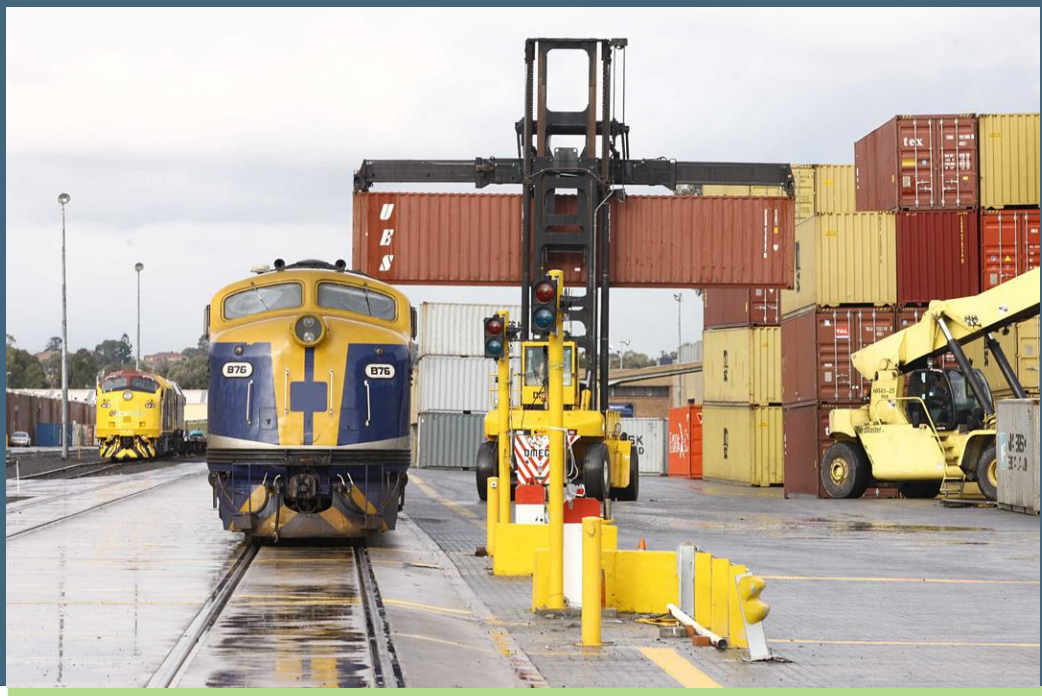
JBS&G

SIMTA Intermodal Terminal Facility – Stage 1

Remediation Action Plan



SIMTA

SYDNEY INTERMODAL TERMINAL ALLIANCE

Part 4, Division 4.1, State Significant Development

26 / MAY / 2015

Qube Property Management Services Pty Ltd
c/o Tactical Group

Remedial Action Plan
SIMTA Intermodal Terminal Facility - Stage 1

Moorebank Avenue
Moorebank, NSW

26 May 2015
50342-61155 (Rev 1)
JBS&G

www.jbsg.com.au

Qube Property Management Services Pty Ltd
c/o Tactical Group

Remedial Action Plan
SIMTA Intermodal Terminal Facility - Stage 1

Moorebank Avenue
Moorebank, NSW

26 May 2015
50342-61155 (Rev 1)
JBS&G

Table of Contents

Tables

Figures

Appendices

List of Abbreviations and Key Terms

ACM	Asbestos Containing Material
AHD	Australian Height Datum
As	Arsenic
bgs	below ground surface
Cd	Cadmium
Concept Plan Approval	Concept Plan Approval (MP 10_0193) granted on 29 September 2014 for the development of the SIMTA Moorebank Intermodal Terminal Facility at Moorebank. This reference includes the associated Conditions of Approval (CoA) and Statement of Commitments (SoC) which form the approval documentation for the Concept Plan Approval.
Construction area	Extent of construction works, namely areas to be disturbed during construction of the Stage 1 Proposal (refer to Figure 1).
CSM	Conceptual site model
Cr	Chromium
Cu	Copper
BTEX	Benzene, toluene, ethylbenzene and xylenes
B(a)P	Benzo(a)pyrene
DEC	NSW Department of Environment and Conservation
DECCW	NSW Department of Environment, Climate Change and Water
DNSDC	Defence National Storage and Distribution Centre
DQI	Data quality indicator
DQOs	Data Quality Objectives
DWE	NSW Department of Water and Energy
EPA	NSW Environment Protection Authority
EPBC Approval	Approval (No. 2011/6229) granted under the EPBC Act in March 2014 by the Commonwealth Department of Environment for the development of the SIMTA Moorebank Intermodal Terminal Facility at Moorebank.
ESA	Environmental Site Assessment
Former DNSDC South	The land to the south of the operational footprint of the Intermodal Terminal, to the boundary fence of the former DNSDC
GME	Groundwater monitoring event
GPR	Ground Penetrating Radar
ha	Hectare
Hg	Mercury
HIL	Health based investigation level
JBS&G	JBS&G Australia Pty Ltd
LOR	Limit of Reporting

MIC Proposal	The development of an intermodal facility, associated commercial infrastructure (warehousing) and a rail link (3 options have been provided) to be located on the MIC site, for which an approval, under Part 4, Division 4.1 of the *Environmental Planning and Assessment Act 1979*. This proposal is currently under assessment by the Department of Planning and Environment.
MIC site	The former School of Military Engineering site to the immediate west of the SIMTA site, across Moorebank Avenue.
Ni	Nickel
OEH	Office of Environment and Heritage
Operational area	Extent of operational activities for the operation of the Proposal (refer to Figure 1).
PAHs	Polycyclic aromatic hydrocarbons
Pb	Lead
PQL	Practical Quantitation Limit
Project site	Includes the SIMTA site and the Rail Corridor, i.e. the entire site area which was approved under the Concept Plan Approval (refer to Figure 1).
Proposal site	Includes the Stage 1 site and the Rail Corridor, i.e. the area for which approval (construction and operation) is sought within the EIS.
PSH	Phase Separated Hydrocarbon
QA/QC	Quality Assurance/Quality Control
RailCorp Land	Lot 1 DP 825352 (part of the Rail Corridor) and owned by RailCorp
Rail Corridor	Area defined as the 'Rail Corridor' within the Concept Plan Approval. The rail link is also included within this area (refer to Figure 1).
Rail link	The rail link including the area on either side to be impacted by the construction works included in the Stage 1 Proposal.
RAP	Remediation Action Plan
RPD	Relative Percentage Difference
SAQP	Sampling, Analysis and Quality Plan
SIMTA	Sydney Intermodal Terminal Alliance
SIMTA Project	The SIMTA Moorebank Intermodal Terminal Facility at Moorebank as approved by the Concept Plan (MP_10_0913).
SIMTA site	Includes the former Defence National Storage and Distribution Centre (DNSDC) site, the land owned by SIMTA which is subject to the Concept Plan Approval (refer to Figure 1).
Southern Boot Land	Commonwealth owned land to the south of the Former DNSDC South, and to the north of the RailCorp Land (part of the Boot Land in the MIC proposal)
SSFL	Southern Sydney Freight Line
Stage 1 site	The subject of the EIS, the western part of the SIMTA site which includes all areas to be disturbed by the Stage 1 Proposal (including the Operational area and Construction area) (refer to Figure 1). This area does not include the Rail Corridor.

The Proposal	Stage 1 of the SIMTA Moorebank Intermodal Terminal Facility including construction and operation of the intermodal terminal facility and rail link, i.e. all works and built form for which approval is sought in this Technical Report.
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
UPSS	Underground Petroleum Storage System
UST	Underground storage tank
Zn	Zinc

Executive Summary

JBS&G Australia Pty Ltd (JBS&G) has been engaged by Tactical Group (Tactical) on behalf of Qube Property Management Services Pty Ltd (the client) to prepare a Remediation Action Plan (RAP) for the Stage 1 site and Rail Corridor (the Proposal site) of the proposed Sydney Intermodal Terminal Alliance (SIMTA) Intermodal Terminal facility at Moorebank, NSW (the Stage 1 Proposal).

The SIMTA Project involves the development of an intermodal facility, including warehouse and distribution facilities, freight village (ancillary site and operational services), stormwater, landscaping, servicing and associated works on the eastern side of Moorebank Avenue, Moorebank (the SIMTA site) (refer to **Appendix A**). The SIMTA Project also includes a Rail Link, within an identified rail corridor (the Rail Corridor), which connects from the southern part of the SIMTA site to the Southern Sydney Freight Line (SSFL) (the entire area, SIMTA site and Rail Corridor referred to as the Project site). The SIMTA Project is to be developed in three key stages:

- Stage 1 – Construction of the Intermodal Terminal Facility and Rail Link;
- Stage 2 – Construction of Warehouse and Distribution Facilities; and
- Stage 3 – Extension of the Intermodal Terminal Facility and completion of the Warehouse and Distribution Facilities.

As previously stated, the site is to be developed in stages, commencing with Stage 1 that involves the construction and operation of the necessary infrastructure to support a container freight volume of 250,000 TEU (twenty-foot equivalent units) throughput per annum.

As a result of the staging, this RAP relates to the Stage 1 site and the Rail Corridor (the Proposal site).

The objective of the RAP is to aid in management of contaminated material during the staged site development, such that on-site management of contaminated material is maximised within the development layout. In relation to the Proposal site, the RAP will:

- Define the extent of remediation required;
- Assess appropriate remediation options and select a preferred option;
- Document the remediation methodology, including the associated safety and environmental management controls;
- Establish the validation criteria relevant to the likely future land-use and detail the validation program (including reporting);
- Identify the regulatory requirements relevant to the proposed remedial works; and
- Outline any potential ongoing monitoring or management requirements to ensure the continued protection of human health and the environment.

Extent of Site Contamination

<u>Bonded ACM Impacted Surfaces and Soils</u>

Non-friable (bonded) ACM was positively identified on the ground surface at the north-western corner of building B11 (Stage 1 site), and in fill at 0.3-0.4 mbgs at a test pit on the north of the East Hills rail corridor (i.e. southern portion of the MIC site) (see **Figures 11a** and **12**). The ACM found near building B11 may be related to degrading or historical building infrastructure. The ACM find at the southern portion of the MIC site may be related to historic burials or filling activities.

It is anticipated that the surfaces that may be subject to remediation and validation for ACM within the Stage 1 site will be those areas adjacent to previous or current buildings (see **Figure 3**).

The ACM potentially related to historic burials or filling activities, noted in soil of the north of the East Hills rail corridor (i.e. southern portion of the MIC site), will require the characterisation, remediation and validation of the Rail Link area within this portion of the Proposal site (see **Figure 14**) as this area will be disturbed during construction and/or operation of the Proposal site. The potentially impacted material has an approximate area of 2.5 ha and a depth of approximately 0.7 mbgs. It is noted however, that investigations to date suggest that ACM impact in this area is not widespread. The potentially impacted material will be managed via the CMP either through the excavation and remediation or excavation and on-site containment of the potentially ACM impacted materials. Should the subsurface of this area be left undisturbed, then a visual validation and clearance of the ground surface for ACM will suffice.

Hydrocarbon Impacted Soils

Given the noted impacts in soil and groundwater at the refuelling area and underground storage tank (UST) tank farm, it is highly likely that the soil surrounding fuel storage and distribution infrastructure in this area has been impacted by hydrocarbons and other petroleum related COPCs.

Should impacted soils be identified during the decommissioning and removal of fuel storage and distribution infrastructure in these areas, impacted soils will require to be chased out from the walls and base of the excavations formed. It is anticipated that the infrastructure to be decommissioned and removed includes USTs, bowsers, fill points, oil/water separator systems, bowsers and fuel lines.

HCB Impacted Soils

Hexachlorobenzene (HCB) was reported in test pit TP013 located on the south eastern corner of the Stage 1 site (URS 2002b). The concentration noted is below the NEPC (2013) commercial / industrial criteria. It is noted, however, that the Site Audit Statement (SAS) (CM 2002b) states that HCB should be included as a COPC during the '*remediation of the southern part of the site adjacent to the rail spur*'. Furthermore, as HCB is considered to be a scheduled chemical in the *Waste Classification Guidelines Part 1: Classifying Waste* (NSW EPA 2014), should waste soil be generated from construction work conducted in this area, the management of HCB impacted waste soils will need to be in accordance with the EPA's scheduled chemical wastes chemical control order 2004. The management of potentially HCB impacted soils that may be disturbed during construction will be included in the CMP.

Heavy Metal Impacted Soils

Selected soil samples taken from within the Stage 1 site and to the north of the East Hills rail corridor (i.e. southern portion of the MIC site) have concentrations exceeding the adopted heavy metal ecological criteria for commercial / industrial land. However, given that the Proposal site will remain as a commercial / industrial site and will include large building structures and extensive hardstand areas with limited vegetated areas that may be exposed to these isolated locations, the exceedance of ecological criteria is not considered to pose an unacceptable risk to the environment nor necessitate further remediation.

Only one sample from within the Proposal site had an exceedance of the adopted human health criteria for lead. This sample was collected from a depth of 2.8 - 3.0 mbgs in the north-western portion of the Glenfield Waste Facility (refer to **Figure 12**). Based on the draft bulk earthworks plan (**Appendix D**), it has been assumed that proposed Stage 1 construction work will not require the disturbance of the subsurface in this area. In addition, as the soil impacts are above the groundwater table in this area and the proposed use of this area will involve rail infrastructure including embankments with ballasts, it is considered unlikely that this reported impact in soil will pose a risk to human health. However, should the construction work in this area require excavation in this area, the potentially impacted soils will need to be managed under the CMP.

Groundwater

The dissolved metal concentrations that exceed the adopted ecological criteria have been reported in groundwater within the Proposal site. These exceedances are not considered to pose an unacceptable risk to environmental receptors as the heavy metal concentrations are considered to be representative of background concentrations in groundwater in urban areas of Sydney.

Historical leaks from the underground storage tanks may have resulted in the noted contamination in the form of light non-aqueous phase liquid (LNAPL) at the refuelling area within the Stage 1 site. Impacts in this area of the site may pose a potential risk to future workers at the site. It is proposed that this area be remediated to the extent practicable

Data Gaps

There is no data available for the RailCorp-owned land located east of Moorebank Avenue. As such, there may be potential unidentified contamination risks within the RailCorp-owned land associated with the anecdotal but as yet unconfirmed disposal of waste and burning of wooden railway sleepers. Further intrusive investigations can be conducted prior to the implementation of the remediation program. It is noted that specific RAPs may be required to be developed depending on the findings of data gap investigations.

Remediation Extent

The extent of remediation and validation is summarised below:

- Stage 1 site - ground surfaces adjacent to former or current buildings;
- Southern portion of the MIC site – ground surfaces of at the Rail Link portion of the site;
- Refuelling facility and UST tank farm – excavation areas associated with the decommissioning and removal of fuel storage and distribution infrastructure; and
- In-ground collection pits and oil / water separators near / within B16, B20 and B22 – excavation areas.

It is noted that other unexpected impacts or structures may exist within the Proposal site that may be potential sources of contamination or be indicators of contamination. Should these be encountered, an unexpected finds protocol should be implemented.

Preferred Remediation Option

Based on the EPA's endorsed guideline hierarchies for remediation options (DEC 2006), the characteristics and distribution of the site specific contaminants, the site's environmental setting, and the principles of ecologically sustainable development (ESD); the preferred remediation strategy is outlined as follows:

- Hand picking of bonded ACM contaminated ground surfaces. Bonded fragments removed during the hand picking process will be disposed off-site to a suitably licensed facility or at the on-site containment area;
- Retain subsurface ACM in place, if no excavation work is required. Where excavation is required (i.e. Rail Link area of the southern portion of the MIC site), excavated soils will be remediated and validated for use as backfill (where suitable) during construction works as detailed in the CMP. Alternatively, soils impacted by ACM can be excavated and placed in a containment area of the site;
- Remove LNAPL to the extent practicable from the refuelling area within the Stage 1 site via multi-phase extraction (MPE);

- Remove fuel storage and distribution infrastructure and excavate and remediate hydrocarbon impacts on-site at the refuelling area within the Stage 1 site;
- Remove, excavate and remediate other underground collection pits and oil/water separators adjacent to or within buildings B16, B20 and B22. Impacted soils are to be remediated on-site or disposed off-site to a suitably licensed facility, as required;
- Reuse of validated bioremediated material for the backfilling of excavations, where appropriate; and
- Groundwater monitoring for residual groundwater contamination in the refuelling area, as required.

Subsequent to the completion of remediation work, a Validation Report will be prepared demonstrate the suitability of the site for commercial / industrial use. The report will be prepared in accordance with the NSW EPA *Guidelines for Consultants Reporting on Contaminated Sites* (OEH 2011).

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) has been engaged by Tactical Group (Tactical) on behalf of Qube Property Management Services Pty Ltd (the client) to prepare a Remediation Action Plan (RAP) for the Stage 1 site and Rail Corridor (the Proposal site) of the proposed Sydney Intermodal Terminal Alliance (SIMTA) Intermodal Terminal facility at Moorebank, NSW (the Stage 1 Proposal).

The SIMTA Project involves the development of an intermodal facility, including warehouse and distribution facilities, freight village (ancillary site and operational services), stormwater, landscaping, servicing and associated works on the eastern side of Moorebank Avenue, Moorebank (the SIMTA site) (refer to **Appendix A**). The SIMTA Project also includes a Rail Link, within an identified rail corridor (the Rail Corridor), which connects from the southern part of the SIMTA site to the Southern Sydney Freight Line (SSFL) (the entire area, SIMTA site and Rail Corridor referred to as the Project site). The SIMTA Project is to be developed in three key stages:

- Stage 1 – Construction of the Intermodal Terminal Facility and Rail Link;
- Stage 2 – Construction of Warehouse and Distribution Facilities; and
- Stage 3 – Extension of the Intermodal Terminal Facility and completion of the Warehouse and Distribution Facilities.

