 1125930 | The Commonwealth of Australia | From 1993 the land has been owned by the Commonwealth of Australia |

| Lot / DP | Current Owner | Historical Ownership |
|---|---|---|
| 1 / 825352 | Rail Corporation NSW | From 1925 – 1993 the land was owned by the Commonwealth of Australia. |
| 5 / 833516<br>51 / 515696<br>52 / 517310<br>104 / 1143827<br>103 / 1143827 | Helen Louise Kennett, Figela Pty Ltd and JC and FW Kennett Pty Ltd | The various lots that now comprise of the Glenfield Quarry and Waste Disposal Facility have had several owners most notable have been;<br>1937 – 1948; Margaret Ross McClure<br>1946 – 1966; Clifford James Kennett, Farmer<br>1947 – 1967; Eugene Erskine Claude, orchardist<br>1967 – 1979; Robert Alexander Paul, company executive<br>1948 – 1952; James Freeland Leacock, retired land valuer<br>1952 – 1966; Rural Homes Co-operative Ltd<br>1966 – Current; Helen Louise Kennett, Figela Pty Ltd and JC and FW Kennett Pty Ltd |
| 4 / 1130937 | The Commonwealth of Australia | This land has been consolidated from several lots, with the following notable owners:<br>From 1949 – 1965; Brian Norman de Meyrick, grazier<br>1965 – 1967 The Commonwealth of Australia<br>1947 – 1967 Eugene Erskine Claude, orchardist |
| 6 / 833516<br>101 / 1143827<br>102 / 1143827 | Railcorp NSW | The land has had the following owners:<br>1947 – 1967; Eugene Erskine Claude, orchardist<br>1967 – 1979; Robert Alexander Paul, company executive<br>1979 – 1987; Stantavus Pty Ltd |

Egis (2000) provides limited historical title information and report that the Moorebank Defence Lands has been in the name of the Commonwealth of Australia since the early 1920s and is identified as Lot 1403 in DP 848565. The title of the Moorebank Defence Lands was Lot 56 in DP 104763 in 2002 and is currently identified as Lot 1 in DP1048263. This lot is currently registered to the Trust Company Limited.

Based on the above information, generally farming activities appear to have been undertaken on portions of the Glenfield Quarry and Waste Facility site prior to quarrying activities. Pesticides and herbicide use may have occurred on these areas, however it is expected that surface soils likely to have been impacted by the use of chemicals, have been stripped as part of the quarrying activities. It is also apparent that portions of the land have been used by the Commonwealth of Australia for Defence purposes.

## 3.3 Other Historical Information

Although the historical title information is limited, Egis (2000) provides a summary of the history for the defence lands between the 1800s to 2000. The source of this information is not referenced and pertinent sections are reproduced below.

> The Moorebank area was first settled around 1800. Thomas Moore received his first land grant in the area in 1805 and built a country mansion and settled on the land which he called “Moore Bank” in 1809. In 1888 the trustees of the Church of England decided to subdivide the Moore Estate. Following subdivision in the Moorebank area, the blocks comprising the site were sold in the early 1890s. The area comprising the DNSDC site, the golf course and vacant lots south of the DNSDC site were acquired by the Department of Defence, as part of the Holsworthy complex, in the early 1900s, although records indicate that much of the land in the Moorebank/Holsworthy area was being used for Defence related purpose from at least the late 1800s.
>
> The golf course located within the Steele Barracks was constructed in 1970s. Prior to this the south-western portion of the golf course and the current Demolitions Training area was the location of the former mock Viet Cong village. The mock Viet Cong village comprised underground tunnels and structures for training during the Vietnam War. Following the war the area was demolished, though it is likely that tunnel materials are still buried.
>
> The DNSDC was established in the early to mid 1990s, though a storage centre has been situated in the same location since the 1940s. The development of the DNSDC in the 1990s generally involved the removal of earlier structures/facilities to slab level in the area immediately to the east of Moorebank Avenue and subsequent building of updated storage facilities.
>
> Earlier Defence activities on the DNSDC site may have had a potential to cause contamination. The southwest corner of the DNSDC, where the proposed rail corridor lands are situated, was an unauthorised burial ground. In April 1994, World War II burial pits (potentially containing batteries as the old battery store was located in this portion of the site) were delineated in the southern section of the DNSDC to the immediate south of the existing POL storage area. It is understood that not all of these identified burials were remediated at the time.

## 3.4 Summary of the History of the Site and Surrounding Areas

A review of historical information by Egis (2000), HLA (2002) and Douglas Partners (2009a and 2009b) together with our assessment of the available information indicates:

- The bush areas immediately south of the DNSDC area have remained relatively unchanged, with some portions of the land cleared and used intermittently. A portion of the land was transferred to Rail Corp in early 1990s and appeared to have been used as a stockpiling area during the construction of the East Hills passenger rail line;
- The Golf course was constructed in the late 70s. Prior to this the areas was used for various training purposes, including the development of a mock Viet Cong village used for training during the Vietnam conflict; and
- Quarrying activities commenced on the Glenfield site in the mid 60s, prior to this the area appears to have been used as farmland. Extraction was initially completed on the site using dredging to remove sand deposits, after which the excavations were continued with open cut excavations through bedrock materials.