A summary of the approvals undertaken to date for the SIMTA site, relating to the SIMTA Project, include:

- **EPBC Approval** (No 2011/6229) granted in March 2014 for the impact of the SIMTA Project on listed threatened species and communities (Sections 18 and 18A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Commonwealth Land (Sections 26 and 27A of the EPBC Act).
- **Concept Approval** (No. 10_0193) granted by the Planning Assessment Commission (PAC) on the 29th of September 2014 for the 'Concept Approval' of the SIMTA Project under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Both of these approvals involved the preparation of design and environmental assessment documentation.

The SIMTA site is to be located on approximately 83 hectares of historical Defence land previously occupied by the Defence National Storage and Distribution Centre (former DNSDC). The Rail Corridor, covering approximately 65 hectares, will pass through Commonwealth land formerly used for Defence-related training and potential waste burial, RailCorp-owned land including portions of the East Hills rail corridor and land north of the corridor and east of Moorebank Avenue, and the privately-owned Glenfield Waste Facility and quarry to the west of the Georges River and east of the SSFL. The investigation area includes land to the west of Moorebank Avenue subject to the proposed Moorebank Intermodal Terminal (MIC site), which includes the southern portion of the MIC site that is currently occupied by part of the Royal Australian Engineers (RAE) golf course, north of the East Hills rail corridor (i.e. southern portion of the MIC site).

As previously stated, the site is to be developed in stages, commencing with Stage 1 that involves the construction and operation of the necessary infrastructure to support a container freight volume of 250,000 TEU (twenty-foot equivalent units) throughput per annum. Specifically, the Stage 1 Proposal includes the following key components, which together comprise the intermodal terminal facility (IMT):

- Truck processing, holding and loading areas – entrance and exit from Moorebank Avenue;
- Rail loading and container storage areas – installation of four rail sidings with adjacent container storage area services by manual handling equipment initially and overhead gantry cranes progressively;
- Administration facility and associated car parking – light vehicle access from Moorebank Avenue;
- The Rail Link – located within the Rail Corridor, including a connection to the intermodal terminal facility, traversing of Moorebank Avenue, Anzac Creek and Georges River and connecting on to the SSFL; and
- Ancillary works – vegetation clearing, remediation, earthworks, utilities installation / connection, signage and landscaping.

As a result of the staging, this RAP relates to the Stage 1 site and the Rail Corridor (the Proposal site).

A number of previous environmental investigations and related documents have been prepared for the SIMTA site dating back to at least 1980, with more recent investigations and summary documents prepared between 2000 and 2011.

A non-statutory site audit and site audit report was completed in 2002, for the former DNSDC site (i.e. the SIMTA site), with the Site Auditor certifying the SIMTA site as suitable for ongoing commercial/industrial use subject to implementation of a Site Management Plan (SMP), which was to include a range of actions relating to further investigation, remediation, groundwater monitoring and management controls. It is not known whether a SMP was prepared or implemented, or whether any recommended actions were undertaken. The Audit did not cover other areas of the Project site including the Rail Link.

The Secretary's Environmental Assessment Requirements (SEARs) (ref: SSD 14-6766 and dated December 2014) states that an Environmental Impact Statement (EIS) must be developed for the SIMTA Intermodal Terminal Facility – Stage 1 (250,000 TEUs) State Significant Development (SSD). The EIS must meet the minimum form and consent requirements in clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000. In relation to the assessment of soil and water impacts for Proposal site, the assessment shall:

- *Identify and assess the soil characteristics and properties that may impact or be impacted by the project, including acid sulfate soils;*
- *Include a contamination assessment in accordance with the guidelines made under the Contaminated Land Management Act 1997 (CLM Act) and in consultation with the EPA for the subject site including the Glenfield Waste Facility. The assessment shall include:*
    - *the potential environmental and human health risks of site contamination on the project site;*
    - *a Remediation Action Plan (RAP);*
    - *consideration of implications of proposed remediation actions on the project design and timing; and*
    - *a Phase 2 environmental site assessment of the project site including rail corridor.*

The Revised Statement of Commitments, with regards to Contamination, require the following to be provided with planning applications for the three major stages of the Concept Plan:

- *Confirming what, if any, actions were taken in regards to the Milsearch (2002) [Ordnance Investigation] recommendations and the associated low risk ordnance issues; and*
- *Undertaking further investigations in the areas of environmental concern likely to be impacted upon by the proposed development. These investigations will be based on the detailed design of the proposed development to identify the extent of contamination, and what, if any, remediation activities are needed. The remediation of areas of the site (if any) would be best matched to the development of the site and considered as part of the future design.*

With regards to the planning application for the first stage of works including the Rail Link, the Revised Statement of Commitments requires the following:

- *Undertaking a Phase 2 intrusive environmental site assessment of the proposed rail corridor lands, with an objective to assess the risk posed to the detailed design and construction of the rail corridor 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 CLM Act.*

Prior to construction of the three major stages of the Concept Plan, the Revised Statement of Commitments requires the following:

- *Developing and implementing a Contamination Management Plan (CMP) as part of the project Construction Environmental Management Plan (CEMP) for managing contaminated materials either expected or unexpectedly encountered during the construction. The contamination management plan would include detailed procedures on:*
    - *Handling, stockpiling and assessing potentially contaminated materials encountered during the development works;*
    - *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;*
    - *Assessment, classification and disposal of waste in accordance with relevant legislation; and*
    - *A contingency plan for unexpected contaminated materials, such as materials that is odorous, stained or containing anthropogenic materials that may be encountered during site works.*

This RAP is tailored to address only those aspects and areas of environmental concern (AECs) relevant to the Proposal site as described above.

The RAP has been developed in general accordance with relevant NSW Environment Protection Authority (EPA) guidelines (**Section 8**).

1.2 Purpose

This document has been prepared for approval of the initial stage of the SIMTA Project, known as the Stage 1 Proposal. This report has been prepared to support a SSD Application for which approval is sought under Part 4, Division 4.1 of the EP&A Act.

This document has been prepared in accordance with the SEARs. Table 1.1 provides a summary of the SEARs and the section where they have been addressed in this report.

Table 1.1: SEARs (SSD 14-6766) Compliance Table

Section/Number	SEARs	Where Addressed
9. l.	Include a contamination assessment in accordance with the guidelines made under the Contaminated Land Management Act 1997 and in consultation with the EPA for the subject site including the Glenfield Waste Facility. The Assessment shall include: i. the potential environmental and human health risks of contamination on the project site; ii. a Remediation Action Plan iv. a Phase 2 environmental site assessment of the project site including rail corridor	This RAP and in the Phase 2 Environmental Site Assessment report (JBS&G 2015)

1.3 Objectives

The objective of the RAP is to aid in management of contaminated material during the staged site development, such that on-site management of contaminated material is maximised within the development layout. In relation to the Proposal site, the RAP will:

- Define the extent of remediation required;
- Assess appropriate remediation options and select a preferred option;
- Document the remediation methodology, including the associated safety and environmental management controls;
- Establish the validation criteria relevant to the likely future land-use and detail the validation program (including reporting);
- Identify the regulatory requirements relevant to the proposed remedial works; and
- Outline any potential ongoing monitoring or management requirements to ensure the continued protection of human health and the environment.

1.4 Referenced Reports

A number of investigation and related reports have been prepared for works previously conducted within the Proposal site. The following reports were reviewed in the development of the RAP:

- Egis (2000) *Preliminary Site Investigation at the Defence National Supply and Distribution Centre*, Moorebank Defence Lands, dated September 2000;
- URS (2002a) *Assessment of DNSDC Buildings – Supplement to Egis 2000 Stage 1 Preliminary Site Investigation of Areas A1 to A6*, dated March 2002;
- HLA (2002a) *Soil and Groundwater Investigation, Precinct H (DNSDC),* Moorebank Defence Lands, dated November 2002, including HLA (2002b) Work Plan Soil and Groundwater Investigation Moorebank Defence Land, dated 17 September 2002;
- URS (2002b) *Investigation Review Report DNSDC*, Moorebank Defence Lands, dated 10 December 2002;
- Contamination Management (CM 2002a) *Summary Site Audit Report*, DNSDC Site, Moorebank, dated December 2002;
- CM (2002b) *Site Audit Statement*, Defence National Storage and Distribution Centre, Moorebank Avenue, Moorebank, dated December 2002;

- Brooks & Associates (Brooks 2002) *Heritage Assessment of the Moorebank Defence site at Moorebank*, dated October 2002;
- Environmental and Earth Sciences (EES 2002a) *Memorandum: Review of Reports Pertinent to Environmental Investigations Conducted at DNSDC*, Moorebank, NSW, dated 12 December 2002;
- EES (2002a) Memorandum: *Review of Investigation Review Report DNSDC*, Moorebank Defence Lands (URS) and Site Audit Statement WRR118 (Dr William Ryall), dated 16 December 2002;
- Milsearch (2002) *Ordnance Investigation*, 2002;
- ARUP (2008) *Stockland Moorebank Intermodal Terminal Geotechnical Desk Study Report*, dated December 2008
- Douglas Partners (DP 2009a) *Summary Environmental Conditions, Proposed Intermodal Freight Terminal*, DNSDC Site – Moorebank Avenue, Moorebank, dated December 2009;
- Douglas Partners (DP 2009b) *Summary Geotechnical Site Conditions, Proposed Intermodal Freight Terminal*, DNSDC Site – Moorebank Avenue, Moorebank, dated December 2009;
- Golder Associates (Golder 2010) *Phase 1 Environmental Site Assessment, Stage 1A of Moorebank Intermodal Freight Terminal Development*, dated December 2010;
- Golder (2011a) *Phase 1 Environmental Site Assessment, SIMTA Rail Corridor Land*, dated November 2011;
- Golder (2011b) *Preliminary Environmental Site Assessment – SIMTA Site and Associated Rail Corridor*, dated 16 November 2011; and
- Toxikos (2011) *Preliminary screening health risk assessment and literature review*, Moorebank Intermodal Freight Terminal, Moorebank NSW, dated August 2011 (Appendix I of the Urbis 2012 EA).
- Parsons Brinkerhoff (PB) (2014), *Phase 2 Environmental Site Assessment Moorebank Intermodal Terminal*, 28 May 2014.
- JBS&G (2015), *Phase 2 Environmental Site Assessment SIMTA Intermodal Terminal Facility – Stage 1*, 13 February 2015 (50342-60868 RevB)

2. Site Condition and Surrounding Environment

The site condition information provided in this section has generally been summarised from the previous investigation reports listed in **Section 1.4**, for the Proposal site. Where appropriate, JBS&G has independently verified the accuracy of the information provided in the previous reports through site inspection.

2.1 Site Identification

The SIMTA site, including the Stage 1 site, is located approximately 27 kilometres south-west of the Sydney Central Business District (CBD) and approximately 26 kilometres west of Port Botany. The SIMTA site is situated within the Liverpool Local Government Area (LGA), in Sydney's South West Sub-Region, approximately 2.5 kilometres from the Liverpool City Centre.

The SIMTA site is located approximately 800 metres south of the intersection of Moorebank Avenue and the M5 Motorway. The M5 Motorway provides the main road link between the SIMTA site and the key employment and industrial areas within the West and South Western Sydney Sub-Regions. The M5 Motorway connects with the M7 Motorway to the west, providing access to the Greater Sydney Metropolitan Region and NSW road network. Similarly the M5 Motorway is the principal connection to Sydney's north and north-east via the Hume Highway.

The SSFL is located 1 kilometre to the west of the proposed SIMTA site. The SSFL is a 36 kilometre dedicated freight line between Macarthur and Chullora.

The SIMTA site was recently operating as the DNSDC however, Defence has recently relocated this operation and vacated the SIMTA site. The majority of land immediately surrounding the SIMTA site is owned and operated by the Commonwealth and comprises:

- School of Military Engineering (SME)[1], on the western side of Moorebank Avenue directly adjacent to the SIMTA site;
- Holsworthy Military Reserve, to the south of the site on the southern side of the East Hills Passenger Railway Line;
- Commonwealth Residual Land, to the east between the SIMTA site and the Wattle Grove residential area; and
- DNSDC to the north and north east of the SIMTA site.

The site immediately west of the SIMTA site which currently includes the SME[1] is the subject of a Development Application (DA) (SSD-5066), under Part 4, Division 4.1 of the EP&A Act, for the development of an intermodal facility known as the Moorebank Intermodal Terminal Project (MIC Proposal). The EIS for the MIC Proposal has recently been prepared and publicly exhibited on 8 October 2014 to 8 December 2014. A Preferred Project Report (PPR) is currently under preparation to respond to submissions received during public exhibition. The MIC Proposal has yet to be determined by the Department of Planning and Environment (DP&E).

A number of residential suburbs are located in proximity to the Stage 1 site, including:

- Wattle Grove, located approximately 600 metres from the Stage 1 site and 750 metres from the Rail link to the east;
- Moorebank, located approximately 1,700 metres from the Stage 1 site and more than 2,700 metres from the Rail link to the north;

[1] The SME will be relocated as part of the Moorebank Units Relocation (MUR) project.

- Casula, located approximately 1,100 metres from the Stage 1 site and 250 metres from the Rail link to the west; and
- Glenfield, located over 1,700 metres from the Stage 1 site and 750 metres from the Rail link to the south-west.

The location of the SIMTA site including the Stage 1 site as well as the Rail Corridor is shown in **Figure 1**. It is understood that the Rail Link will include an area approximately 10 m either side of proposed rail lines, as shown on **Figure 1**.

Details relating to the SIMTA site are summarised in **Table 2.1** below.

Table 2.1: Summary SIMTA Site Details

Site Details	
Lot/DP	Lot 1 in DP 1048263
Address	Moorebank Avenue, Moorebank, NSW
Local Government Authority	Liverpool City Council
Current Use	Defence-related uses
Current Zoning	Industrial
Proposed Use	Intermodal Terminal Facility
Site Area	Approximately 83 ha
MGA Coordinates (Zone 56)	E: 308120.81; N: 6241120.15 – approximate NE corner of Stage 1

Details for the area of investigation are summarised in **Table 2.2** below.

Table 2.2: Summary Area of Proposal Site

Stage 1	
Lot/DP	Stage 1 forms part of Lot 1 in DP 1048263 (Sydney Intermodal Terminal Alliance); Rail Corridor lands include Lot 4 in DP 1197707, Lot 1 in DP 825352, Lot 2 in DP 825348, Lot 1 in DP 1061150, Lot 2 in DP 1061150 (private, RailCorp and Crown Land); The MIC site comprises Lots 1 and 2 in DP 1197707; The Glenfield Waste Facility comprises Lot 1 in DP 712701, Lot 91 in DP 1155962, Lots 5 and 7 in DP 833516, Lot 52 in DP 517310, Lot 101 in DP 1143827, Lot 4 in DP 1130937, Lot 5 in DP 833516, Lot 51 in DP 515696 and Lots 102, 103 and 104 in DP 1143827; and Lot 1 in DP 1130937 and Lot 4 in DP 1186349 are associated with the SSFL.
Address	Moorebank Avenue, Moorebank, NSW Glenfield Waste Facility located north of Cambridge Avenue, Glenfield
Local Government Authority	Liverpool City Council
Current Use	Commonwealth land for current/former Defence-related uses; RailCorp land for Rail-related uses; Glenfield Waste Facility for quarry and waste disposal purposes.
Proposed Use	Intermodal Terminal Facility and associated Rail Corridor
Site Area	Stage 1 site: Approximately 310,568 m^2, or 31.05 ha Rail Corridor lands: Approximately 65 ha (Golder 2011a)
MGA Coordinates (Zone 56)	E: 308120.81; N: 6241120.15 – approximate NE corner of Stage 1

Cadastral boundaries are shown in **Figure 2**.

2.2 Site Description

Preliminary site inspections were conducted between September 2012 and December 2014 by JBS&G to provide information on current site conditions to assist in the understanding of previous investigations, the site's environmental setting and to aid in development of an appropriate investigation program and RAP.

2.2.1 Stage 1 Site of the Former DNSDC

The Stage 1 site within the former DNSDC (includes the Operational and Construction areas as shown on **Figure 1**) is characterised by concrete and bituminous concrete access roads providing access to a number of enclosed warehouse/storage structures, buildings and open storage/parking areas bordered by various open grassed areas. A concrete-lined drainage channel runs north-south through the Stage 1 site, west of a main concreted access road that runs along the centre of the area. Building numbers and descriptions for structures within and adjacent the Stage 1 site are shown on **Figure 3**, with descriptions taken from URS (2002) and Golder (2010). It is noted that the Stage 1 site has been expanded to include the Construction area. The Operational area of the Stage 1 site aligns with the area identified in the Golder 2010 report. The new Stage 1 site boundary (including the Construction area) is presented in **Figure 3**.

The northern portion of the Stage 1 site includes palletised stores used to store larger pieces of equipment. It is noted that B7 was reported by URS (2002) to have been potentially used as a warehouse.

The southwest of the Stage 1 site includes fuel storage and dispensing facilities, including a separately fenced area only accessible from Moorebank Avenue comprising a fuel dispensing 'service station' (building B163, **Figure 3**), and five underground storage tanks (USTs) within the former DNSDC area (structure B21, **Figure 3**) immediately east of the fenced 'service station' area. Egis (2000) reported these USTs each have a capacity of 58,000 litres. The 'service station' is predominantly surfaced with hardstand (concrete and bituminous concrete), with some grass areas along the eastern and western boundaries. There are several fuel bowsers beneath a canopy, presumably linked to the USTs east of the area by underground fuel transfer lines. A brick office adjoins the western edge of the canopy area, with a sign indicating building number "21" on the north wall. There are two bowsers on the western boundary north of the canopy area, and a separate vent stack and UST is located adjacent these bowsers. There is a series of remote fill points in a 'fill box' for the five USTs located east of the 'service station' area. North of this fill box is what appears to be an oil-water separator system with separator and drum sitting in a small concrete bund. The five USTs located east of the 'service station' sit within a grassed area with a concrete pad to the east between the USTs and the associated vent stacks. The USTs themselves are beneath a concrete pad with raised bund around the edges, which is surrounded by steel protection rails. The USTs are used for storage of diesel and unleaded petrol (ULP) fuels. Egis (2000) reports one tank was used for storage of leaded petrol.

The southern portion of the Stage 1 site includes Dangerous Goods stores, noted on **Figure 3** as buildings B22, B23, B24, B25 and B26. B22 is an open-sided steel structure with steel roof. A small section in the north of the store is enclosed. The floor of the store area is concrete and there is a raised concrete bund around the floor's extent. Drums of oil and other liquid dangerous goods in steel drums are stored on wooden pallets predominantly within the western half, while racks storing boxed and packaged goods are located in the central/east portion. New and used batteries were stored on wooden pallets in the northeast corner, and a ranged of drummed, boxed and packaged goods were stored on pallets along the eastern edge of the store. Adjacent the northeast of the store is a concrete-covered pit of unknown purpose. A low grassed drainage swale was located immediately east of the store, at the eastern edge of the Stage 1 area, which appeared to drain north into the drainage system. A similar drainage swale is located west of the store, between the store and the USTs. Drainage from the store's roof is directed via downpipes to the concrete pad around the store's perimeter from where it runs over grass to the drainage swales. B23 was reported to have been used for the storage of large containers (>20 L) of Class 3 flammable liquids including solvents and fuels. Some staining was noted by URS (2002) in the centre of the DGS. B24 was reported to have been used as a temporary store used to pack items for distribution as well as a store for combustible solids, miscellaneous dangerous goods (e.g.

batteries) and smaller quantities (<20L) of flammable liquids (e.g. paints). Buildings B25 and B26 are large open warehouses that are used to store dangerous goods including solvents, fuels, lubricants and compressed gas. The warehouse floors are concrete lined and bunded.

The southern-most portion of the Stage 1 site extends south of the Dangerous Goods stores and USTs to a boundary line extending approximately east from the southern egress point of the 'service station' area. This is an open grassed area with sparse trees. This open area is reported to provide a fire-break between the Dangerous Goods store and bushland to the south of the former DNSDC.

On eastern portion of the Stage 1 site lies a raised, grassed area east of B40 and B45. These buildings were used for warehousing and this open area the site is considered to be the most upgradient area of the Stage 1 site. Egis (2000) mentions that a portion of this open, grassed area was used as a magnetics storage yard.

North of the B22 DGS is a building (**Figure 3**) that was described on site as a former meat store (B20), which is no longer in use. The building is constructed of brick and concrete panels, and appears to have a steel roof. The building sits on ground raised approximately 1 to 1.5 m above the surrounding ground levels, with grassed slopes on east, south, north and northwest of the building footprint and concrete loading platform at southwest. The area to the west of this store comprised a vehicle parking/turning/loading area surfaced with bituminous concrete which also contained a number of shipping containers. To the east of building B20 is a grassed area within which is the concrete-lined open drainage channel and then concreted site access road.

A portion of B16, located at the centre of the Stage 1 site, was reported to have been used as a treatment and preservation (T&P) area. This building was noted to have solvent dipping and water rinsing tanks for cleaning equipment as well as solvent tanks that drained into above ground storage tanks. Two underground oil/water separator or interceptor pits were reported to be observed near the entrance of the T&P area.

North of the former meat store and the Dangerous Goods store B24 are large rectangular steel warehouses or store building (buildings B10, B11, B17, B18 and B19, **Figure 3**) referred to by Golder (2010) as Bulk Pallet Silos. URS (2002) reports that these buildings were used for sorting and packaging materials and equipment.

The concrete-lined drainage channel leads north along the eastern sides of the former meat store (B20) and the Bulk Pallet Silo (B19), before turning west around the northern end of building B19 and then turning north again in a straight line towards the Canteen (building B4, **Figure 3**), north of the Stage 1 area.

An open storage area storing mainly shipping containers at the time of inspection was located north of building B19, between the concrete-lined drainage channel and the western boundary. This area was surfaced with bituminous concrete. To the east of this area and the drainage channel was a concreted access road and parking area for the large store and office building (B16).

North of the open storage area is a fenced grassed recreational area with some trees to the north where there is a car parking area and office-style (former Defence Bank and Defcredit) building and further north the former Duty Office (B5 and B3 respectively, **Figure 3**). The northern portion of Stage 1 of the former DNSDC comprises two narrow portions separated by the Canteen (building B4, **Figure 3**).

An open, grassed elevated area is located on the eastern boundary of the Stage 1 site. This area lies east of warehouses B40 and B45 and was once used as a magnetic store.

2.2.2 Former DNSDC South

This area comprises open grassed area south of the Stage 1 site that extends to the southern boundary fence of the former DNSDC site. There are sparse mature trees in this area, approximately half way between the Dangerous Goods store and southern boundary of the former DNSDC, with one smaller tree that appeared dead. The area was relatively level, with no obvious features other than the trees and wire mesh security fence along the western and southern boundaries. This area is shown on **Figure 4** and as Area 1 on **Figure 7**.

2.2.3 Commonwealth Land South / Boot Land

The Commonwealth land south of the former DNSDC (also referred to as Boot Land) is largely bushland, with a cleared area with narrow fire-trail and overhead power line corridor along the northern boundary, immediately south of the former DNSDC southern boundary fence, accessed via a locked gate from Moorebank Avenue. This area is shown on **Figure 4** and as Area 2a on **Figure 7**. The bushland is quite dense and apart from the northern access track there was only one other possible vehicular access track accessible from a locked gate along the western Moorebank Avenue boundary, south of a low drainage channel. Anzac Creek runs east to west across the northern portion of this land.

A rail siding runs north-south along the western edge leading from the former DNSDC site to the rail corridor to the south. The siding appears unused.

During the preliminary site inspection, it was noted that there was evidence of minor waste materials including rusted drum in the northwest corner, just inside the fenceline. The southern portion of this area appeared slightly less dense, but was not accessible from RailCorp land to the south due to the presence of a wire mesh security fence along the southern boundary.

2.2.4 RailCorp Land

The RailCorp land (shown on **Figure 4** and as Area 3 on **Figure 7**) is accessible via a gravel access track from Moorebank Avenue, just north of the railway overpass. It includes an approximately trapezoidal parcel with the southern boundary aligned to the East Hills rail corridor south of the land. The southwest corner is separately fenced and comprises a roughly square and predominantly grass-covered area that forms an irregular mound that is approximately 2 to 3 m high along the northern fenceline of this area, and higher towards the central-southern area. The mound appears to slope up to the southeast from a set of locked gates in the northwest corner. Access to this area was not possible due to security fencing around its perimeter. There are few trees on this mounded area with the exception of the southern boundary and southwest corner. A shipping container and abandoned demountable office were present in the southwest corner of the RailCorp land.

The northern, triangular portion of this area comprised patches of grassed areas, dense scrub and open bushland areas. There were numerous areas of disturbed, hummocky ground including low mounds of soil mixed with building rubble and or metal, and a number of shallow pits indicative of small excavations, as well as what appeared to be parallel wheel/track ruts leading to one area of apparent spoil. At least one fragment of suspected asbestos containing material (ACM) was observed in this area.

A number of piles of household wastes were noted towards the eastern boundary of this area, close to the access track from Moorebank Avenue.

Anecdotal information provided by Defence's Regional Environmental Officer (Robert Kolano, pers. comm. 25 September 2012), suggests this mounded portion of the rail land may have historically been used for dumping and burning of wooden railway sleepers. No other information has been obtained to confirm historical activities in this area.

To the west of Moorebank Avenue, a portion of the proposed rail corridor follows the northern side of the existing East Hills rail corridor, passing south of the southern extent of the MIC site, before crossing the Georges River immediately north of the existing rail bridge where the corridor enters the Glenfield Waste Facility.

Observations from the Moorebank Avenue bridge over the rail corridor indicate there is a vehicular access track within the rail corridor on the northern side of the rail lines. A security fence separates the rail corridor from the golf course, which comprises open and relatively flat grassed areas with scattered trees in the area immediately north of the rail corridor. Review of recent aerial photographs showing the western portion of this area, along the eastern river bank, indicates the land along the river is heavily vegetated. This is consistent with observations made from the western river bank during inspection of the Glenfield Waste Facility. There appears to have been some excavation and/or filling adjacent the existing rail bridge supports, presumably associated with construction of the bridge.

2.2.5 Glenfield Waste Facility

The Glenfield Waste Facility is an active landfill and quarry. The Rail Corridor connecting to the SIMTA site enters the Glenfield site at the eastern boundary immediately north of the existing rail corridor bridge crossing at the Georges River, which forms the eastern boundary of the Glenfield site. The existing East Hills rail corridor passes through the Glenfield Waste Facility, however the Rail Corridor will only take up land in the portion north of the East Hills rail corridor, as shown in **Figure 5** and as Area 5 on **Figure 7**. Within this area, the Rail Corridor separates the suburbs of Glenfield to the south and Casula to the north.

The southeast corner of the Glenfield Waste Facility, where the Rail Corridor enters, includes a rehabilitated area. Black liner material was evident at the top of the sloping bank leading to the river, leading north towards a fenced enclosure used to park excavation and other equipment. A gravel access road passes immediately west of this enclosure, leading to the lower excavated landfill areas towards the centre of the landfill. A smaller track follows the site's fenceline on a constructed levee raised above the river bank to the east, and which is considerably elevated above the excavated landfill base and dam on the eastern boundary. The Rail Corridor follows this boundary track/levee along the site's boundary, and east of the eastern dam, to high ground north of the current landfill floor and quarry area. This high ground appears to be formed of natural in-situ material yet to be excavated, as well as excavated and/or tipped spoil material. The Rail Corridor divides at the highest point of the Glenfield Waste Facility, approximately where a 'dam' of wet 'sloppy' soil is contained within an earth bund. One part of the Rail Corridor swings towards the west and south to connect to the SSFL to the west of the current quarry area, while the other portion of the proposed corridor maintains a northerly direction from the high ground to a lower area where the northern dam of the Glenfield site exists.

A set of monitoring points was observed immediately east of the site fence adjacent the boundary access track at the top of the river bank, to the east of the eastern dam. A second set of monitoring points was observed in the northern corner of the site, immediately north of the access track that leads to the Rail Corridor north of the northern dam. There appeared to be groundwater monitoring wells within each set of monitoring points, present as standpipes. Up to four standpipes of varying construction were present at each location. The purpose of all monitoring points was not clear. Review of Environmental Protection Licence (EPL) 4614 for Glenfield Waste Disposals that there are at least three "concrete leachate risers" for leachate quality monitoring, at least 19 groundwater monitoring bores although some of these appear to be multiple monitoring points at the same location, as well as at least six subsurface landfill gas monitoring wells.

EPL 4614 notes the depth of waste landfill in Cells A1 and A2 must not exceed 30 m including capping material, and includes a condition requiring filling plans to be updated at least annually. Monitoring is required quarterly for some parameters, including methane, and yearly for a full range of parameters. During discharge periods, monthly monitoring is required for a selected range of parameters. A leachate barrier and leachate collection system is required on the eastern wall of Cell A2, with reference to a Leachate Management Plan (LMP) by Consulting Earth Sciences (CES) in February 2007. There is also reference to Cell B1 required to be constructed in accordance with a Cell B1 Design Report prepared in May 2012.

Glenfield Waste Services (GWS) has provided JBS&G with information regarding the groundwater bore and subsurface gas locations at the site. In addition, limited 2013 to 2014 groundwater, leachate and gas data has been made available for review. The majority of data made available are from locations along the Rail Link which is considered to be part of low operation areas within the waste facility. On review of this data, the following is noted:

- Available standing water levels from the groundwater monitoring wells located along the Rail Link (i.e. BH1A, BH1B, BH4A, BH4D, BH7A, BH7B, BH9A, BH9B, BH10D, BH13D, BH15S, BH17A and BH17B) range between 3.48 to 11.98 metres below top of casing (mbtoc);
- Groundwater pH ranged from 5.18 to 7.86;
- Total dissolved solids (TDS) in groundwater ranged from 6.5 to 13,800 mg/L, with an average of 2,417 mg/L;
- Concentrations of heavy metals in groundwater were either below or marginally above the laboratory's limit of reporting (LOR) except for barium and manganese which have reported maximum concentrations of 14 mg/L (BH4D) and 2.5 mg/L (BH9B), respectively;
- Concentrations of TRH and BTEX in groundwater were either below or marginally above the LOR;
- Leachate sampling locations to do not align with the proposed Rail Link; and
- The average methane concentrations from monitoring points at the facility is 0%. Exceptions to this include the average methane concentrations from LG3 (3%) and at LG5 (43.9%).

The reported methane concentrations at LG3 on the southern corner of the Glenfield Waste Facility (within the Rail Link) has recorded methane concentrations above the nominated levels stated in the *Environmental Guidelines: Solid Waste Landfills* (NSW EPA, 1996) (i.e. 1.25% methane (v/v)) between March and August 2013. Monthly measurements of methane were conducted between March 2013 and February 2014 with the more recent (i.e. between September 2013 and February 2014) methane concentrations reported below the aforementioned guideline levels.

The reported methane concentrations at LG5, located on the western boundary of the Glenfield Waste Facility (outside the Rail Link), were above the Solid Waste Landfill guideline levels between March 2013 and February 2014. It is noted that reported methane concentrations at this location decreased significantly in January and February 2014.

2.3 Surrounding Land-use

The following description of land uses surrounding the Proposal site has been based on information provided in previous investigation reports, review of aerial photographs available from Google Maps and Nearmap, and observations made by JBS&G staff during site inspections. Current land use of adjacent properties or properties across adjacent roads is summarised below.

To the north of Stage 1 site is the main entry and security point for the former DNSDC facility, and the main administrative building. Other former DNSDC areas lie in between and around the northern and eastern portions of the Stage 1 site. Moorebank Avenue is present west of the Stage 1 site, with Commonwealth (Defence) land occupying the land west of Moorebank Avenue to the Georges River, and includes the land north of the section of the Rail Corridor that runs along the northern side of the existing East Hills rail corridor. The Georges River forms the eastern boundary of the Glenfield Waste Facility.

To the east of the southern Commonwealth land and the RailCorp-owned site situated between the SIMTA site and the existing rail corridor, lies more Commonwealth land (i.e. Boot Land) formerly used by Defence, and which is currently heavily vegetated. A transmission line easement passes in a north-south orientation along the eastern boundary of the SIMTA site. A smaller transmission line travels east-west along the southern boundary of the SIMTA site.

The Glenfield Waste Facility is boarded to the west by the existing South and Cumberland rail corridor, which also forms part of the Proposal site's Rail Corridor, on which works associated with additional rail infrastructure for the SSFL are currently underway. Further west of the rail corridor is Leacock Regional Park and then the residential areas of Casula east of the Hume Highway.

The East Hills rail corridor, which forms part of the Proposal site's Rail Corridor, forms the effective southern boundary for the Proposal site. South of this rail corridor, on the eastern side of Georges River, is Commonwealth land associated with the Defence Holsworthy. On the western side of the river, land south of the East Hills rail corridor forms part of the Glenfield Waste facility.

The nearest sensitive receptors include environment and users of open space land comprising the golf course on Commonwealth land west of Moorebank Avenue (i.e. MIC site), bushland on Commonwealth land within, to the east and to the south of the Proposal site, the Georges River east of the Glenfield area, and Leacock Regional Park to the west of the Glenfield area.

2.4 Topography and Drainage

The Proposal site is generally level with a slight slope to the south and west, away from a slight rise on the eastern side of the SIMTA site. Land immediately along the Georges River banks slopes towards the river.

The topography within the Glenfield Waste Facility has been largely modified by quarrying and landfilling activities. The access track along the eastern boundary of the Glenfield facility, which the Rail Corridor loosely follows, slopes up gradually to the north from just north of the fenced equipment enclosure to the formed high ground north of the current quarry face. From the northern side of the high ground there is a steep (formed) embankment down to a lower level occupied by the northern dam.

Within the Stage 1 site, open concrete-lined channels and box culverts ultimately drain to the Georges River, via the site's stormwater system or infiltrate unsealed ground surfaces. Commonwealth land south of the SIMTA site includes Anzac Creek, an east-west aligned low-lying area across the Commonwealth land south of the SIMTA site flows in a northeast and north direction to the Georges River approximately 5 km north of the site. The western extent of this feature appears to exist in the MIC site on the western side of Moorebank Avenue, where the creek appears to have been modified into a series of water features (dams/ponds), as shown on **Figure 4**.

Drainage within the Glenfield facility is either captured within two dams on site and presumably reused on site for activities such as dust control and possibly irrigation, or runs off following

ground surfaces to low points such as Georges River. Review of EPL 4614 for Glenfield Waste Disposals indicates that stormwater overflow discharges from the dams to Glenfield Creek and Georges River.

Some level of infiltration and water pooling is expected to occur in unsealed surfaces, consistent with the local soil permeability.