# 4.0 REGULATORY AGENCY RECORDS SEARCH

## 4.1 Contaminated Land Management Act 1997

A search of the Environment Protection Authority (EPA) (now incorporated in the NSW Office of Environment and Heritage (OEH)) contaminated land public register indicates there are no records for the site or the nominated rail corridor (refer Appendix B) including no:

- orders made under Part 3 of the Contaminated Land Management Act 1997 (CLM Act)
- approved voluntary management proposals under the CLM Act that have not been fully carried out and where the approval of the Office of Environment and Heritage (OEH) has not been revoked
- site audit statements provided to OEH under section 53B of the CLM Act that relate to significantly contaminated land
- where practicable, copies of anything formerly required to be part of the public record
- actions taken by OEH under section 35 or 36 of the Environmentally Hazardous Chemicals Act 1985 (EHC Act)[2]

The contaminated land public register is not a listing of all contaminated sites in New South Wales, nor is it a list of all contaminated sites of which OEH has knowledge. The register specifically excludes the obligation under Section 60 of the CLM Act, which requires an owner or polluter to notify the OEH when they believe a site is contaminated. Notifications made under Section 60 of the CLM Act, are listed on the NSW OEH web page (http://www.environment.nsw.gov.au/clm/publiclist.htm)**,** and these indicate there are no records of EPA regulatory involvement in the site or the nominated rail corridor. Copies of search results are presented as (Appendix B).

## 4.2 Protection of the Environment Operations Act 1997 (POEO)

A search of NSW OEH on-line database records indicated that there are no Environment Protection Licences (EPLs) for the bushland, rail corridor and golf course lands. The Glenfield Quarry and Waste Disposal Facility operate under EPL 4614, permitting the following scheduled activities;

- Crushing, grinding or separating;
- Extractive activities;
- Waste storage;
- Waste processing (non-thermal treatment); and
- Waste disposal by application to land.

Waste permitted to be disposed on the site includes general solid non-putrescible waste, waste tyres and asbestos waste.

A number of other current, pending, surrendered and no longer in force licences were identified about 1.5km to the north of the site within the general Moorebank industrial area. A copy of Glenfield Quarry and Waste Facility License and selected search results are provided in Appendix C.

## 4.3 Council Records

Land use planning certificates were issued by Liverpool City Council for the Site and the surrounding lands under Section 149 (2) & (5) of the Environmental Planning and Assessment Act 1979. The Certificates were dated 15 July 2011.

[2] Some notices under section 35 of the EHC Act were issued by the State Pollution Control Commission, which was the NSW Government agency responsible for managing contaminated sites before the EPA was established in 1992.

- Lot 3001 Moorebank (Army) Avenue (Lot 3001 DP 1125930)

This Lot is zoned "IN1 General Industrial SP2 Infrastructure - Defence" under Liverpool Local Environmental Plan 2008. The information indicated the following:

- Council has been provided with written information indicating the presence of contamination on the subject land which may restrict development and use of the land.
- The land is identified as containing environmentally significant land under division 2 General provisions of the Liverpool Local Environmental Plan 2008. The objectives are:

(a) to maintain bushland, wetlands and wildlife corridors of high conservation value,

(b) to identify areas of significance for revegetation to connect to 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 land is not located in a Conservation Area.
- An item of Environmental Heritage is situated on the land.
- The land does not include or compose critical habitat.
- The land is not affected by a policy adopted by Council that restricts the development of the land because of the likelihood of land slip, tidal inundation, or any other risk. However, 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 and bushfire.
- The land is subject to an ongoing maintenance order in a matter arising under the CLM Act 1997. However, the OEH public register does not have records for the site.
- The land is identified as flood prone and is within the high risk flood category.

- Lot 1 Moorebank (Army) Avenue (Lot 1 DP 825352)

This Lot is zoned "SP2 Infrastructure - Railway" under Liverpool Local Environmental Plan 2008. The information indicated the following:

- The land is not declared contaminated land.
- The land is identified as containing environmentally significant land under division 2 General provisions of the Liverpool Local Environmental Plan 2008.
- The land is not located in a Conservation Area.
- An item of Environmental Heritage is not situated on the land.
- The land is not affected by a policy adopted by Council that restricts the development of the land because of the likelihood of land slip, tidal inundation, or any other risk. However, the land is affected by the Rural Fires Act 1997 that restricts the development of the land because of the likelihood of bushfire.

- Lot 51 Glenfield Road, Casula (Lot 51 DP 515696) and Lot 52 Glenfield Road, Casula (Lot 52 DP 517310)

These Lots are zoned "RE1 Public Recreation" under Liverpool Local Environmental Plan 2008. The information indicated the following:

- The land is not declared contaminated land.

- The land is identified as containing environmentally significant land under division 2 General provisions of the Liverpool Local Environmental Plan 2008.
- The land is not located in a Conservation Area.
- An item of Environmental Heritage is not situated on the land.
- The land is not affected by a policy adopted by Council that restricts the development of the land because of the likelihood of land slip, tidal inundation, or any other risk. However, 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 and bushfire.
- The land is identified as flood prone and is within the high risk flood category.

■ Lot 101 Glenfield Road, Casula (Lot 101 DP 1143827), Lot 102 Glenfield Road, Casula (Lot 102 DP 1143827), Lot 103 Glenfield Road, Casula (Lot 103 DP 1143827), Lot 104 Glenfield Road, Casula (Lot 104 DP 1143827) and Lot 5 Glenfield Road, Casula (Lot 5 DP 833516)

These Lots are zoned “RE1 Public Recreation” under Liverpool Local Environmental Plan 2008. The information indicated the following:

- The land is not declared contaminated land.
- The land is identified as containing environmentally significant land under division 2 General provisions of the Liverpool Local Environmental Plan 2008.
- The land is not located in a Conservation Area.
- An item of Environmental Heritage is not situated on the land.
- The land is not affected by a policy adopted by Council that restricts the development of the land because of the likelihood of land slip, tidal inundation, or any other risk. However, 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 and bushfire.
- The land is identified as flood prone and is within the high risk flood category.

■ Lot 4 Casula Road, Casula (Lot 4 DP 1130937)

This Lot is zoned “SP2 Infrastructure - Defence” under Liverpool Local Environmental Plan 2008. The information indicated the following:

- The land is not declared contaminated land.
- The land is identified as containing environmentally significant land under division 2 General provisions of the Liverpool Local Environmental Plan 2008.
- The land is not located in a Conservation Area.
- An item of Environmental Heritage is not situated on the land.
- The land is not affected by a policy adopted by Council that restricts the development of the land because of the likehood of land slip, tidal inundation, or any other risk. However, the land is affected by Liverpool Local Environmental Plan 2008 that restricts the development of the land because of the likehood of acid sulfate soils and bushfire.
- The land is identified as flood prone and is within the high risk flood category.

Copies of Section 149 Planning Certificates are presented in Appendix D.

# 5.0 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

A number of environmental investigations have been completed over the broader Moorebank Defence Lands. These are listed below and relevant information from the reports is summarised in the following sections.

- Egis (2000) Preliminary Site Investigation at the Defence National Supply and Distribution Centre, Moorebank Defence Lands dated September 2000;
- HLA (2002) Soil and Groundwater Investigation, Precinct H (DNSDC), Moorebank Defence Lands dated November 2002;
- URS (2002) Investigation Review Report DNSDC, Moorebank Defence Lands dated 10 December 2002;
- Contamination Management (2002) Summary Site Audit Report, DNSDC Site, Moorebank dated December 2002;
- Brooks & Associates (2002) Heritage Assessment of the Moorebank Defence site at Moorebank dated October 2002;
- Douglas Partners (2009a) Summary Environmental Conditions, Proposed Intermodal Freight Terminal, DNSDC Site – Moorebank Avenue, Moorebank dated December 2009;
- Douglas Partners (2009b) Summary Geotechnical Site Conditions, Proposed Intermodal Freight Terminal, DNSDC Site – Moorebank Avenue, Moorebank dated December 2009; and
- Golder Associates (2010) Phase 1 Environmental Site Assessment, Stage 1A of Moorebank Intermodal Freight Terminal Development, dated December 2010.

## 5.1 Egis (2000) – Preliminary Site Investigation

Egis completed a Preliminary Site Investigation (PSI) of the entire Moorebank Defence Lands in 2000. This included a review of available information and historical records, as well as an inspection of the broader area.

Egis (2000) noted that a partially remediated disposal area existed on the southern extremities of the DNSDC site. This area was identified as an unauthorised burial ground, and works completed in 1994 identified the presence of batteries. Egis reported that not all of these were remediated at the time. The south-western portion of the golf course was reported to have been the location of the former mock Viet Cong training village, which was demolished following the Vietnam conflict with tunnel materials likely to still be buried in the area.

The bushland located south of the DNSDC site and west of the rail spur, was reported to have been used as grenade range from the 1950s to the 1980s. The Milsearch (2000) report, which was appended to the Egis report provided greater detail in regards to the former grenade range. Milsearch (2000) noted that the grenade range had operated south of the DNSDC site for a considerable period, with a permanent facility constructed in the 1950s. However, it was likely that the area was initially used during World War II. The position of the grenade range was predominately on the western side of the current rail spur, however, a portion of the former lineal range maybe intersected by the current rail spur. A 200m x 200m portion of the grenade range was reported to have been remediated in 1994, and was evident on the 1994 aerial photograph however a report on the remediation was not was sighted by Milsearch or Egis. The Milsearch (2000) report recommended additional investigations be completed, particularly to delineate the areas impacted by the projected grenades and by early hand thrown grenades including areas south-west of the previously remediated areas.

Both Egis and Milsearch reported significant quantities of demolition debris and soil stockpiles being identified in the bushland areas located east of the rail spur. Asbestos materials were not identified, however, were suspected as asbestos fragments identified in the eastern side of the current rail spur.

## 5.2 HLA (2002) Soil and Groundwater Investigation

HLA performed a soil and groundwater investigation of the DNSDC at the direction of URS Australia in 2002. This investigation included soil and groundwater sampling to assess potential contamination based on the results of PSI (Egis 2000) and included a series of approximately 170 investigation locations across the DNSDC site. The investigation did not extend into the proposed rail corridor lands, the closest investigations were completed in the southern portions of the DNSDC site in the vicinity of the underground fuel tanks.