2.5 Geology

The Stage 1 site is reportedly underlain by Tertiary fluvial deposits comprising clayey sand and clay, as well as silty clay with some ironstone, with clay present to depths of at least 10 to 12 metres below ground surface (bgs). Surface cover material overlying the clay includes silty sand topsoil to approximately 0.3 m bgs and clay fill to variable depth between 0.5 m and 1.5 metres below ground surface (mbgs) (HLA 2002a, DP 2009a, DP 2009b).

The fluvial deposits of clayey sand and clay are present beneath the Rail Corridor lands south of the SIMTA site and east of the Georges River, while the western area including the Glenfield Waste Facility west of the Georges River, are reported to be underlain by Quaternary fluvial deposits of medium grained sand, clay and silt (Golder 2011a).

Quarrying at the Glenfield facility is reported to have removed a “significant portion” of quaternary sand deposits, which have been replaced by filling with waste materials including “building demolition, shredded car tyres and asbestos waste materials” (Golder 2011a).

Surface material and fluvial deposits are underlain at depth by shale (Golder 2011a) associated with Ashfield Shale deposits (DP 2009a). Registered bores immediately west of the Georges River, associated with the Glenfield Waste Facility, indicate sandy clay and sands to 10 m overlying shale to 20 m overlying sandstone to 30 m depth (Golder 2011a).

URS (2002b) report shale bedrock was encountered in the east of the SIMTA site, while sandstone bedrock was report in the southern portion of the SIMTA site.

Golder (2011a) have reported there is a low probability of acid sulfate soils beneath the rail corridor lands.

2.6 Hydrogeology

Regional groundwater is understood to flow within shale and alluvial deposits in a north and westerly direction towards the Georges River (Golder 2010). Two aquifers have been reported (DP 2009b and URS 2002a), comprising shallow and deep aquifers with groundwater at depths of approximately 6 to 11 mbgs. Golder (2010) report standing water levels for shallow groundwater in a sandy clay horizon of between 5.5 m and 5.8 m bgs.

On the Glenfield facility, west of the Georges River, it is anticipated that local groundwater flows will be influenced by extraction and filling at the site, with flow generally in an easterly direction towards the river. Licensed bores at the site encountered water at 8 to 10 m depth but are screened between 20 and 30 m depth (Golder 2011a).

URS (2002b) reported deeper groundwater generally exhibiting high salinity and therefore having little or no beneficial use. Shallow groundwater was reported to have lower salinity, potentially as a result of local recharge.

2.7 Acid Sulfate Soils

From a review of the Australian Soil Resource Information System (ACLEP, 2015), there is an extremely low to low probability of the presence of acid sulfate soil materials at or in the vicinity of the site, which is consistent with the geological and topographic setting of the site. No

indications of acid sulfate soils or potential acid sulfate soils were encountered during the soil sampling event.

3. Site History

The site condition information provided in this section has been summarised from the previous investigation reports listed in **Section 1.4**. The summary below focusses on the Proposal site, and is taken from information reported by Golder (2010 and 2011a) and Egis (2000):

3.1 Stage 1 and Former DNSDC South Area

- The area was first settled (by Europeans) around 1800, with Thomas Moore receiving a land grant in 1805 and setting up an estate called Moore Bank in 1809;
- In 1840, the property transferred to the Church of England and between 1840 and 1880 the Moore Estate land was cleared for pasture, farming, vineyards and orchards;
- The trustees of the Church of England subdivided the Moore Estate in 1888, and the blocks comprising Stage 1 were sold in the early 1890s, with the Department of Defence acquiring land as part of the Holsworthy complex in the early 1900s. Brooks (2002) reports land including the DNSDC was acquired in 1913 for Defence purposes, with the site reported to have been for military-related storage since 1915, with plans at the time indicating the area as a "Mobilisation Store";
- Records indicate Defence used the land in the Moorebank/Holsworthy area for Defence-related purposes from at least the late 1800s;
- A storage centre had been established in the 1940s where the former DNSDC operations were located, with the former DNSDC as such being established in the 1990s, which involved the removal of former structures to slab level and construction of updated storage facilities;
- Aerial photographs confirm development of storage facilities and roads within and adjacent to the Stage 1 site was underway in 1949 with buildings B10 and B11 visible as well as two similar sized structures to the south, and roads formed by 1951. The carpark south of the canteen had been formed by 1974. By 1994 the two buildings south of B10 and B11 had been replaced by a single large structure (possibly B16), and two small structures are present in the south of Stage 1. By 1998 a large building (possible B19) has been constructed south of the car park, with no discernible changes to the land between 1998 and 2008 aerial images;
- The southern portion of the Stage 1 site comprised bushland in 1949 and 1951 aerial photographs, but had been cleared by 1961;
- The southwest corner of the SIMTA site was reported as an unauthorised burial ground, designated H30:A2:c-3. Egis (2000) shows this area being within DNSDC South, shown as Area 1 on Figure 7. Burial pits in the southern section of the DNSDC were delineated in 1994 immediately south of the petrol, oil and lubricants (POL) store, where building B22 currently houses a dangerous goods store. The burial pit(s) in this area are reported to have potentially contained batteries as an old battery store was located in this area of the site. It is reported that while a large portion of material in burial pits at the DNSDC site was removed in the mid-1990's for proper disposal, it is understood not all burial pits were remediated at the time.
- The 1998 aerial photograph shows red structures located on the eastern portion of the Stage 1 site. These structures were identified as having magnetic properties during the Egis (2000) site inspection.

3.2 Southern Commonwealth and Rail Lands

- In 1949 and 1961 the area south and south-west of the SIMTA site was largely bushland with small access tracks, although some land clearing was evident immediately south of the SIMTA site;
- Based on aerial photographs, the RAE Golf Course (on the southern portion of the MIC site) is reported to have been developed by 1974 to the west of the SIMTA site, although Golder (2011a) report it was constructed in the late 1970s;
- The access track within the southern Commonwealth land parallel with Anzac Creek appears to have greater usage in 1994, and the East Hills rail line is now evident, including a rail siding entering the SIMTA site. The rail siding is reported to have been added in 1919 (Brooks 2002);
- A cleared area potentially containing rail-related infrastructure is visible south of the SIMTA site, which may correspond with the current filled RailCorp land north of the East Hills rail corridor;
- A portion of the bush area south of the former DNSDC area was transferred to RailCorp in the early 1990s and appeared to have been used for stockpiling during construction of the East Hills rail;
- No discernible changes in the land are reported between 1998 and 2011 aerial images;
- Information from online sources indicates the East Hills line terminated at East Hills until it was extended in the 1980s to join the Main South line at Glenfield Junction, which was opened in 1987.

3.3 Glenfield Facility

- The area west of the Georges River is reported to have comprised open farmland with crops and orchards evident in 1949 and 1961;
- Quarrying commenced in the mid-1960s, with extraction on the site initially using dredging to remove sand deposits after which excavations continued with open cut excavations through bedrock materials. Flooded excavations immediately west of the Georges River were evident in 1974 aerial photographs, and excavations well established by 1994 with several pits and processing areas evident;
- Although no changes are evident between 1994 and 1998, by 2011 filling activities commenced, with several areas rehabilitated and vegetated;
- Golder (2011a) report the Glenfield Waste Disposals site operated under Environmental Protection Licence (EPL) 4614 permitting non-thermal processing of general waste, waste storage and disposal, and material crushing, grinding and separating. Wastes permitted to be disposed at the facility included general solid non-putrescible waste, waste tyres and asbestos waste. EPL 4614 is still in force, following review of the Protection of the Environmental Operations (POEO) Act Public Register of licences maintained online by the EPA.

4. Previous Investigations

A brief summary of the previous investigations listed in **Section 1.4** is provided below for the Proposal site. It is noted that references to DNSDC in the previous investigations pertain to the former DNSDC site (i.e. the SIMTA site).

4.1 Egis (2000) Preliminary Site Investigation (PSI) of DNSDC

Egis (2000) included the following relevant to the area of investigation:

- Waste materials (unspecified) were reportedly removed from burial pits in the southwest of the DNSDC. There was considered to be a moderate to high risk of occurrence of contaminants in this area. Egis noted that potential contaminants could include unexploded ordnance (UXO) contamination and fragments of exploded ordnance waste (EOW), but considered that UXO contamination at the DNSDC was not an issue based on the age of the DNSDC, "as any UXOs would probably have been removed during the construction of the warehouses".
- The presence of five USTs identified and the kerbside refuelling area. No reference is made to the additional UST towards the western boundary of the refuelling area. Historical spillages were noted to have occurred in the refuelling area and the main UST area. This area was considered to represent a high risk of hydrocarbon contamination.
- The dangerous goods store B22 is noted, referred to as a POL, which were reported to drain to an oil-water separator. Risk of contamination associated with this area was considered low.
- A radiation store (B27) is reported to be located north of dangerous goods store B26.
- The open, grassed area east of B40 and B45 was not considered to be an area of potential concern.

4.2 URS (2002a) Assessment of DNSDC Buildings

The URS (2002a) assessment was reported as being supplementary to an Egis (2000) PSI of Areas A1 to A6 (March 2002), which is different to the abovementioned Egis (2000) PSI of the DNSDC area (September 2000), and which JBS&G has not cited. The Egis (2000) PSI report reviewed above refers to Area A2, the DNSDC area. Relevant information from URS (2002a) is summarised as follows:

- The report reviewed referred to a former DNSDC building layout plan in an appendix, however the plan itself was not included in the report provided to JBS&G. The former building layout plan may have been useful in identifying the former footprint of demolished buildings and the potential for ACM and lead paint impacts.
- The northeast of building B16, reportedly contained a solvent treatment and preservation operation including storage of solvents in above ground storage tanks (ASTs) in an underground basement, with two underground oil-water separators nearby. The concrete floor of the basement was reported to be in good condition.
- Page 6-1 of this report was missing, which is suspected of including a portion of Table 2 containing information relating to potential contamination sources associated with the southern portion of the Stage 1 site referred to as areas of concern Items P33, P34 and P35 relating to the former burial grounds south of DGS B22 that extend into DNSDC South (P33), the DGS at B22 (P35) and the kerbside refuelling area and USTs (P34).

4.3 HLA (2002a) Soil and Groundwater Investigation, Precinct H DNSDC

The results of the HLA (2002a) investigation of the DNSDC site, referred to as Precinct H of the broader Commonwealth land in Moorebank, were utilised in preparation of the URS (2002b) investigation review report summarised below. HLA performed the investigations under the direction of URS. Results are summarised in the following section.

4.4 URS (2002b) Investigation Review Report DNSDC

URS (2002b) utilised the HLA (2002a) and Milsearch (2002) results, with the scope for each developed by URS acting as Principal Environmental Advisor to the Defence Property Disposal Task Force (PDTF). Relevant information is summarised as follows (refer to **Figures 6a** and **6b** for historical site locations):

- The investigation adopted a judgemental strategy targeting areas of potential concern reported previously by Egis (2000) and URS (2002a), as well as a broad assessment of fill, soils, sediment and groundwater, and a UXO hazard analysis and investigation in potential areas impacted by former waste burial. It is noted that risks of impacts to soils from the radiation sources noted in previous investigations was considered to be very low based on the type of radioactive materials reported to be contained in the store (i.e. Class 7 radioactive materials on/in watches and indicators). As such, radiation analysis was not considered to be required.
- The greatest filling was identified in the southern area of the DNSDC, particularly the southeast area. The average depth of fill was reported as approximately 1 m while the greatest fill depth was 2.2 m bgs in test pits excavated in the southeast of the DNSDC, outside the Stage 1 site. The fill material in boreholes within the Stage 1 site generally comprised silty sand with gravel, while fill in the southeast (outside the current investigation area) included various waste materials including ACM.
- The whole of the areas south of the USTs (B21) and the DGS (B22) within the Stage 1 site, extending to the boundary with DNSDC South, was subject to ground-based geophysical survey. Based on Figure 4a in the report, no anomalies were identified within the Stage 1 site. Anomalies elsewhere were subject to intrusive investigation by excavation of test pits and trenches. Further information from Milsearch (2002) is provided below.
- Asbestos fragments were reported in surface soil at BHH004, adjacent the northwest corner of building B11 (Figure 6a). Asbestos fibres were not reported in the soil sample, and no other observations regarding asbestos on ground surfaces were reported.
- Monitoring wells were installed in a reported downgradient direction from the refuelling area and USTs where “significant contamination” was observed in soils, at locations BHHP34002 and BHHP34011, as shown on Figure 6b. The two wells noted reported elevated TPH, BTEX, PAHs and metals (copper, lead, nickel and zinc) exceeding adopted criteria. Phenols were also reported in groundwater in BHHP34011 within the refuelling area. No PSH was reported.
- Reference to HLA (2002a) indicates that elevated photoionisation detector (PID) readings and hydrocarbon odours were recorded at other locations during soil boring within the refuelling and UST area. The highest PID readings and strong hydrocarbon odours were recorded in BHHP34011 in the south of the refuelling area.
- Drilling logs provided by HLA (2002a) for boreholes drilled into the mounded material which the former meat store sits on, indicates the presence of up to 1.6 m of fill including sandy clay and gravel and some black ash fragments. Refusal on concrete or other obstructions occurred at both locations (BHH033 and BHH034).

- Low level hexachlorobenzene (HCB) (2.26 mg/kg) contamination was noted from soil collected from TPH013, south east of B26.
- Recommendations made by URS that relate to the Stage 1 site include further groundwater monitoring across the DNSDC and further investigation of the refuelling/UST area, and consideration of the Milsearch (2002) ordnance investigation outcomes during future development. These actions were to be incorporated into a Site Management Plan (SMP) for implementation at the site.

4.5 CM (2002a and 2002b) Site Audit, DNSDC

Mr Bill Ryall of CM undertook a Site Audit resulting in preparation of a Summary Site Audit Report (CM 2002a SSAR) and Site Audit Statement (CM 2002b SAS) relating to the DNSDC area. CM (2002a) concurred with the findings and recommendations of URS (2002b), and the SMP requirements as reported by URS (2002b) were noted as a condition of the CM (2002b) SAS certification that the DNSDC site was suitable for commercial/industrial use.

4.6 EES (2002a and 2002b) Memorandums, DNSDC

EES (2002a) prepared a memorandum following review of Egis (2000), Milsearch (2002), HLA (2002a) and URS (2002a). The memorandum presented a summary of key findings and did not make any conclusions with regards to contamination, other than to note that the targeted investigations by HLA (2002a) were appropriate for a “first pass assessment” but that further grid based sampling would be required should the land use change in future.

EES (2002b) prepared another memorandum following review of URS (2002b) and the CM (2002b) SAS. The memorandum provided an outline of key investigation findings including reference to the SMP requirements recommended by URS and included as conditions on the SAS. It was noted that, technically, site audits under the NSW Contaminated Land Management Act (CLM Act) do not have any jurisdiction on Commonwealth land, and that it was unusual for a SAS to have “so many conditions”. EES noted that “a significant amount of work is still required before the magnitude of some of the issues (and how best to address them) is identified”.

4.7 Milsearch (2002) Ordnance Investigation

Milsearch completed an ordnance investigation and hazard analysis of approximately 82 ha of the DNSDC site, including portions of the Stage 1 site. Relevant findings are summarised below:

- No geophysical anomalies were noted south of the USTs. Anomalies noted were south of DGS B22 towards the southeast of the DNSDC. The nearest anomalies, comprised two small pits (6m x 3m x 2m deep) containing building rubble with large sections of reinforced concrete (southeast of B22) and one pit (84m x 6m x 5m deep) containing general stores rubbish including shelving, metal mugs, building tie bars, small arms ammunition boxes (all empty) and remnants of old building material (south and east of B25 and B26).
- During the investigation, apart from a number of small empty arms ammunition boxes (outside the current investigation area), no munitions or munitions related material was encountered.
- A draft aerial photographic analysis prepared by Milsearch in August 2002 noted that some burial pits from the 1950s located south of new POL (DGS) stores probably remain close to and south of the new facilities, reporting “Thiess decided not to remediate beyond the new facility footprint”. The subsequent geophysical assessment suggests that there are no such pits in the southern portion of Stage 1.

4.8 DP (2009a) Summary Environmental Conditions, DNSDC

DP prepared a summary of environmental conditions within the DNSDC for the proposed intermodal freight terminal. The report did not provide any additional information or data in previous investigation reports to that reported herein. DP did not review the HLA or Egis reports. It was noted that DP were not aware whether any identified areas of environmental concern (AECs) from previous investigations had been addressed or whether the previously recommended SMP had been developed.

DP (2009a) recommended addressing outstanding items associated with the identified AECs, and any potential contaminating activities since the 2002 investigations.