## 5.3 Contamination Management (2002)

Dr Bill Ryall (EPA-accredited Auditor) of Contamination Management (CM) prepared a summary site audit report for the DNSDC site. This review was limited to the investigations completed on the DNSDC site, which included the ordnance investigation completed Milsearch (2002). The investigations did not extend into the proposed rail corridor.

## 5.4 Heritage Assessment of the Moorebank Defence site at Moorebank (2002)

The heritage assessment was prepared by Graham Brooks and Associates Pty. The heritage assessment did not consider the areas of the proposed rail corridor land.

## 5.5 Other reports

Douglas Partners prepared two reports for Stockland Developments in December 2009 regarding the DNSDC site, one summarising the environmental conditions (2009a) and the other summarising the geotechnical conditions (2009b). These reports summarised some of the work that had been performed to date (URS 2002, CM 2002 and ARUP 2009[3]), however were not related to the rail corridor lands.

## 5.6 Summary of Previous Environmental Reports

A number of environmental reports have been prepared for the DNSDC site, however only limited investigations have been completed on the rail corridor land. The Egis (2000) stage one investigation was the most relevant, and HLA/URS (2002) soil and groundwater investigation include an assessment of soil and groundwater conditions. However, the intrusive investigations completed by HLA/URS (2002) did not extend into the proposed rail corridor land areas.

The Egis (2000) investigation noted that unauthorised disposal areas existed on the southern extremities of DNSDC and these have not been completed remediated. Hence Egis reported that they pose a medium risk in regards to potential contamination. Egis also reported that the former grenade range posed a medium to high risk of potential contamination and unexploded ordnance.

[3] Note ARUP 2009 provides geotechnical information only which has not been referenced in this report.

# 6.0 CURRENT SITE ACTIVITIES AND OBSERVATIONS

A site visit to the DNSDC was undertaken by Golder personnel on 25 July 2011 (which included an interview with a Site Representative, refer to section 2.0). Access to the various lots that comprised the Glenfield Quarry and Waste Disposal Facility was completed on the 15 November 2011. The active rail corridor was viewed from accessible vantage points, including from within the DNSDC land, from within the Glenfield Quarry and Waste Disposal Facility and the Moorebank Road overpass, however, without entering the active rail corridor.

Photographs highlighting key features and observations made during the site visit are presented in Appendix E.

## 6.1 Above Ground and Underground Storage Tanks

Underground storage tanks (USTs) were not observed in the investigation area during the site visit.

There are five USTs on the south-western corner of the DNSDC site. Anecdotal information proved by the Site Representative during the site visit was that there was a spill of diesel 6-7 years ago at the re-fuelling area. The spill was localised to the area of the USTs and surface impacts were cleaned, however there is potential that the underlying soils were contaminated by the spill.

No ASTs or USTs were observed on the Glenfield Quarry and Landfill.

## 6.2 Asbestos-Containing Materials

Asbestos-containing materials (ACM) were observed during the site visit. Based on the anecdotal information provided by the Site Representative, most asbestos buildings were located in the vicinity of the main warehouse (located in the centre of the DNSDC site; however several fragments of potential ACM were identified on the surface in the areas immediate west of the current rail spur (refer to Plate 1, and Figure 1).

*Plate 1: Potential ACM materials identified west of the existing rail spur*

Anecdotal information provided by the Site Representative noted that several buildings containing asbestos materials were removed from the DNSDC site in the early 1990s.

The Glenfield Quarry and Landfill Facility is licensed to receive asbestos containing materials, however, current operations do not accept large quantities of asbestos waste at the facility. Historically, limited volumes of asbestos contaminated materials were received and were placed at the lower levels of the

landfill. Small volumes of asbestos contaminated materials are accepted on occasion (not as normal practice) and are placed in the lower levels of the landfill.

Asbestos is common within rail environments, with sources including old brake liners, asbestos cement conduit, and asbestos linings or insulation within rolling stock and some electrical equipment. However, the East Hills Passenger line was constructed in approximately 1989, and the risk of asbestos contamination being present within the East Hills Passenger rail corridor is considered to be low.

No further information was provided to Golder regarding the presence or removal of ACMs on the rail corridor lands. This report should not be considered to be an asbestos audit.

## 6.3 Hazardous Material and Wastes Storage, Handling and Management

There is no bulk storage of industrial quantities of chemicals on the site, however there is a dangerous good store located on the adjacent DNSDC site.

No spills or stains were evident during the inspection and no chemical processes are conducted on the proposed rail corridor lands.

The Glenfield Quarry and Landfill Facility operates a landfill leachate treatment system, in which leachate is collected from each of the waste cells (via a herringbone drainage network and leachate risers) and directed to a leachate storage dam, currently located on the eastern side of the site. Leachate is allowed to evaporate, or recirculated onto the tip face via irrigation or re-injection. If required, leachate is disposed offsite via tankers to a licensed liquid waste treatment facility.

## 6.4 PCB-containing Materials and Equipment

The site representatives were not aware of any PCB-containing equipment, installations and/or joint putty; however a PCB survey has not been conducted.

## 6.5 Wastewater/Stormwater Discharges

We understand that the DNSDC site and golf course is connected to the municipal main water, sewage, and stormwater systems. However, no further information and documentation regarding water and wastewater/stormwater discharges were provided or available during the site visit.

On the southern portion of the DNSDC site an extensive stormwater system drains to a number of open channels which discharge runoff to the Georges River via a culvert under Moorebank Avenue. The southern portion of the DNSDC site was referred to by the site representative as the “swamp” as the drainage in the area was often poor. Runoff from the Golf course was through a series of dams and ponds which discharged to the north-west via the branch of Anzac Creek which intersected the bushland located south of the DNSDC site.

Sanitary/domestic wastewater from the DNSDC and golf courses discharges to the municipal sewerage system.

Stormwater on the Glenfield Quarry and Landfill Facility is collected through an onsite drainage network and directed to a storage basin located on the northern end of the facility prior to discharge to the Georges River. Overflow discharge from the dam is monitored in accordance with the EPL. Leachate and stormwater are managed through separate systems to limit the potential for cross contamination. A levee, with minimum height of 12.4m AHD, has been constructed along the eastern boundary of the Glenfield quarry site 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.

Sanitary / domestic wastewater from the Glenfield quarry and landfilling operations were not reviewed as the administration offices and associated facilities were located on parcels of land outside the investigation area.

## 6.6 Radon

Radon is not expected to occur at the site based on the geology (sandstone) of the area and is generally not considered to be an issue in Australia.

## 6.7 Unexploded Ordnance (UXO)

Based on history of the site, a grenade range operated in the bushland areas to the south of the DNSDC site from as early as the 1940s to the 1970s. Anecdotal information provided by the site representative noted that grenade pins were found in the area south of the DNSDC, which is consistent with the history of the site. As such, there is the potential that UXO is present in the bushland areas located immediately south of the DNSDC Site.

## 6.8 Landfilling

It was observed during the site visit that Lot 1 DP 825352 (owned by Railcorp) had been filled to 2-2.5m above the surrounding ground level. Historic information also noted that landfilling may have occurred in the areas immediately south of the DNSDC site. Illegally dumped building waste materials (refer to Plate 2), and some ash and slag materials were also noted within the bush land area immediately south of the DNSDC site and north of the Rail Corp property (Lot 1 DP 825352). This fill could potentially contain asbestos materials.

*Plate 2: Illegally dumped building materials identified north of Lot 1 DP825352*

The Glenfield Quarry and Landfill Facility currently operate under an EPL, and there is extensive land filling in engineered waste containment cells occurring at the site. 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 2m thick. Each layer includes a daily cover of soil (minimum 15 cm) prior to ceasing daily operations, and an intermediate soil cover of approximately 30cm 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 2m 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.

## 6.9 Surrounding Land Use

The site is located within the Moorebank industrial district and Defence National Supply and Distribution Centre (DNSDC). Nearby properties to the east and west of the Defence lands are predominantly residential in nature. The East Hills passenger railway is immediately south of the proposed rail corridor land areas, and beyond this is the northern extremity of the Holsworthy Military Reserve. As such, the land remains largely undeveloped bushland with a network of public and private roads.

The Liverpool-Holsworthy railway line runs through a largely vacant area of land adjacent to the western side of the Georges River and the area of Crown Land. A decommissioned diesel fuelled power station (now the Powerhouse Regional Arts Centre) is located north of the Crown land with a golf course located further to the north. To the south of the Crown land is a former quarry which is now a waste transfer station. To the south of the waste transfer station and further to the west of the railway line across the Hume Highway, the land use is dominated by several relatively new residential subdivisions. The area to the north of the DNSDC, across Anzac Road, is additional Defence land in the form of the Yulong Playing Fields together with Moorebank Village. To the north of the School of Military Engineering is the Amiens site and the location of ABB Power Transmissions. In addition, a Rifle Range Park (a former rife range) is located in the south-western corner of the M5 Motorway and the Georges River.

# 7.0 SUMMARY OF POTENTIAL CONTAMINATION

Based on the site history and visit to the site, there is the potential for subsurface contamination as a result of prior use of the site.

The areas of environmental interest are marked on Figure 2 and include:

- Area 1 – the area immediately south of the proposed SIMTA site, where historic information has noted that partially remediated areas of unauthorised dumping may have occurred;
- Area 2 – the bushland area south of the proposed SIMTA site development, where historic information has noted that potential UXO associated with the former grenade ranges may exist. This areas also has evidence of illegal dumping, with historic reports and the site inspection noting the presence of building rubble and other waste materials;
- Area 3 – Lot 1 DP825352 (owned by Railcorp) has been subjected to extensive filling with the area levelled approximately 2-2.5m higher than the surrounding areas;
- Area 4 – the south-western portion of the golf course, where historic information has noted the former training facility, the mock Viet Cong village, was demolished with potential tunnel materials buried in the area;
- Area 5 – the Glenfield Quarry and Waste Disposal Facility, where extractive and waste disposal is being undertaken in accordance with a current EPL; and
- All areas of the site – potential unidentified buried waste as well as the use of pesticides and herbicides for pest and/or weed control.

## 7.1 Potential Contaminants of Concern

The potential contaminants of concern are commonly associated with the areas of environmental interest identified above:

- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc).
- Polycyclic aromatic hydrocarbons (PAH).
- Hydrocarbons including $C_6$-$C_{36}$ total petroleum hydrocarbons (TPH) and benzene, toluene, ethyl benzene and xylene (BTEX).
- Semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs).
- Phenolic compounds.
- Asbestos.
- Pesticides such as organochlorine and organophosphate pesticides (OCPs and OPPs).
- Unexploded ordnance (UXO).
- Landfill Gas (methane, carbon dioxide and hydrogen sulphide).