4.9 Golder (2010) Phase 1 ESA, Stage 1A

Key historical information from the Golder (2010) assessment of the Stage 1A area has been incorporated into the site history (**Section 3**) herein, and the summary findings from previous investigations incorporated above where appropriate. Stage 1A in this report pertains to the western portion of the Stage 1 site. Additional key information from this report is summarised below:

- As noted in Section 3, the southwest corner of the DNSDC was reported as an unauthorised burial ground, with burial pits south of the existing dangerous goods store(s) potentially containing old batteries. As noted above (Section 4.7), Milsearch did not identify any such burial pits south of DGS B22, although some substantial burial areas were identified to the south and east of DGS B25 and B26.
- The buildings and structures present in the Stage 1A area had not changed function, type or use since 2000. Building B5 as referred to by Golder as being occupied by Defcredit was subsequently occupied by Defence Bank, following a name change in 2012. This building is constructed of fibre cement potentially comprising ACM.
- The canteen (B4) has a grease trap located outside of the southern end of the building.
- An in-ground fat collection pit is located outside the southern end of the former meat store (B20). The pit is reported to have collected fat and other remains washed from food cutting/preparation benches inside the building. JBS&G noted during site inspection that this building rests on a filled mound raised above the surround ground levels.
- Of the five USTs west of the refuelling area, tanks T1, T4 and T5 store diesel and tanks T3 and T4 store ULP. One of the ULP tanks (T4) is reported to have been re-lined approximately 2007 to 2008 as it was partially rusted. Defence observed fuel losses however the volume of fuel loss is not known.
- Five diesel and six ULP fuel dispensers were noted within the refuelling area, with two diesel dispensers at the western boundary appearing to be served by an additional UST adjacent these two dispensers. An oil-water separator is noted in the northeast of the bowsers with oil being capture in an in-ground tank of unknown volume. The oil is pumped out as required. It is not known where water from the separator discharges. JBS&G notes that an absorbent sock/boom enclosed a surface water drainage pit in the grassed area outside the refuelling area, immediately northeast of the separator.
- Golder identified the following potential areas of contamination:
    - The grease trap south of the canteen;
    - ACM associated with the Defence Bank building;
    - The in-ground fat collection pit south of the former meat store;

- Leaks and spills within the DGS (B22) which drain to the in-ground collection pit northeast of the store;
- USTs east of the refuelling area, particularly given the reported ULP fuel loss from T4;
- Hydrocarbon spillage at the refuelling area and the additional UST in this area; and
- Potentially buried waste as well as pest and/or weed control in the remaining site areas.

4.10 Golder (2011a) Phase 1 ESA, SIMTA Rail Corridor Land

Key historical information from the Golder (2011a) assessment has been incorporated into the site history (**Section 3**) herein, and the summary findings from previous investigations incorporated above where appropriate. Additional key information is summarised below:

- Council records from Liverpool City Council note that Council have been provided information indicating the presence of contamination on the land, which may restrict development;
- Anecdotal information referred to a diesel spill at the refuelling area (within the Stage 1 site) sometime in 2004 to 2005. The spill was reportedly localised to the area of the USTs and surface impacts were cleaned. Golder noted that there was the potential for underlying soils to be contaminated by the spill. While Golder referred to the spill at the refuelling area, reference to this occurring at the USTs (plural) suggests this relates to the USTs immediately east of the refuelling area.
- No ASTs or USTs were noted at the Glenfield quarry and landfill area.
- Several fragments of potential ACM were identified by Golder on the ground surface in areas immediately west of the current rail spur (siding), although the exact location is not identified. Consequently it is unclear if this relates to land west of the rail siding within the eastern portions of the DNSDC South or southern Commonwealth land areas. JBS&G also identified suspected ACM on the ground surface in the northern bushland portion of RailCorp land, south of the southern Commonwealth land, considered to be in a different location to that described by Golder (2011a).
- Several asbestos containing building were removed from the DNSDC in the early 1990s, however Golder were advised that most of these were located in the centre of the DNSDC site, where the main warehouse is currently located, which is consistent with previous investigation findings for this area of the DNSDC.
- Golder considered that asbestos contamination in the East Hills rail corridor was unlikely given this line was constructed in the late 1980s.
- The Glenfield landfill leachate system directs collected leachate to a dam on the eastern boundary, where it is allowed to evaporate or is re-circulated by irrigation of tip faces or re-injected, or disposed off-site via tanker to licensed facilities.
- There is the potential for UXO and EOW in the bushland south of the DNSDC (Area 2b), given prior observations of grenade fragments, consistent with previous reports, although Golder's figure (used for **Figure 7** of this report) indicates the former grenade range is outside the rail corridor area.
- RailCorp land immediately north of the East Hills rail corridor had been filled to between 2 and 2.5 m above the surrounding ground level, and illegal waste dumping had also occurred in this area, consistent with JBS&G observations.

- Golder report that current operations at Glenfield do not involve large volumes of asbestos waste materials. When received, such materials are placed in the lower levels of the waste cells.
- Golder (2011a) concluded there were five areas of concern, as shown on **Figure 7**:
  - Area 1 – DNSDC South, where partially remediated areas of dumping (filling) may have occurred;
  - Area 2 – southern Commonwealth land comprising bushland, where potential UXO and EOW associated with the former grenade range (designated Area 2b by JBS&G, Figure 4), with other bushland areas (designated Area 2a by JBS&G) subject to potential and observed illegal dumping;
  - Area 3 – RailCorp land subject to extensive filling, and illegal dumping;
  - Area 4 – former mock Viet Cong village used for training, located in the southern portion of the RAE golf course, outside the investigation area and beyond the northern extent of the rail corridor land, as shown on **Figure 7**;
  - Area 5 – Glenfield Waste Disposal facility subject to quarrying and landfilling; and
  - Potential unidentified waste burial as well as use of pesticides and herbicides for pest and/or weed control across the site.
- Golder recommended Phase 2 intrusive investigation of soil and groundwater in the rail corridor lands, and development and implementation of a contamination management plan (CMP) for the development stage to enable appropriate management of contaminated materials, waste disposal, landfill gas management and management of waste materials in the Glenfield area, and contingencies for unexpected finds.

4.11 Golder (2011b) Preliminary ESA, SIMTA Site and Rail Corridor

This was a brief letter report to address Director General's Requirements (DGRs) for the proposed development in regards to contamination and potential acid sulfate soils (PASS). The report did not present any further Phase 1 investigations; rather it presented a summary of key findings from previous environmental investigations. No new findings in addition to any already note herein were reported.

Golder recommended that confirmation of any actions recommended by Milsearch (2002) regarding low risk ordnance issues be undertaken as part of detailed design development for the project, and that further detailed investigation of identified AECs that are likely to impact on the development. These investigations were recommended to be based on detailed design for the development and aim to identify the extent of contamination and remediation actions required, matching these requirements to the development of the site. The additional investigations would also facilitate preparation of a CMP (previously recommended by Golder (2011a).

It was noted that the review and investigation by Golder (2011b) did not identify "significant environmental issues which would preclude the currently proposed development of the SIMTA site and associated rail corridor".

4.12 PB (2014) Phase 2 ESA, Moorebank Intermodal Terminal

Moorebank Intermodal Company (MIC) commissioned Parsons Brinckerhoff (PB) to undertake a Phase 2 ESA for the proposed Moorebank Intermodal Terminal (IMT). The objectives of the ESA were to assess and characterise the nature and likely extent of contamination at the Moorebank IMT, assess the suitability of the Moorebank IMT for the proposed future land use and provide

sufficient information to enable the provision of a remediation action plan (RAP) and construction environment management plan (CEMP) to be prepared.

The MIC site lies west of Moorebank Avenue and the SIMTA site (refer to **Figure 1**). The southern portion of the site is known as Steele Barracks, which houses the School of Military Engineering (SME). This investigation included the assessment of the southern portion of the MIC site that includes the golf course land immediately north of the East Hills Railway line which forms part of the Proposal site's Rail Corridor.

In relation to the Proposal site's Rail Corridor, the following were noted:

- An unexploded ordnance (UXO) assessment was undertaken across the site with UXO artefact finds reported within the Proposal site's Rail Corridor. These finds were considered to contain explosive ordnance waste (EOW), particularly blank ammunition as a result of close training activities. All detected items were confirmed as inert training ordnance with the appearance of UXO/EOW. Based on specialist advice provided by G-Tek, the Moorebank IMT site has a very low potential to contain remnant UXO/EOW containing high explosive or other energetic material other than propellants/primers in unfired/misfired small arms ammunition (SAA) blank cartridge cases. Items of military origin which have the appearance of UXO/EOW may cause concern if encountered during redevelopment works; however the occupational health and safety risk of such items is considered to be perceptual rather than actual;
- The geology at the MIC site consisted of localised fill with variable alluvial deposits. Saturated horizons were encountered between 7 and 15 mbgs within the natural alluvium;
- Sampling within the Proposal site's Rail Corridor and its immediate surrounds was limited to a hand auger location (i.e. PB_HA14) and two test pit locations (i.e. PB_TP35 and an unlabelled location). The three locations were located at the Georges River Compound (refer to **Figure 1**); and
- Based on the figures summarising the findings of this report, the samples collected from within the Proposal site's Rail Corridor did not have contaminants of potential concern (COPC) concentrations above the adopted commercial/industrial criteria.

4.13 JBS&G (2015) Phase 2 ESA, SIMTA Intermodal Terminal Facility – Stage 1

JBS&G was engaged by Tactical on behalf of Qube Property Management Services (the client) to conduct a supplementary Phase 2 Environmental Site Assessment (ESA) within the Proposal site of the proposed Sydney Intermodal Terminal Alliance (SIMTA) Intermodal Terminal facility at Moorebank, NSW (the Stage 1 Proposal).

The overarching objective of the ESA is to assess potential human health and environmental risks from contamination at the Proposal site to enable development of a RAP and a CMP to aid in management of contaminated material during the staged site development, such that on-site management of contaminated material is maximised within the development layout.

Key historical information from the JBS&G (2015) assessment has been incorporated into the site history (**Section 3**) herein, and the summary findings from previous investigations incorporated above where appropriate. Additional key information is summarised below:

- A review of the Australian Soil Resource Information System indicates that there is an extremely low to low probability of the presence of acid sulfate soil materials at or in the vicinity of the Proposal site. No indications of acid sulfate soils or potential acid sulfate soils were encountered during the soil sampling event.

- Most of the reported concentrations of the COPCs for soil samples from previous and current investigations were below the adopted human health commercial / industrial criteria. Only one soil sample had a concentration above the human heath criteria. This sample was collected from the north-western portion of the Glenfield Waste Facility site. This area will require further management to mitigate potential risks to future workers during the development of this area of the Proposal site.
- ACM was positively identified on the surface on the north-western corner of building B11 (Stage 1 site), and in fill at 0.3-0.4 mbgs at a test pit on the north of the East Hills rail corridor (i.e. southern portion of the MIC site) (see **Figures 11a** and **12**). The ACM find adjacent building B11 may be related to degrading or historical building infrastructure. The ACM find at the southern portion of the MIC site may be related to historic burials or filling activities. The ACM finds have the potential to pose a risk to future workers at the site should the ACM be disturbed.
- Selected soil samples taken from within the Stage 1 site and to the north of the East Hills rail corridor (i.e. southern portion of the MIC site) have concentrations exceeding the adopted heavy metal ecological criteria for commercial / industrial land. However, given that the Proposal site will remain as a commercial / industrial site and is assumed to include large building structure and extensive hardstand areas with limited areas of (environmental) concern, the exceedance of ecological criteria was not considered to pose an unacceptable risk to the environment nor necessitate further remediation. Similarly, the ecological heavy metal exceedances reported in groundwater was not considered to pose an unacceptable risk to environmental receptors as the heavy metal concentrations are considered to be representative of background concentrations in groundwater in urban areas of Sydney.
- The refuelling area within the Stage 1 site was noted to have significant contamination in the form of LNAPL. This may have resulted from historical leaks from the underground storage tanks. Impacts in this area of the site may pose a potential risk to future workers at the site. It was proposed that this area be remediated to the extent practicable prior to or in parallel with the planned development work. This should include the decommissioning of all above and underground petroleum distribution and storage infrastructure.
- Impacts reported for the Proposal site (excluding RailCorp-owned land) that will require management include the ACM finds at the southern portion of the MIC site and at the Stage 1 site, the lead soil concentrations reported from one location at the Glenfield Waste Facility, and the petroleum related impacts at the refuelling area within the Stage 1 site.
- Based on the findings, the site was considered suitable for ongoing commercial / industrial use subject to the limitations and management of the impacts discussed above. There was no noted gross or widespread contamination that would unreasonably restrict development and use of the site.
- It was recommended that a RAP be developed to address the aforementioned impacted areas to minimise the risk to future workers at the Proposal site. As a precautionary measure, it was also recommended that an unexpected finds protocol be incorporated in future site management plans to ensure the protection of future on-site workers.

5. Extent of Remediation

5.1 Extent of Site Contamination

5.1.1 Soil

5.1.1.1 Bonded ACM Impacted Surfaces and Soils

Non-friable (bonded) ACM was positively identified on the ground surface at the north-western corner of building B11 (Stage 1 site), and in fill at 0.3-0.4 mbgs at a test pit on the north of the East Hills rail corridor (i.e. southern portion of the MIC site) (see **Figures 11a** and **12**). The ACM found near building B11 may be related to degrading or historical building infrastructure. The ACM find at the southern portion of the MIC site may be related to historic burials or filling activities.

It is anticipated that the surfaces that may be subject to remediation and validation for ACM within the Stage 1 site will be those areas adjacent to previous or current buildings (see **Figure 3**).

The ACM potentially related to historic burials or filling activities, noted in soil of the north of the East Hills rail corridor (i.e. southern portion of the MIC site), will require the characterisation, remediation and validation of the Rail Link area within this portion of the Proposal site (see **Figure 14**) as this area will be disturbed during construction and/or operation of the Proposal site. The potentially impacted material has an approximate area of 2.5 ha and a depth of approximately 0.7 mbgs. It is noted however, that investigations to date suggest that ACM impact in this area is not widespread. The potentially impacted material will be managed via the CMP either through the excavation and remediation or excavation and on-site containment of the potentially ACM impacted materials. Should the subsurface of this area be left undisturbed, then a visual validation and clearance of the ground surface for ACM will suffice.

5.1.1.2 Hydrocarbon Impacted Soils

Given the noted impacts in soil and groundwater at the refuelling area and UST tank farm (refer to **Section 4.13**), it is highly likely that the soil surrounding fuel storage and distribution infrastructure (refer to **Figure 15**) in this area has been impacted by hydrocarbons and other petroleum related COPCs.

Should impacted soils be identified during the decommissioning and removal of fuel storage and distribution infrastructure in these areas, impacted soils will require to be chased out from the walls and base of the excavations formed. It is anticipated that the infrastructure to be decommissioned and removed includes USTs, bowsers, fill points, oil/water separator systems, bowsers and fuel lines.

5.1.1.3 HCB Impacted Soils

Hexachlorobenzene (HCB) was reported in test pit TP013 located on the south eastern corner of the Stage 1 site (URS 2002b) (refer to **Figure 6B**). The concentration noted (i.e. 2.26 mg/kg) is below the NEPC (2013) commercial / industrial criteria (80 mg/kg). It is noted, however, that the SAS (CM 2002b) states that HCB should be included as a COPC during the '*remediation of the southern part of the site adjacent to the rail spur*'. Furthermore, as HCB is considered to be a scheduled chemical in the *Waste Classification Guidelines Part 1: Classifying Waste* (NSW EPA 2014), should waste soil be generated from construction work conducted in this area, the management of HCB impacted waste soils will need to be in accordance with the EPA's scheduled chemical wastes chemical control order 2004. The management of potentially HCB impacted soils that may be disturbed during the construction works will be included in the CMP.

5.1.1.4 Heavy Metal Impacted Soils

Table 5.2 below lists the areas of the Proposal site (excluding RailCorp-owned land) that are impacted by metals.

Table 5.2: Summary of Soil Impacts - Metals

Area of Concern	Sample Location / ID	Sample Depth	Human Health Criteria Exceedances	Ecological Criteria Exceedances
Stage 1 site – north of B25	BHHP3600101	0.1-0.2	-	Copper (207 mg/kg)
Stage 1 site – east of B26	TPH01403	1-1.1	-	Zinc (784 mg/kg)
Stage 1 site – south of B26	TPI00203	1-1.1	-	Zinc (133 mg/kg)
Glenfield Waste Facility	TP49	2.8-3.0	Lead (2 000 mg/kg)	Zinc (290 mg/kg)

Selected soil samples taken from within the Stage 1 site and to the north of the East Hills rail corridor (i.e. southern portion of the MIC site) have concentrations exceeding the adopted heavy metal ecological criteria for commercial / industrial land. However, given that the Proposal site will remain as a commercial / industrial site and will include large building structures and extensive hardstand areas with limited vegetated areas that may be exposed to these isolated locations, the exceedance of ecological criteria is not considered to pose an unacceptable risk to the environment nor necessitate further remediation.

Only one sample from within the Proposal site had an exceedance of the adopted human health criteria for lead. This sample was collected from a depth of 2.8 - 3.0 mbgs in the north-western portion of the Glenfield Waste Facility (refer to **Figure 12**). Based on the draft bulk earthworks plan (**Appendix D**), it has been assumed that proposed Stage 1 construction work will not require the disturbance of the subsurface in this area. In addition, as the soil impacts are above the groundwater table in this area and the proposed use of this area will involve rail infrastructure including embankments with ballasts, it is considered unlikely that this reported impact in soil will pose a risk to human health. However, should the construction work in this area require excavation in this area, the potentially impacted soils will need to be managed under the CMP.

5.1.2 Groundwater

The dissolved metal concentrations that exceed the adopted ecological criteria have been reported in groundwater within the Proposal site. These exceedances are not considered to pose an unacceptable risk to environmental receptors as the heavy metal concentrations are considered to be representative of background concentrations in groundwater in urban areas of Sydney.

Historical leaks from the underground storage tanks may have resulted in the noted contamination in the form of LNAPL at the refuelling area within the Stage 1 site. Impacts in this area of the site may pose a potential risk to future workers at the site. It is proposed that this area be remediated to the extent practicable as discussed in **Section 5.1.1.2**.

Table 5.3 summarises the reported impacts in groundwater that require management / remediation at the Proposal site (excluding RailCorp-owned land).