# 8.0 POTENTIAL CONTAMINATION MANAGEMENT MEASURES

The general procedure for managing contamination issues will be:

- Intrusive investigations prior to commencement of construction works
- Identification of contamination issues.
- Remediation planning.
- Regulatory approval and site auditor review (if required)
- Implementation of remediation and validation.

The contamination risks identified in Section 7 of this report have not been subject to intrusive investigations, comprising soil and groundwater sampling and analysis, to confirm if these risks have resulted in actual contamination and, if present, the extent, magnitude and chemical characteristics of such contamination. It is anticipated that intrusive investigations would be undertaken during the detailed design of the project and prior to commencement of construction works. The results of these investigations would help refine the design and develop a contamination management plan to determine how either identified or unexpected contamination will be managed.

In the absence of such information the Department of Planning has requested provision of advice regarding the potential management options which may be available to manage contamination within the project area if identified.

The following provides a general outline of potential options which may be considered for the contamination risks identified in this report. This information is of a general nature only and may be subject to revision following completion of intrusive investigations.

The rail corridor will be approximately 3.5 km long and 30 m wide. The potential sources of contamination along the corridor alignment are predominantly:

1) historical placements of fill material and dumping of building rubble and other waste materials;
2) historical use pesticides and herbicides;
3) potential UXO associated with the former grenade ranges; and
4) operation of a landfill.

With regards to the first two contamination risks, the contamination may be present as physical contaminants (eg waste materials) and contaminated soil. The likelihood of impacts upon groundwater is relatively low. The general approach to remediation of physical contaminants and contaminated soil is likely to be selective excavation and disposal. Disposal options include either an approved off-site landfill or an approved placement and capping on site (subject to regulatory approval). Both methods are well established in the contaminated sites management industry.

With regards to remediation of areas impacted by UXOs, remediation works would focus on removal of explosive material (unexploded grenades) and grenade fragments. This could be achieved by the following actions:

- Geophysical surveys to locate UXO components in former grenade range areas.
- Removal of UXOs by the military.
- Selective manual removal of residual physical fragments of exploded ordnance located during geophysical surveys.
- Scraping or excavation of physical contaminants and contaminated soil back to a clean surface.

- Separation of physical contaminants from clean soil where feasible and beneficial via screening, such as through a metal rake screen.
- Transfer of physical contaminants and contaminated soil to an appropriate on-site burial pit or off-site licenced landfill depending upon the characteristics of the contamination and subject to regulatory approval.

Excavated soil surfaces would be subject to validation sampling and analysis to assure that all of the contaminated soil had been removed.

The risk of soil being chemically contaminated with explosive residues from grenades is relatively low due to the small volume of explosives in a grenade. Nonetheless such contamination if present could be remediated via excavation and off-site disposal at a licensed landfill.

These approaches have been satisfactorily adopted on many contaminated sites in NSW with contamination risks similar to those identified in this Phase 1 ESA and are considered likely to be suitable options for the proposed railway corridor.

Groundwater may be present along the railway alignment, however, it is not known if the depth of construction works will intersect groundwater. The risk of groundwater contamination having resulted from the first three contamination risks is considered to be relatively low. Nonetheless, in the event that groundwater extraction is required to enable excavation and construction works and such groundwater is contaminated, there are a number of treatment options which may be adopted to manage contamination risks, depending upon the characteristics of the contamination and the groundwater disposal methods. Groundwater pump and treat systems have been developed for various contaminants including the range of potential contaminants identified in this Phase 1 ESA.

The contamination risks of the landfill located in the Glenfield Quarry and Waste Disposal Facility would require consideration of physical contaminants, leachate and landfill gas. It is noted that the Facility operates under an Environment Protection Licence issued by the NSW EPA. 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 cells are capped with an engineered cover approximately 2 m thick. In the event that construction of the railway requires disturbance to a landfill cell, it is assumed that the disturbed material would be handled in the same manner as the currently landfilled material. As the waste material is encapsulated within the landfill and the gas and leachate are collected within managed systems, it is considered that the landfill contamination would be isolated from the railway construction works. It is noted that a segment of the East Hills Line was constructed over part of the landfill site, providing experience in managing construction of a railway line in close proximity to a landfill operation.

In summary, it is considered that the contamination risks identified may be managed via commercially available and well established remediation methods which can be tailored for site-specific circumstances and would not preclude the construction of the railway. The specific details of the remediation method adopted for the project will depend upon factors such as the contamination characteristics identified during the intrusive investigations, the detailed design of the construction works, cost and schedule.

# 9.0 CONCLUSIONS

Golder has completed a Phase 1 ESA of the proposed rail corridor lands associated with the proposed SIMTA site at Moorebank Avenue, Moorebank, NSW. The objective of the Phase 1 ESA was to address the Project's Director-Generals Requirement (DGRs) that an assessment of potential ground contamination issues be completed for the project including the rail link connection to the Main Southern Railway.

The Phase 1 ESA was prepared in general accordance with the proposal ref. P17623116 dated 22 June 2011 and included a review of selected publicly available information such as: aerial photos and land titles; regulatory information; the geological and topographical maps. The scope also included a review the following previous reports: Egis (2000), HLA (2002), URS (2002), CM (2002) and Douglass Partners (2009a and 2009b) and a site inspection of the DNSDC site with site personnel on 25 July 2011 and a site inspection of the Glenfield Quarry and Waste Disposal Facility on 15 November 2011.

On the basis of the information reviewed Golder conclude that areas of environmental interest exist where soil and to a lesser extent groundwater contamination may have occurred. The investigation undertaken by Golder has not identified significant environmental issues which would preclude the currently proposed development of the site as a rail corridor.

# 10.0 RECOMMENDATIONS

Further investigation work is 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.

- Undertake a Phase 2 intrusive environmental site assessment of the proposed rail corridor , with an objective to assess the risk posed to the detailed design and construction of the rail link by the areas of environmental concern identified within this report. The Phase 2 intrusive investigation would include 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*;
- Develop and implement 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. The contamination management plan would include 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, if excavation is required during the development, in the area of the Glenfield Quarry and Landfill; and
  - A contingencies plan for unexpected contaminated materials, such as materials that is odorous, stained or containing anthropogenic materials that may be encountered during site works.

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# Report Signature Page



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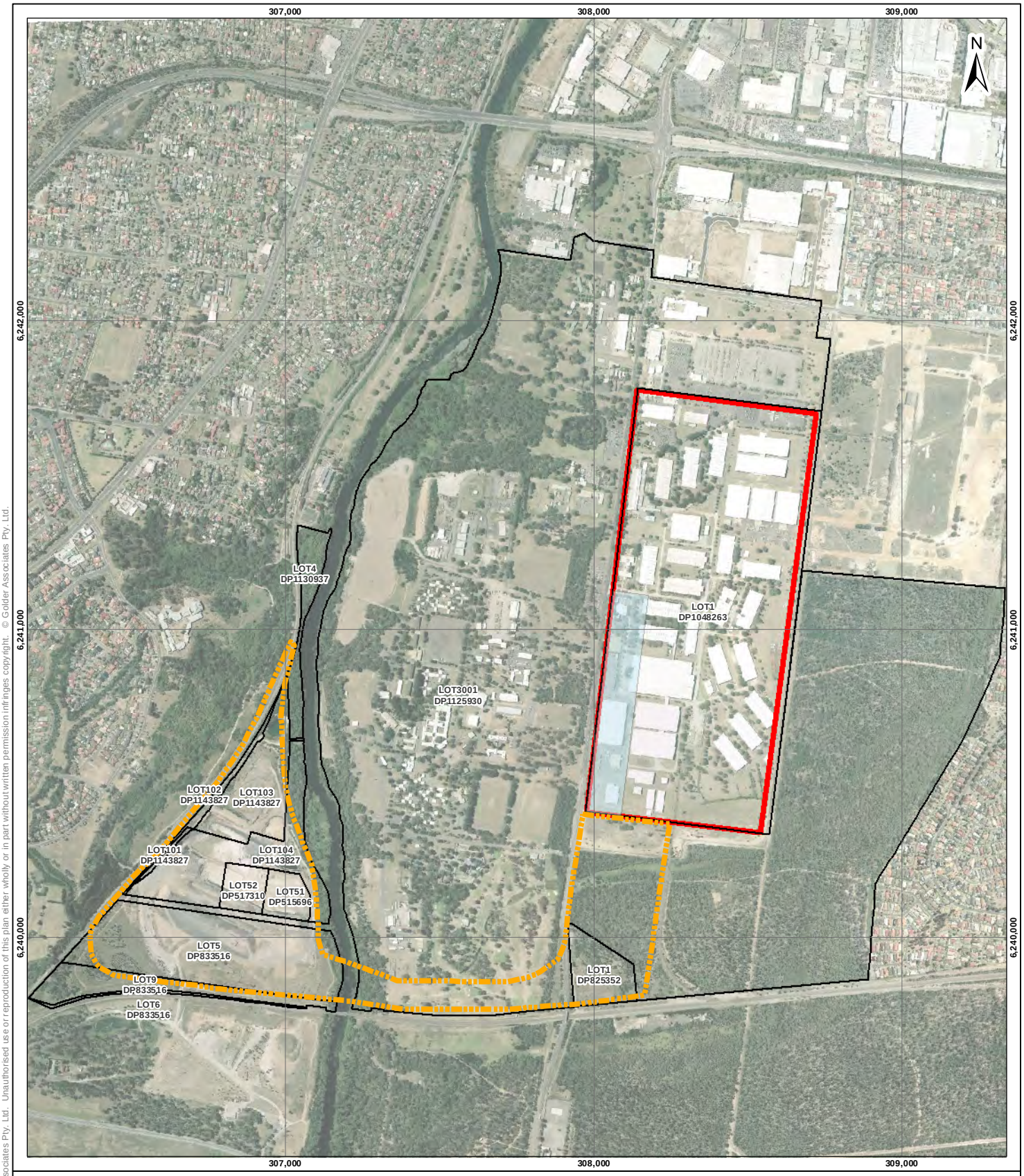