Table 5.3: Summary of Groundwater Impacts that Requires Management / Remediation

Area of Concern	Sample Location / ID	Human Health Criteria Exceedances	Ecological Criteria Exceedances
Stage 1 site - refuelling area Refuelling Area	MW03	Light non-aqueous phase liquid (LNAPL) (2.865 m)	
	BHHP34011	LNAPL (0.684 m)	

5.1.3 Data Gaps

There is no data available for the RailCorp-owned land located east of Moorebank Avenue (refer to **Figure 2**). As such, there may be potential unidentified contamination risks within the RailCorp-owned land associated with the anecdotal but as yet unconfirmed disposal of waste and burning

of wooden railway sleepers. Typical rail-related COPC in fill materials include heavy metals, asbestos, TPH, PAHs, phenols and OCPs, and are readily able to be managed through standard industry approaches including off-site disposal and on-site reuse or containment/management. There are general waste immobilisation approvals for copper-chrome-arsenate (CCA) and creosote treated timber wastes. Further intrusive investigations can be conducted prior to the implementation of the remediation program. It is noted that specific RAPs may be required to be developed depending on the findings of data gap investigations.

5.2 Remediation Extent

On the assumption that the subsurface of the AEC with reported impacts (refer to **Section 5.1**) will not be disturbed during the development and operation of the Proposal site and that the noted subsurface impacts can be managed via a CMP, only the following areas will be subject to remediation:

- Stage 1 site and the Rail Link area of the southern portion of the MIC site (**Figure 14**) - ground surfaces for ACM;
- Refuelling facility and UST tank farm – decommissioning and removal of fuel storage and distribution infrastructure and remediation and validation of impacted soils and LNAPL to the extent practicable.

There are other underground pits/tanks within the Stage 1 site. This includes the in-ground fat collection pit on the southern boundary of the former meat store (B20), the in-ground concrete tank north of the DGS (B22) and the two oil/water separators near the treatment and preservation area in B16. These structures will require decommissioning, removal, remediation and validation.

The extent of remediation and validation is summarised below:

- Stage 1 site - ground surfaces adjacent to former or current buildings;
- Southern portion of the MIC site – ground surfaces of at the Rail Link portion of the site as shown on **Figure 14**;
- Refuelling facility and UST tank farm – excavation areas associated with the decommissioning and removal of fuel storage and distribution infrastructure as shown on **Figure 15**; and
- In-ground collection pits and oil / water separators near / within B16, B20 and B22 – excavation areas.

It is noted that other unexpected impacts or structures may exist within the Proposal site that may be potential sources of contamination or be indicators of contamination. Should these be encountered, an unexpected finds protocol should be implemented (refer to **Section 10.6**).

6. Remediation Criteria

The remediation criteria detailed in the sections below are applicable to the whole Proposal site given the intended commercial / industrial land use.

6.1 Soil Remediation Criteria

Current requirements for remediation have been broadly established based on identified exceedances of site adopted published soil health-based investigations levels. Summary tables of historical analytical results for soil are provided in **Appendix C**. Analytical results have been assessed against published commercial/industrial investigation levels sourced from the NEPC (2013) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM).

6.1.1 Health Investigation Levels

The NEPC (1999) NEPM provides risk-based Health Investigation Levels (HIL) for selected organic and inorganic chemicals in soils. Different levels are provided for a variety of exposure settings including residential, open-space / parks / recreational and commercial / industrial land uses. The NEPM HILs have been developed to be protective of human health and do not take into account environmental concerns.

The NEPM was revised in 2013 and based on the proposed future land use of the site, it is considered the NEPM HIL Level D values (for commercial / industrial use, including premises such as shops, offices, factories and industrial sites) are the appropriate health based investigation levels for assessment of soil analytical results.

6.1.2 Health Screening Levels

The NEPM HILs do not provide investigation levels for benzene, toluene, ethylbenzene, total xylene and unspeciated TPH. However, health screening levels (HSLs) are provided in the NEPM (NEPC, 2013) for these analytes. The HSLs are applicable to assessing human health risk via the inhalation pathway. They apply to different soil types and depths. The applicable HSLs for the remediation program is considered to be the HSL D for commercial / industrial use.

6.1.3 Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs)

The revised NEPM (NEPC, 2013) requires that ecological assessment be considered on all sites, even those with no significant ecological environments. Ecological Investigation Levels (EILs) and the Ecological Screening Levels (ESLs) are applicable for assessing risk to terrestrial ecosystems. ESLs in particular, are provided for several land use scenarios and soil types. The EILs and the ESLs for the commercial / industrial land use is considered relevant for the site.

Both the EILs and the ESLs are relevant for the root zone in soil which corresponds to the top 2 m of the finished level of the site.

6.1.4 Petroleum Hydrocarbon Management Limits

'Management Limits' have been provided in the revised NEPM (NEPC 2013) to avoid or minimise the potential for the following:

- Formation of observable LNAPL;
- Fire and explosive hazards; and
- Effects on buried infrastructure.

The application of the management limits require consideration of the depth of building basements, services and depth to groundwater. It is considered that any future developments at the site will not include the construction of a basement. As such, it is considered relevant that the

'Management Limits' will only apply to the first 2 m of the site to ensure that buried infrastructure is taken into account.

6.1.5 Selected Criteria – Soil

A summary of the selected remediation criteria for soil is shown in **Table 7.1** below.

Table 6.1: Soil Criteria (all units in mg/kg)

	Limit of Reporting	Laboratory Method	HIL D	HSL D[d]	EIL and ESL Commercial and Industrial	Management Limits Commercial and Industrial
METALS						
Arsenic	2.0	ICP-AES (USEPA 200.7)	3 000	-	160	-
Cadmium	0.4		900	-	-	-
Chromium (VI)	5.0		3 600	-	323[g,h]	-
Copper	5.0		240 000	-	113[h]	-
Nickel	5.0		6 000	-	60[h]	-
Lead	5.0		1 500	-	1 963[h]	-
Zinc	5.0		400 000	-	132[h]	-
Mercury (inorganic)	0.05	Cold vapour ASS (USEPA 7471A)	730	-	-	-
PETROLEUM HYDROCARBONS						
F1[a]	10	Purge Trap-GCMS (USEPA8260)		260	215[c,e]	700[e]
F2[b]	50			NL	215[c,e]	1 000[e]
F3	100			-	1 700[e]	3 500[e]
F4	100			-	3 300[e]	10 000[e]
BTEX						
Toluene	1.0	Purge Trap-GCMS (USEPA8260)		NL	135[e]	-
Ethylbenzene	1.0			NL	165[e]	-
Xylenes	3.0			230	180[e]	-
Naphthalene	1.0	GCMS (USEPA8270)		NL	370	-
Benzene	1.0	Purge Trap-GCMS (USEPA8260)		3	75[e]	-
POLYCYCLIC AROMATIC HYDROCARBONS						
Benzo(a)pyrene	0.05	GCMS (USEPA8270)	40	-	1.4[e]	-
Total PAHs	1.55		4 000	-	-	-
PHENOLS and CRESOLS						
Phenol	1.0	GCMS (USEPA8170)	240 000	-	-	-
Pentachlorophenol	1.0		660	-	-	-
Cresols	1.0		25 000	-	-	-
ORGANOCHLORINE PESTICIDES						
Aldrin + Dieldrin	0.2	GCECD (USEPA8140,8080)	45	-	-	-
Chlordane	0.2		530	-	-	-
DDT + DDD + DDE	0.2		3 600	-	640[f]	-
Endosulfan	0.2		2 000	-	-	-
Endrin	0.2		100	-	-	-
Heptachlor	0.2		50	-	-	-
HCB	0.2		80	-	-	-
Methoxychlor	0.2		2 500	-	-	-
Mirex	0.2		100	-	-	-
Toxaphene	0.2		160	-	-	-
ORGANOPHOSPHORUS PESTICIDES						
Atrazine	0.2	GCMS (USEPA8141,8270)	2 500	-	-	-
Chlorpyrifos	0.2		2 000	-	-	-
Bifenthrin	0.2		4 500	-	-	-
HERBICIDES						
2,4,5-T			5 000	-	-	-
2,4-D			9 000	-	-	-
MCPA			5 000	-	-	-

MCPB			5 000	-	-	-
Mecoprop			5 000	-	-	-
Picloram			35 000	-	-	-
PCBs						
PCBs (total)	0.9	GCECD (USEPA8140,8080)	7	-	-	-
OTHER						
Asbestos	0.1g/kg	PLM / Dispersion Staining	No asbestos on ground surface. ACM must be less than 0.05% w/w. Asbestos fibres / fibrous asbestos must be less than 0.001% w/w.			

Notes:
a = C6-C10 minus BTEX
b = >C10-C16 minus naphthalene
c = ESLs are of low reliability except where indicated by 'c', which indicates that the ESL is of moderate reliability
d = HIL D, sand 0m to <1m. For other soil types and depths, refer to Table 1A(3) of Schedule B1 in NEPC (2013)
e = values for coarse soil texture used
f = Guideline for DDT only
g = Guideline for Chromium
h = Calculated using the ambient background concentration (ABC) from the 25th percentile of background concentrations for NSW Urban Soils (old suburbs, high traffic) in Olszowy, et.al (1995) + the most conservative added contaminant limits (ACL) from Schedule B1 in NEPC (2013).
NL = Not limiting
ESL = Ecological Screening Level provided in NEPM (2013)
HIL D = Health Investigation Levels (HILs) for petroleum hydrocarbons for commercial/industrial land use provided in NEPM (2013)
HSL D = Health Screening Levels (HSLs) provided in NEPM (2013) for petroleum hydrocarbons for commercial/industrial land use.

The results of asbestos observations and analysis will be assessed by visual presence or absence of visible fragments, or laboratory detection of fibres or fragments in soil.

6.1.6 Application of Soil Criteria

For soil to be considered as validated (i.e., not posing an unacceptable risk) all reported concentrations should ideally be below the site validation criteria.

NEPC (2013) notes the following with regards to the application of the HILs and HSLs;

- HILs and HSLs are not 'clean up' or response levels, nor desirable soil quality criteria;
- The HILs and HSLs are concentrations of contamination above which further investigation and evaluation is required; and
- HILs and HSLs are intended to be triggers to consider the appropriateness of development of a site specific risk based approach or site management options when they are exceeded.

In addition, the NEPM (NEPC, 2013) allows for a pragmatic approach in the consideration of risks in context with planned land use, particularly commercial / industrial sites where substantial hardstand areas and/or structures will reduce the use of vegetation that may otherwise be potentially exposed to contaminant levels in soils exceeding EILs or ESLs.

As such, where the validation criteria adopted herein are exceeded, further remediation and validation, or evaluation of risk, will be required.

In addition consideration shall be given to the presence of odorous or discoloured soils (caused by contamination), and aesthetic issues.

6.2 Groundwater Criteria

Groundwater impact has been identified based on investigation levels selected from environmental and human health based guidelines, as described below:

6.2.1 Environmental Guidelines

Investigation levels have been adopted from the Australian and New Zealand Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* to evaluate the site groundwater analytical results. These guidelines provide environmental based trigger values for concentrations of organic and inorganic chemicals in freshwater and marine aquatic environments.

As the nearest surface water body to the site is the Georges River, the trigger levels for freshwater aquatic ecosystems have been adopted. It is considered that ecosystems with high conservation value are not present in the investigation area and therefore the 95% level of protection has been adopted.

6.2.2 Human Health Guidelines

The revised NEPM (NEPC, 2013) provides Tier 1 groundwater HSLs for vapour intrusion of petroleum hydrocarbons and have been developed for the protection of site users from vapours released from the impacted groundwater. The HSLs take into consideration the exposure settings including residential, open-space / parks / recreational and commercial / industrial land uses, the depth to groundwater intersection (2 m to <4 m, 4 m to <8 m and 8 m+) and the dominant soil type (sand, silt or clay) overlying the groundwater intersection depth.

Based on the commercial / industrial zoning of the site and the average depths to groundwater being greater than 4 mbgs, the HSL D for sand soils at depths ranging between 4m and >8m will apply to the site. It is noted that the modelling used to derive the groundwater vapour intrusion values is not strictly compatible with the presence of LNAPL on the site.

It is noted that the drinking water guidelines are not considered to be relevant to the site given its commercial / industrial use, the quality of groundwater reported and the availability of reticulated water in the area.

6.3 Waste Classification Criteria

The proposed remediation works will generate a variety of waste streams, principally comprising excavated materials. The waste materials will include soil/fill and/or concrete materials exceeding the adopted remediation criteria. If liquid waste is generated it will be collected in on-site holding tanks/directly into a vacuum tanker. This waste liquid will be removed for off-site disposal by a licensed liquid waste contractor.

Solid (soil/fill and concrete) wastes will require classification for disposal in accordance with the *Waste Classification Guidelines: Part 1 Classifying Wastes* (NSW EPA, 2014).

6.4 Imported Materials Criteria

Should imported materials be required for excavation backfill, the material should comprise either Virgin Excavated Natural Materials (VENM) or Excavated Natural Materials (ENM) as defined under the Protection of the Environment Operations (POEO) Act 1997 and the POEO (Waste) Regulation 2005. The materials proposed for importation should also be validated as suitable using sampling and analysis in accordance with the requirements of the NSW EPA (1995) *Sampling Design Guidelines*. Further details on sampling and analytical requirements for the validation of imported materials are presented in **Section 9**. Validation will be consistent with the requirements stated in the Auditor Guidelines.

Contaminant concentrations for VENM or ENM materials proposed for importation must meet the validation criteria listed in Table 2 of the POEO (Waste) Regulation 2005 – General Exemption

under Part 6, Clause 51 and 51A for Excavated Natural Material exemption (NSW EPA 2014). Furthermore, the VENM materials should be within accepted background contaminant ranges.

Table 6.2 details a summary of the adopted remediation validation guidelines for imported materials.

Table 6.2: Validation Criteria for Imported Materials

Constituent	ANZECC/NHRMC (1992) Background Concentrations (mg/kg)	ENM Exemption (2008) (mg/kg)
Arsenic	0.2 - 30	20[a] / 40[b]
Cadmium	0.04 - 2	0.5[a] / 1.0[b]
Lead	<2 - 200	50[a] / 100[b]
Nickel	2 – 400	30[a] / 60[b]
Mercury	0.001 – 0.1	0.5[a] / 1.0[b]
Chromium	0.5 – 110	75[a] / 150[b] (total)
Copper	1 – 190	100[a] / 200[b]
Zinc	2 – 180	150[a] / 300[b]
pH*		5 to 9[a] / 4.5 to 10[b]
Electrical conductivity		1.5 dS/m[a] / 3 dS/m[b]
Total PAHs		20[a] / 40[b]
Benzo(a)pyrene		0.5[a] / 1[b]
Total petroleum hydrocarbons C_{10}-C_{36}		250[a] / 500[b]
Rubber, plastic, bitumen, paper, cloth, paint and wood		0.05%[a] / 0.10%[b]

Notes:
A = maximum average concentration for characterisation
B = absolute maximum concentration
* = Ranges given for pH are for the minimum and maximum acceptable pH values in the ENM

All other COPC analysed for source characterisation and site verification should be below the respective laboratory detection limits. Any deviations from this protocol (such as trace level concentrations of TPH due to, for instance, naturally occurring hydrocarbon substances) would require justification.

7. Remediation Options

Previous investigations (refer to **Section 4**) have indicated that surface soils have been impacted by ACM within the Stage 1 site and the Rail Link portion of the southern portion of the MIC site and that groundwater at the refuelling area has been impacted by petroleum hydrocarbon contamination (in the form of LNAPL). In addition to this, it is noted that there are other underground pits/tanks within the Stage 1 site. This includes the in-ground fat collection pit on the southern boundary of the former meat store (B20), the in-ground concrete tank north of the DGS (B22) and the two oil/water separators near the treatment and preservation area in B16.

7.1 Remediation Objectives

The remedial objectives for the site are as follows:

- Remove unacceptable risks to human health and the environment within the Proposal site in the context of the proposed land use and potential exposure scenarios;
- Validate the remediation work in accordance with the relevant NSW EPA guidelines and with reference to site specific criteria;
- Document the validation process; and
- Outline any potential ongoing monitoring or management requirements to ensure the continued protection of human health and the environment.

7.2 Extent of Remediation

The extent of the proposed remediation is summarised in **Section 5.2**. It is noted that other unexpected impacts or structures may exist within the Proposal site that may be potential sources of contamination or be indicators of contamination. Should these be encountered, an unexpected finds protocol should be implemented (refer to **Section 10.6**).

7.3 Remediation Strategy

Prior to consideration and selection of a preferred remediation option, an assessment of possible remediation strategies is required to be undertaken for the site

In relation to the refuelling area and UST tank farm, the remediation strategy adopted is consistent with the typical approach adopted on petroleum hydrocarbon impacted sites. This includes the removal of hydrocarbon sources (including hydrocarbon impact as LNAPL) to the extent practicable. Following the removal works to the extent practicable, groundwater monitoring will be undertaken to assess groundwater conditions at the site.

7.4 Possible Remediation Options

The NEPM (NEPC 2013) states that in general, to achieve the desired environmental outcome, the process of assessment of site contamination should be placed within the context of the broader site assessment and management process. In particular, in assessing the contamination, the preferred hierarchy of options for site clean-up and/or management (as outlined below) should be considered.

- On-site treatment of contamination so that it is destroyed or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or

If the above are not practicable,

- Consolidation and isolation of the soil on-site by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material;

Or,

- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of and appropriate management strategy.

Each of the identified remedial options has been assessed consistent with the NEPC (2013) framework of preferred approaches, further noting the potential environmental impacts / environmental emissions and consistency with ecologically sustainable development (ESD).

7.5 Assessment of Possible Remediation Options

An assessment of possible remediation options is provided in **Table 7.1** below.