PHASE 1 ASSESSMENT OF
RAIL CORRIDOR ALLOTMENT

STOCKLAND DEVELOPMENTS PTY LTD

## SITE LAYOUT


**Legend**

- Rail Link
- Area 1a
- Cadastre
- DNSDC Bounday

0 62.5 125 250 375 500 625 metres

SCALE (at A4) 1:17,000

DATUM GDA 94, PROJECTION MGA Zone 56

PROJECT: 107623148
DATE: 26/08/2011
DRAWN: AJW
CHECKED: GS

**FIGURE 1**



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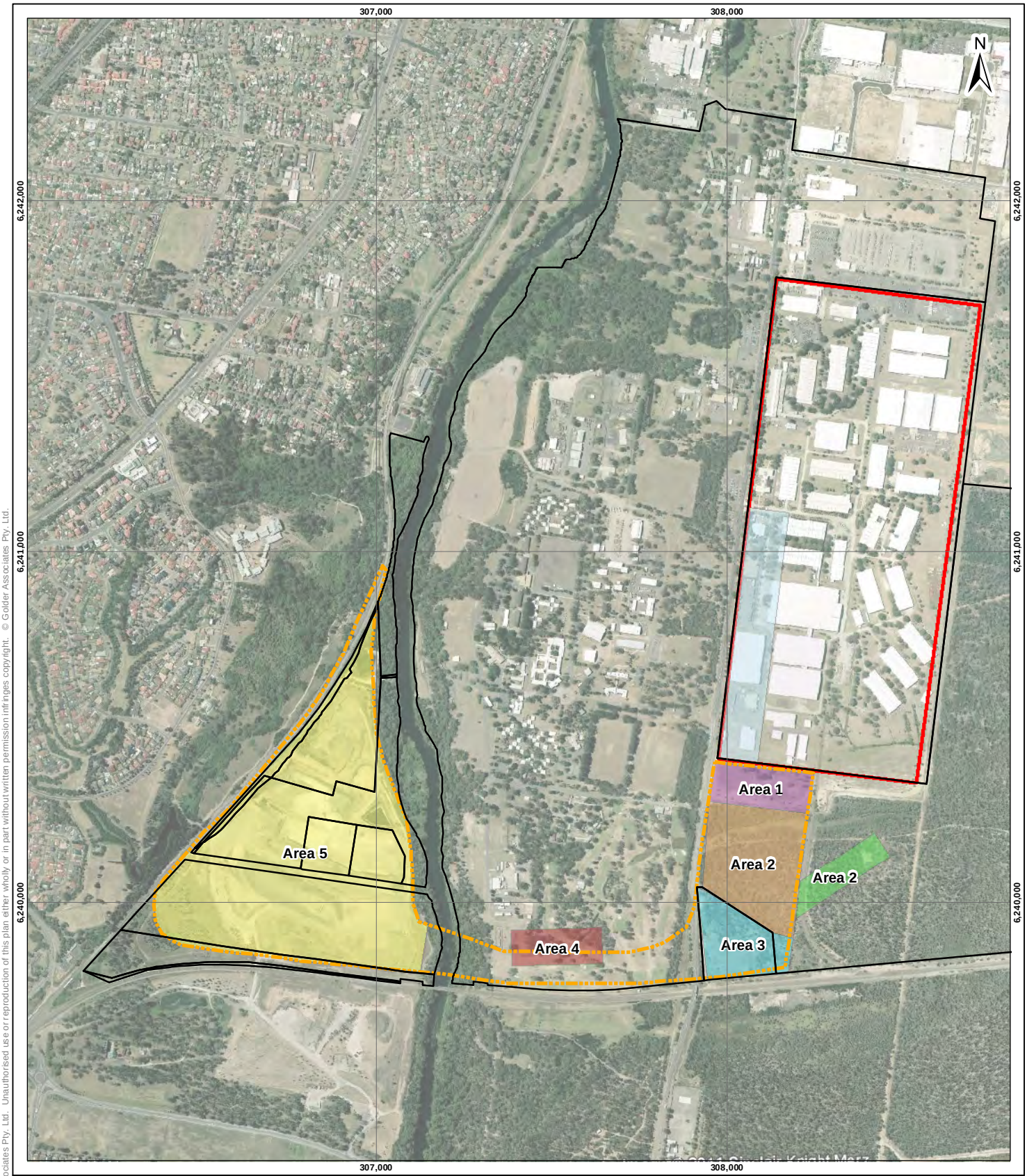


PHASE 1 ASSESSMENT OF
RAIL CORRIDOR ALLOTMENT

STOCKLAND DEVELOPMENTS PTY LTD

# AREAS OF ENVIRONMENTAL INTEREST




**Legend**

- Cadastre
- Rail Link
- Area 1a
- DNSDC Boundary

**Areas Of Environmental Interest**

- Area 1 - Unauthorised Dumping Area
- Area 2 - Former Grenade Range
- Area 2 - Illegal Dumping Identified
- Area 3 - Area of Land Filling
- Area 4 - Former Mock Viet Cong Village
- Area 5 - Glenfield Quarry & Waste Disposal Facility

0 55 110 220 330 440 550 metres

SCALE (at A4) 1:15,000

DATUM GDA 94, PROJECTION MGA Zone 56

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**FIGURE 2**

Golder Associates



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