Table 7.1 Remedial Options Screening

Option	Discussion	Conclusion
On-site treatment of the contaminated material so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level	**Bonded ACM Impacted Surfaces** Hand picking of ACM from ground surfaces is labour intensive and can be costly and time consuming. The success of his remediation method is highly dependent on the surface covering, amount of building rubble present and also on the adopted validation criteria. The more clayey the soil, or the more building rubble present, the harder it is to identify and remove all ACM. This option is considered to be the most efficient for retaining material containing ACM given the limited extent of impacted areas.	This is considered to be the practical given the surficial nature of the ACM impacts and the limited extent of the potential impacted areas.
	Hydrocarbon Impacted Soils On typical petroleum hydrocarbon impacted sites, hydrocarbon source material occurs in the unsaturated zone in the proximity of the hydrocarbon release. This material sorbs to organic carbon present within soils, and distributes laterally by relative reduced resistance to horizontal movement of hydrocarbons in comparison to vertical movement. This hydrocarbon source material, where not addressed, may act as an ongoing source of contamination in groundwater. The removal the primary sources of contamination (i.e. USTs and associated infrastructure) and secondary sources of contamination (i.e. impacted soils) will minimise continued impacts to groundwater in the form of dissolved phase impacts or LNAPL. It is noted that prior to the removal of the aforementioned sources of contamination, multi-phase extraction (MPE) will be utilised to reduce LNAPL impacts. Post remediation, should residual contamination in groundwater be observed, ongoing management may be required (refer to contingency scenarios in **Section 10.6.2**). Hydrocarbon source material can be effectively removed via excavation. The on-site treatment of soils is considered to be relatively straightforward. Petroleum hydrocarbon impacted soils are known to readily undergo bioremediation, and the bioremediation of soils can be controlled to prevent air emissions. This option is considered to be feasible as the site has been decommissioned and has adequate space to conduct on-site treatment of soils. It is noted that potentially impacted soils may be present at underground collection pits and oil / water separators located adjacent to or within buildings B16, B20 and B22. Some of the soil may be impacted by COPCs that cannot be bioremediated. As such, on-site treatment of these soils is not proposed.	This option corresponds with the most preferred remedial option as per DEC (2006) and is considered to be a cost effective remediation option given the volatile nature of the main contaminants, the relatively limited areas of impact and the available space at the site.

Option	Discussion	Conclusion
Off-site treatment of the contaminated material so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site	**Bonded ACM Impacted Surfaces** As the impacted areas are on the ground surface and are limited in extent (i.e. adjacent to current or historical building structures, Rail Link portion of the southern portion of the MIC site, the scraping of surface soil for hand picking off-site is considered not to be practical.	The off-site treatment of soils would likely increase the costs of the remediation work due additional transportation that would not be otherwise required. In addition, this option would increase the overall carbon footprint of the remediation program.
	Hydrocarbon Impacted Soils Similar to the previous option, this option requires excavation of impacted soils. However, off-site treatment may require additional approvals to transport and treat impacted soils from the site at a licensed facility. In addition, it would require transportation of the impacted soils from the site. It is noted that potentially impacted soils may be present at underground collection pits and oil / water separators located adjacent to or within buildings B16, B20 and B22. Some of the soil may be impacted by COPCs that cannot be bioremediated. Depending on the COPCs present in the soil, it may be possible to transport these soils to a licensed off-site facility for treatment.	The excavation and treatment of the impacted materials is considered to be an effective remediation option. However, the off-site treatment of soils would likely increase the costs of the remediation work due to potential approval requirements and additional transportation that would not be otherwise required. In addition, this option would increase the overall carbon footprint of the remediation program.
Removal of the contaminated material to an approved site or facility, followed ,where necessary, by replacement with clean material	**Bonded ACM Impacted Surfaces** As the impacted areas are on the ground surface and are limited in extent (i.e. adjacent to current or historical building structures, Rail Link portion of the southern portion of the MIC site, the scraping of surface soil for hand picking off-site is considered not to be efficient given the likely success of remediation via hand picking. However, should validation prove hard to achieve based on the nature of the ACM contamination, this option should be reconsidered.	This option is less time-consuming and relatively straightforward. However, it results in volumes of impacted material disposed at a landfill facility which could have otherwise been used on-site after treatment. In addition, costs will be incurred through the disposal and transportation fees. It is noted that off-site disposal of impact is one of the least preferred options in NEPC (2013) and would increase the overall carbon footprint of the remediation program.
	Hydrocarbon Impacted Soils Similar to the previous option, this option requires excavation of impacted soils. Solid waste facilities are available in the local area to received wastes classified as 'General Solid Waste' or 'Asbestos Waste'. The soils classified as restricted or hazardous would require disposal at an appropriately licenced waste facility. This option is considered to be relatively straightforward and would require transportation of impacted soils to the off-site facility. Should the volume of impacted soils, timeframes, co-contaminants or space constraints make bioremediation ineffective or impractical, this option should be reconsidered for hydrocarbon impacted soils. It is noted that potentially impacted soils may be present at underground collection pits and oil / water separators located adjacent to or within buildings B16, B20 and B22. Soils that cannot be bioremediated on-site will require disposal at a suitably licensed waste facility.	
Consolidation and isolation of the contaminated material on-site by containment within a properly designed barrier	**Bonded ACM Impacted Surfaces and ACM Impacted Soils** This option would entail the consolidation of impacted materials and its containment in an appropriately engineered barrier or containment cell. Ongoing management and monitoring of this engineered solution would be required if the ACM impacted soils are contained at depths	Given the limited extent of ACM impacts, the option to bury ACM impacted soils at depths greater than 3 mbgs is considered to be practical and feasible depending on the intended scope of construction works and selected containment area.

Option	Discussion	Conclusion
	above 3 mbgs. In addition, it is noted that there must be acceptance by the ultimate custodian of the land and local council that future controls will be implemented, and that a notation will be made on the Title(s) of the land. Should the impacted soils be contained at depths greater than 3 mbgs, no ongoing management is considered to be required. It is noted however, that the containment area will need to be noted on the site's asbestos register. Appropriate burial sites will be required to be identified. Burial sites would preferably be located in areas of the site that are to be covered by hardstand and will be covered by clean fill (e.g. internal roadways, or carparks). Additional measures are required (e.g. use of a geo-textile barrier) should the impacted materials be buried above 3 mbgs. Furthermore, should impacted soils require transportation on public roads, additional permits may need to be obtained.	
	Other Impacted Soils As above, this option would entail the consolidation of impacted materials and its containment in an appropriately engineered barrier or containment cell. Ongoing management and monitoring of this engineered solution would be required. In addition, it is noted that there must be acceptance by the ultimate custodian of the land and local council that future controls will be implemented, and that a notation will be made on the Title(s) of the land.	Given the likely success of the bioremediation of hydrocarbon impacted soils and the expected volumes of soils impacted by COPCs that cannot be bioremediated, this option is not considered to be more beneficial or cost effective.

7.6 Preferred Remediation Option

Based on the EPA's endorsed guideline hierarchies for remediation options (DEC, 2006), the characteristics and distribution of the site specific contaminants, the site's environmental setting, and the principles of ESD; the preferred remediation strategy is outlined as follows:

- Hand picking of bonded ACM contaminated ground surfaces. Bonded fragments removed during the hand picking process will be disposed off-site to a suitably licensed facility or at the on-site containment area;
- Retain subsurface ACM in place, if no excavation work is required. Where excavation is required (i.e. Rail Link area of the southern portion of the MIC site), excavated soils will be remediated and validated for use as backfill (where suitable) during construction works as detailed in the CMP. Alternatively, soils impacted by ACM can be excavated and placed in a containment area of the site;
- Remove LNAPL to the extent practicable from the refuelling area within the Stage 1 site via multi-phase extraction (MPE);
- Remove fuel storage and distribution infrastructure and excavate and remediate hydrocarbon impacts on-site at the refuelling area within the Stage 1 site;
- Remove, excavate and remediate other underground collection pits and oil/water separators adjacent to or within buildings B16, B20 and B22. Impacted soils are to be remediated on-site or disposed off-site to a suitably licensed facility, as required;
- Reuse of validated bioremediated material for the backfilling of excavations, where appropriate; and
- Groundwater monitoring for residual groundwater contamination in the refuelling area, as required.

It is noted that other unexpected impacts or structures may exist within the Proposal site that may be potential sources of contamination or be indicators of contamination. Should these be encountered, an unexpected finds protocol should be implemented (refer to **Section 10.6**).

8. Regulatory Approvals / Licensing

An assessment has been undertaken of the regulatory approvals / licensing, and compatibility with existing legislation / guidelines of the proposed remedial approach to make the site suitable for a future commercial / industrial land use.

8.1 Contaminated Land Management Act 1997

In NSW, the management of contaminated land is shared by the NSW EPA, the NSW Department of Planning & Environment (NSW DP&E) and planning consent authorities (usually local councils).

Under the Contaminated Land Management Act (CLM Act) 1997, the NSW EPA regulates contaminated sites where the contamination is Significant Enough to Warrant Regulation (SEWR). Contaminated sites that are not regulated by the NSW EPA are managed by local councils through land use planning processes (such as change of land use, or some remediation works).

Should long term management be required, related to impacted material contained or capped on-site (consistent with the NEPM (NEPC, 2013)), appropriate public notification of any restrictions applying to the site must be made. This can be implemented through notations on a planning certificate issued under section 149(2) of the *Environmental Planning and Assessment Act 1979* or a covenant registered on the land title under section 88B of the *Conveyancing Act 1919*.

The Proposal site is not currently listed under the NSW EPA Contaminated Land register.

8.2 Environment Planning and Assessment Act 1979

8.3 State Environmental Planning Policy (SEPP) 55 – Remediation of Land

The *State Environmental Planning Policy No. 55 (SEPP 55) – Remediation of Land under the Environmental Planning and Assessment Act (EP&A Act) 1979* provides a state wide planning approach for the remediation of contaminated land. In particular, SEPP 55 provides for Category 1 and Category 2 remediation. Projects classified as Category 1 require development consent, while projects classified as Category 2 do not require development consent.

The proposed scope of work is considered a Category 1 remediation work as the development of the SIMTA Intermodal Terminal Facility – Stage 1 is considered to be a SSD.

8.3.1 Protection of the Environment Operations Act 1997

The Protection of the Environment Operations Act 1997 (NSW) (POEO Act) is the key piece of environment protection legislation administered by the NSW EPA.

The POEO Act provides a single integrated licensing arrangement to control the air, noise, water and waste impacts of an activity. The NSW EPA is the regulatory authority for the licensing of activities specified under Schedule 1 of the POEO Act (scheduled activities) and in most cases councils are the regulatory authority for non-scheduled activities. Licences can also be issued to regulate water pollution from activities that are not in Schedule 1. Such licences can provide protection against prosecution for water pollution if the licence conditions are complied with.

The POEO Act also provides the key mechanisms (including the issuing of three types of environment protection notices including: clean-up, prevention and prohibition notices) for protecting the environment. It also provides the regulatory regime for waste management under the Protection of the Environment Operations (Waste) Regulation 2005 (Waste Regulation).

All remediation works completed at the site will be conducted in compliance with the relevant requirements of the POEO Act.

8.3.1.1 Protection of the Environmental Operations (Waste) Regulation 2005

The following outlines the required documentation and approvals required for the handling, off site transport and disposal of waste during the remediation works in accordance with the Protection of the Environment Operations (POEO) (Waste) Regulation 2005 and the POEO Act 1997.

8.3.1.2 Waste Transporter Requirements

Under Schedule 1, Part 2 of the POEO Act 1997 the transport of several classifications of waste in loads exceeding 200 kilograms is declared to be a scheduled activity for which a licence is required. As such should the transport of selected wastes from the site to off-site disposal facilities be necessary, the use of licensed transporters will be required.

8.3.1.3 Waste Tracking Requirements

The POEO (Waste) Regulation 2005 specifies requirements for the tracking of waste both within NSW and interstate. The wastes that must be tracked are listed in the Schedule 1 of the Regulation (this Schedule includes soil contaminated with waste oil/ water, hydrocarbons/ water mixtures or emulsions).

Wastes that need to be tracked need to be characterised in accordance with the NSW EPA (DECCW, NSW, 2009) Waste Classification Guidelines, Part 1: Classifying Waste. The following characteristics of the waste must also be determined:

- The form of the waste (the physical state e.g. solid);
- The waste code;
- The waste description; and
- The Dangerous Goods properties (if applicable).

A NSW EPA on line tracking system is available to track waste that is transported within NSW or into NSW from other states or territories.

8.3.1.4 Waste Disposal Facilities

Confirmation that the proposed landfill or recycling facility that the waste from site is being transported to is legally able to accept the waste must be obtained prior to the waste material leaving the site.

8.3.1.5 Waste Records

If not using an approved on line tracking system, records must be maintained of the waste transport certificates for at least four years. The use of the NSW EPA on line tracking system removes the requirement to maintain these records.

8.4 Waste Avoidance and Resource Recovery Act 2001

Section 3 of the Waste Avoidance and Resource Recovery Act 2001 (WARR Act) includes the following objectives:

a) To encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ESD;

b) To ensure that resource management options are considered against a hierarchy of the following order:

i. Avoidance of unnecessary resource consumption,

ii. Resource recovery (including reuse, reprocessing, recycling and energy recovery),

iii. Disposal,

c) To provide for the continual reduction in waste generation,

d) To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste …

The efficient use of resources / resource recovery is achieved by the adoption of the principles of ESD throughout the remedial technology selection process. As such, the proposed remedial approach (i.e. excavation and on-site treatment) reduces the potential volumes of impacted soils that may have otherwise been disposed at an appropriately licensed landfill. In addition, the use of the Proposal site for the treatment of impacted soils also minimises the transportation requirements to conduct the works. Ultimately minimising the negative environmental impacts from the remedial works.

8.5 Water Management Act 2000

The Water Management Act provides for the sustainable and integrated management of the water sources of the State of NSW for the benefit of both present and future generations.

An aquifer interference approval confers a right on its holder to carry out one or more specific aquifer interference activities at a specified location, or in a specified area, in the course of carrying out specified activities. This type of approval may be required should the remediation work require excavations to extend below the water table.

8.6 Ecologically Sustainable Development

The National Strategy for Ecologically Sustainable Development facilitates the adoption of ESD in environmental decision making. The strategy was adopted by all levels of Australian Government in 1992.

Section 9 of the Contaminated Land Management Act 1997 makes specific references to principles of ESD.

(3) … … Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

> (a) the precautionary principle—namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
>
> > (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
> >
> > (ii) an assessment of the risk-weighted consequences of various options,
>
> (b) inter-generational equity—namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,
>
> (c) conservation of biological diversity and ecological integrity—namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
>
> (d) improved valuation, pricing and incentive mechanisms—namely, that environmental factors should be included in the valuation of assets and services

The precautionary principle is adhered to by using the NSW EPA endorsed levels of acceptable risk as the basis of the remedial work.

Inter-generational equity has been achieved via the treatment of impacted soils on-site, which avoids unnecessarily using space at the landfill, reducing pressures on a common resource.

Environmental factors have been considered in the selection of remediation options for the Proposal site. Remediation approaches have been selected on the basis of the valuation of environmental benefits and potential emissions.

9. Remedial Plan

9.1 Define the Boundary of Contamination

The boundaries of the contaminated areas are discussed in detail in **Section 5**.

9.2 Site Establishment

All safety and environmental controls are to be implemented at the first stage of remediation works. These controls will include:

- Locate and isolate all required utilities in the proximity of the works;
- Assess needs for traffic controls;
- Selection of areas to use for temporary stockpiles, bioremediation and locate site amenities for remedial personnel (if required)
- Work area security fencing, with dust mesh on the fences;
- Site signage and contact numbers;
- Stabilised work area entry gates;
- Sediment fencing (attached to security fencing); and
- Stormwater runoff and sediment controls (hay bales).

Environmental controls are discussed in detail in **Section 11**.

9.3 Remediation Works Team

The remediation and validation works will be supervised by an appropriately qualified and experienced environmental consultants and undertaken by appropriately licensed demolition and asbestos removal contractors.

9.4 Bonded ACM Impacted Surfaces

The remediation proposed below shall be undertaken on the bonded ACM impacted surfaces as detailed in **Section 5.2.**

It is assumed that the removal of surface bonded ACM would be conducted in parallel with the hazardous materials removal work prior to the demolition of existing buildings. The ACM on ground surfaces will be removed by hand picking in accordance with the *Work Health and Safety Regulation 2011* and relevant associated Codes of Practice. The contractor will ensure that risk assessments and control measures are implemented in accordance with the Work Health Safety Act 2011 Code of Practice titled: *How to Safely Remove Asbestos*. Removal works will be undertaken by a WorkCover, NSW licensed asbestos removalist contractor. Asbestos impacted material exceeding NEPC (2013) land use criteria will need to be disposed of as 'Special (asbestos) Waste' or placed in the on-site containment area, if available.

A suitably qualified environmental consultant will validate the remediated ground surfaces. If bonded ACM is identified, ground surfaces should be revisited, picked and re-inspected until such time as visual validation is obtained.

9.5 Hydrocarbon Impacted Soils

9.5.1 Fuel Infrastructure Removal

The remediation proposed below shall be undertaken on areas where fuel storage and distribution infrastructure are located, as detailed in **Section 5.2**:

- Inspection and removal of any residual liquid contents from the UST by an appropriately licensed contractor and off-site disposal to an appropriately licensed facility in accordance with the *Waste Classification Guidelines* (NSW EPA 2014).Removal of LNAPL to the extent practicable via MPE and off-site disposal of the recovered liquids to an appropriately licensed facility;
- Removal and disposal of the concrete pavement overlying and surrounding the USTs, fuel lines, bowsers and other petroleum related infrastructure.
- The USTs and pipe work will be degassed, emptied (if applicable) and removed for off-site disposal for recycling to an appropriately licensed facility. Photographic records of the condition of each of the tanks and fuel lines will be maintained to assist in identifying potential contaminant sources.
- Excavation of backfill sand around the USTs and analytical testing to assess the suitability of backfill sands to remain on-site.

9.5.2 Excavation of Impacted Soils

Upon removal of the petroleum related infrastructure, additional excavation of hydrocarbon impacted soils to the extent practicable, may be required. Excavations will be extended until field observations (i.e. visual inspection and PID readings) indicate that impacted soil above the adopted remediation criteria (refer to **Section 6**) is likely to have been removed. It is anticipated that the vertical extent of excavation will be restricted to 5 mbgs.

The practicable limits of excavation include consideration of the following:

- Physical limitations of available equipment;
- Extending the excavation into the saturated zone;
- Geotechnical constraints associated with excavation safety and excavation stabilisation requirements (e.g. benching) and / or potential effects on nearby infrastructure; and
- Structural constraints should the excavation extend to a close proximity to roadways, footpaths, building and underground conduits.

Excavated material will be segregated and stockpiled based on an initial screening of levels of contamination. The excavated material will be temporarily stockpiled on a paved surface or on plastic sheeting to provide a separation layer between potentially contaminated soils and surface soils.

Excavation validation soil sampling (refer to **Section 10**) will be conducted to confirm that contaminated soil has been removed or in the case of the limits of the site boundary or excavation practicability limits, to assess residual concentrations.

Clean and / or validated, stockpiled soils will be used to partially backfill the open excavations, battering the excavation edges to minimise fall hazards.

9.5.3 Bioremediation

Bioremediation / landfarming will be conducted with consideration of the NSW EPA *Best Practice Note: Landfarming* (2014).

Impacted soils will be spread out in a designated bioremediation / landfarming area and will be subject to bioremediation prior to an assessment of whether the soils are suitable for re-use on-site.

Soils to be bioremediated / landfarmed will be placed in a designated paved or lined area of the site. It is proposed that the bioremediation area be located on the south western portion of the SIMTA site (see **Figure 16**), however the location will be dependent on the final development layout and approach, and as such there should be flexibility in the selection of the final bioremediation area. Controls to prevent sediment run-off will be placed around this area.

It is proposed that the impacted soils be turned on a monthly frequency for a period of three to four months. It is recommended that the material be inspected by a suitably qualified environmental consultant at an 8 week frequency, and where found to be suitable by field analysis, undertake validation sampling and analysis to demonstrate the suitability of the material to be used as backfill at the site.

Suitable bioremediated material will be used as backfill on-site. Material considered not suitable for reuse on-site will be classified in accordance with the *Waste Classification Guidelines* (NSW EPA 2014) prior to off-site disposal. Validated imported VENM may be required to achieve a level site.

9.6 Other Underground Collection Pits and Oil / Water Separators

Section 5.2 noted that other underground collection pits and oil/water separators are located adjacent to or within buildings B16, B20 and B22. Impacted soils are to be remediated in an approach similar to the remediation of the USTs (**Section 9.5**) and validated based on appropriate COPCs. Soils that can be bioremediated on-site will be managed as detailed in **Section 9.5.3**. Soils that cannot be remediated on-site will be disposed off-site to a suitably licensed facility, as required. Validated materials will be suitable for reuse on site.

It is noted that other unexpected impacts or structures may exist within the Proposal site that may be potential sources of contamination or be indicators of contamination. Should these be encountered, an unexpected finds protocol should be implemented (refer to **Section 10.6**).

9.7 Potential Backfill Materials Assessment – Raised Area on Eastern Portion of the Stage 1 Site

A raised, grassed area is located east of B40 and B45 on the eastern portion of the Stage 1 site. This area is considered to be the most upgradient area of the Stage 1 site. Material from this site, if found to be suitable, will be used as backfill material in other portions of the Stage 1 site. As such, it is proposed that a samples from the surface to approximately 3 mbgs to collected at a minimum of ten locations to ascertain the suitability (from a contamination perspective) of the material for reuse on-site.

9.8 Groundwater Assessment – Refuelling Area within the Stage 1 Site

Upon completion of fuel infrastructure removal works and soil remediation, an assessment of residual groundwater quality at the refuelling area and UST tank farm will be undertaken to establish groundwater conditions, including greater definition of NAPL extent. This will include the installation of replacement monitoring wells as required and groundwater sampling.

9.9 Potential Backfill Materials Assessment – Glenfield Waste Facility

A stockpile of material is currently located on the northern portion of the Glenfield Waste Facility. Should this material remain as a stockpile upon commencement of the construction works and be earmarked for use as backfill material at the Proposal site, an appropriate sampling program should be implemented to ascertain its suitability for reuse on-site in general accordance with the sampling and analytical schedule described in **Section 10**.

9.10 Stormwater Pond Assessment – Glenfield Waste Facility

The Rail Access Report (AECOM, 2015) states that the stormwater pond located at the north-eastern corner of the Glenfield Waste Facility (refer to **Figure 1**) will need to be relocated due to

the northern connection to the SSFL. The pond is proposed to be moved directly south within the triangle formed by the north and south connections and the SSFL.

As part of the relocation works, it is required that targeted testing of the sediments in the existing pond and soils at the relocation area be conducted to ensure that appropriate management measures are implemented for the sediment and the soils to be excavated at the relocation area and for potential on-site reuse or waste classification purposes. This work should be conducted in accordance with the sampling and analytical schedule described in **Section 10**.

9.11 Validation

Validation of the remedial works will be an integral part of the works to demonstrate that the remediation objectives have been achieved. Details of the validation program are provided in **Section 10**.

The remediation works will be completed in accordance with the *Guidelines for the Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems* (DECC 2008) for the removal and destruction of the USTs. Additionally, the *UPSS Technical Note: Site Validation Reporting* (DECCW 2010) will be considered during the validation process.

9.12 Site Dis-Establishment

On completion of the remediation works all plant/equipment and safety/environmental controls shall be removed from the site. Details are provided in the Site Management Plan in **Section 11**.

10. Validation Plan

A summary of the proposed remediation validation plan is provided in the following sections. The validation plan is focused on confirming site suitability for the future commercial / industrial land use of the site.

The validation sampling program will be undertaken in general accordance with the following guidelines:

- NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Measure (NEPM) 1999*;
- NSW DEC (2006) *Guidelines for the NSW Site Auditor Scheme (2nd edition)*; and
- NSW EPA (2014) *Best Practice Note: Landfarming*, April 2014

10.1 Validation Inspection, Sampling and Analyses

A suitably qualified person, trained and experienced in the identification of asbestos, will be required to undertake the validation inspections and / or sampling of remediated bonded ACM impacted ground surfaces.

Should analysis for fibrous asbestos (FA) or asbestos fines (AF) be required, samples collected will be 500 mL in size, in accordance with the Western Australia (WA) Department of Health (DOH) (2009) guidelines. Samples will be analysed in accordance with the Australian Standard *Method for Qualitative Identification of Asbestos in Bulk Samples* (AS4964-2004).

Soil samples will be collected by an experienced environmental consultant. Soil logs and/or sample registers will be prepared for each location showing soil description, sampling depths and sampling intervals. Photographic records will also be maintained.

Field indication of volatile compounds in soil will be measured with a field portable PID using representative soil from each sample taken. This soil will be placed inside a zip-lock bag and head space screened using a PID. Results of PID analysis will be reported on bore logs in addition to observations such as odour and discoloration.

Soil will be sampled whilst wearing disposable nitrile gloves and placed into laboratory prepared sampling containers. All samples will be labelled with a unique identifier consisting of the sample location and date and time of sampling. Samples will be placed directly into a chilled esky following collection and transported to a National Association of Testing Authorities, Australia (NATA) accredited laboratory under Chain of Custody (CoC) protocols.

The decontamination of personnel, PPE and sampling equipment (if used) will be in accordance with industry approved standard procedures to minimise risks to health and safety and cross contamination. Where dedicated disposable sampling equipment cannot be used, non-dedicated sampling equipment will be scrubbed and washed in Decon 90 solution and rinsed with de-ionised water. Disposable equipment will not require decontamination and reuse (i.e. nitrile gloves).

10.2 Analytical Schedule for Validation Samples

The proposed validation sampling and analytical program is outlined in **Table 10.1**.

Table 10.1: Sampling and Analytical Schedule

Validation Area	Sampling Frequency	Analytes
ACM impacted ground surfaces that have undergone hand picking and / or excavations of ACM impacted soils that have been removed and placed in the on-site containment area.	Visual validation by a person qualified, trained and experienced in the identification of asbestos	NA
Excavation formed by the removal of petroleum related infrastructure (refuelling area and UST tank farm)	2 floor validation samples and 1 validation sample per wall. For larger excavations, the sampling density should generally be 1 validation sample per 25 m^2.	Total recoverable hydrocarbons (TRH) Benzene, toluene, ethylbenzene, xylenes (BTEX) Polycyclic aromatic hydrocarbons (PAHs) Speciated phenols Metals (arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni) and zinc (Zn)
In-ground tank adjacent to building B22 and oil / water separators within building B16	2 floor validation samples and 1 validation sample per wall.	TRH Volatile organic compounds (VOCs) Semi-volatile organic compounds (SVOCs) PAHS Speciated phenols Metals
In-ground concrete tank adjacent to building B20	2 floor validation samples and 1 validation sample per wall.	TRH, VOCs, PAHs, speciated phenols Organochlorine pesticides (OCPs) Polychlorinated biphenyls (PCBs) Metals Asbestos
Bioremediated soils	1 validation sample per 400 tonnes (t)[2]	**Initial screening:** TRH, BTEX, PAHs, speciated phenols, metals **Post turning screening:** TRH, BTEX and naphthalene
Potential backfill material from the grassed area east of buildings B40 and B45	Minimum of 10 samples to enable calculation of 95% UCL_{avg} concentrations	TRH, BTEX, PAHs, OCPs, PCBs, metals, asbestos
Impacted soils requiring off-site disposal	1 validation sample per 400 t	TRH, BTEX, PAHs, OCPs, PCBs, metals, asbestos
Residual soils underneath stockpiles where contaminated material has been stored	1 validation sample per 10 m grid	COPC of material stockpiled
Imported fill material	1 validation sample per 100m^3. Sampling of imported excavated natural materials (ENM) will be undertaken in accordance with the requirements of the POEO (Waste) Regulation 2005 – General Exemption under Part 6, Clause 51 and 51A for Excavated Natural Material exemption (NSW EPA 2014).	TRH, BTEX, PAHs, OCPs, PCBs, metals, asbestos
Groundwater at the refuelling area post remediation	1 groundwater sample per well	TRH, BTEX, PAHs, speciated phenols, metals

[2] Noting the homogeneity of soils as reported in previous environmental assessments conducted on the site, and in lieu of any current published NSW EPA endorsed sampling frequency for on-site reuse of soils, it is proposed that the stockpiled soils be sampled at a rate of 1 per 400 tonnes consistent with the POEO (Waste) Regulation 2005 – General Exemption under Part 6, Clause 51 and 51A for Excavated Natural Material exemption (DECCW, NSW, 2009)

Validation Area	Sampling Frequency	Analytes
Potential backfill material from the stockpile on the northern portion of the Glenfield Waste facility	1 validation sample per 400 tonnes (t)[2]	TRH, BTEX, PAHs, OCPs, PCBs, metals, asbestos
Sediment from the sediment pond in the north-eastern corner of the Glenfield Waste Facility and soils to be excavated at the relocation area	1 validation sample per 400 t[2]	TRH, BTEX, PAHs, OCPs, PCBs, metals, asbestos

10.3 Data Quality Objectives

Data quality objectives (DQOs) were developed for the investigation, as discussed below.

10.3.1 State the Problem

Previous investigation data indicates potential contamination risks which may impact future development of the land, workers involved in development and use of the site, and environmental receptors.

In addition, the SEARs (December 2014), states that an EIS must be developed for the SIMTA Intermodal Terminal Facility – Stage 1 SSD which should include a RAP to address the potential environmental and human health risks of contamination on the Project site.

10.3.2 Identify the Decision

At the cessation of the remediation and validation works, a determination of whether the identified impacts have been sufficiently remediated in line with future commercial / industrial land-use will need to be completed.

10.3.3 Identify Inputs to the Decision

The primary inputs to the decision include the following:

- Knowledge of the historical activities, infrastructure and investigation findings to identify COPCs (refer **Sections 3** and **4**) and potential impacted areas (refer **Section 5**);
- Physical observations, including visual and olfactory indicators of contamination reported during remediation activities; and
- Soil and groundwater analytical data collected as part of the remediation activities.

10.3.4 Define the Study Boundaries

The boundaries of the contaminated areas are discussed in detail in **Section 5**.

The depth of impacted material varies across the site however, it is not anticipated that the vertical extent of impacts will exceed 5 mbgs.

Due to the project objectives, it is not proposed at this stage that seasonality will be assessed as part of this investigation.

10.3.5 Develop a Decision Rule

Laboratory analytical data will be assessed against EPA endorsed criteria as identified in **Section 6**. Alternate criteria will be applied with appropriate justification where there are no EPA endorsed criteria.

10.3.6 Specify Limits of Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project will be assessed statistically where required, consistent with NSW EPA guidelines.

The environmental data gathered by the environmental assessment will not readily be assessed to quantitative limits of decision error. Instead it is proposed to undertake a qualitative assessment of potential decision errors during each stage of validation data collection

10.3.7 Optimise the Design for Obtaining Data

The purpose of this step is to identify a resource effective field investigation sampling design that generates data that are expected to satisfy the site's decision performance criteria, as specified in the preceding steps of the DQO Process. The output of this step is the sampling design that will guide development of the field sampling and analysis plan. This step provides a general description of the activities necessary to generate and select data collection designs that satisfy decision performance criteria.

Sections 9, **10.1** and **10.2** present the optimised design of the remediation and validation program for the Proposal site.

10.4 Quality Assurance / Quality Control

Data generated during this project must be appropriate to allow decisions to be made with confidence. Specific limits for this project have been adopted in accordance with the appropriate guidance from the NSW EPA, NEPC (2013), ANZECC (2000), DEC (2007), appropriate indicators of data quality (DQIs used to assess QA/QC) and standard JBS&G procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined Data Quality Indicators (DQIs) for completeness, comparability, representativeness, precision, accuracy and sensitivity.

The pre-determined Data Quality Indicators (DQIs) established for the project are discussed below in relation to precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS parameters), and are shown in **Table 10.2**.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** –expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** – expresses the appropriateness of the chosen laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted criteria.

If any of the DQIs are not met, further assessment will be necessary to determine whether the non-conformance will significantly affect the usefulness of the data. Corrective actions may include requesting further information from samplers and/or analytical laboratories, downgrading of the quality of the data or alternatively, re-collection of the data.

Table 10.2: Summary of Quality Assurance / Quality Control Program

Data Quality Objectives	Frequency	Data Quality Indicator
Precision		
Blind duplicates (intra laboratory)	1 / 20 samples	<50% RPD
Blind duplicates (inter laboratory)	1 / 20 samples	<50% RPD
Accuracy		
Surrogate spikes	All organic samples	70-130%
Laboratory control samples	1 per lab batch	70-130%
Matrix spikes	1 per lab batch	70-130%
Representativeness		
Sampling appropriate for media and analytes		-
Samples extracted and analysed within holding times.	-	organics (14 days), inorganics (6 months)
Trip spike	1 per sampling event	70-130% recovery
Trip blank	1 per sampling event	<LOR
Method blank	1 per lab batch	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All Samples	All samples
Standard analytical methods used for all analyses	All Samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All Samples	All samples
Limits of reporting appropriate and consistent	All Samples	All samples
Completeness		
Sample description and COCs completed and appropriate	All Samples	All samples
Appropriate documentation	All Samples	All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted site assessment criteria		

10.5 Reporting

A Validation Report will be prepared following the remedial works to demonstrate the suitability of the site for commercial / industrial use. The report will be prepared in accordance with the NSW EPA *Guidelines for Consultants Reporting on Contaminated Sites* (OEH 2011) and will include the following:

- Details of the remediation works conducted;
- Information demonstrating that the objectives of the RAP have been achieved, in particular the assessment of the data against both the pre-defined data quality objectives and the remediation acceptance (validation) criteria;
- Information demonstrating compliance with appropriate regulations and guidelines;
- Any variations to the strategy undertaken during the implementation of the remedial works;

- Results of all environmental monitoring undertaken during the course of the remedial works;
- Details of any environmental incidents occurring during the course of the remedial works and the actions undertaken in response to these incidents;
- Details on waste classification, tracking and off-site disposal / recycling; and
- Other information as appropriate, including requirements (if any) for ongoing monitoring / management.

The report will serve to document the remediation works for future reference.

10.6 Contingency Plan

A review of remediation works has been undertaken to identify potential risks to meeting the specified site validation criteria. A number of potential risks have been identified.

10.6.1 Unexpected Finds

It is noted that other unexpected impacts or structures may exist within the Proposal site, particularly at the Glenfield Waste Facility and the RailCorp-owned land, that may be potential sources of contamination or be indicators of contamination.

Environmental sampling is based on analytes identified as a potential concern during a documented process of reviewing historical site activities. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and/or in unexpected locations. The nature of any additional hazards which may be present at the site are generally detectable through visual or olfactory means, for example:

- Asbestos impacted soils;
- Drums or other underground tanks / pits / structures;
- Construction / demolition waste;
- Bottles / containers of chemicals; and
- Odourous or unusually coloured soils.

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances be identified (or any other unexpected potentially hazardous substance), the procedure summarised in **Flowchart 7.1** and detailed in the following sections, is to be followed.

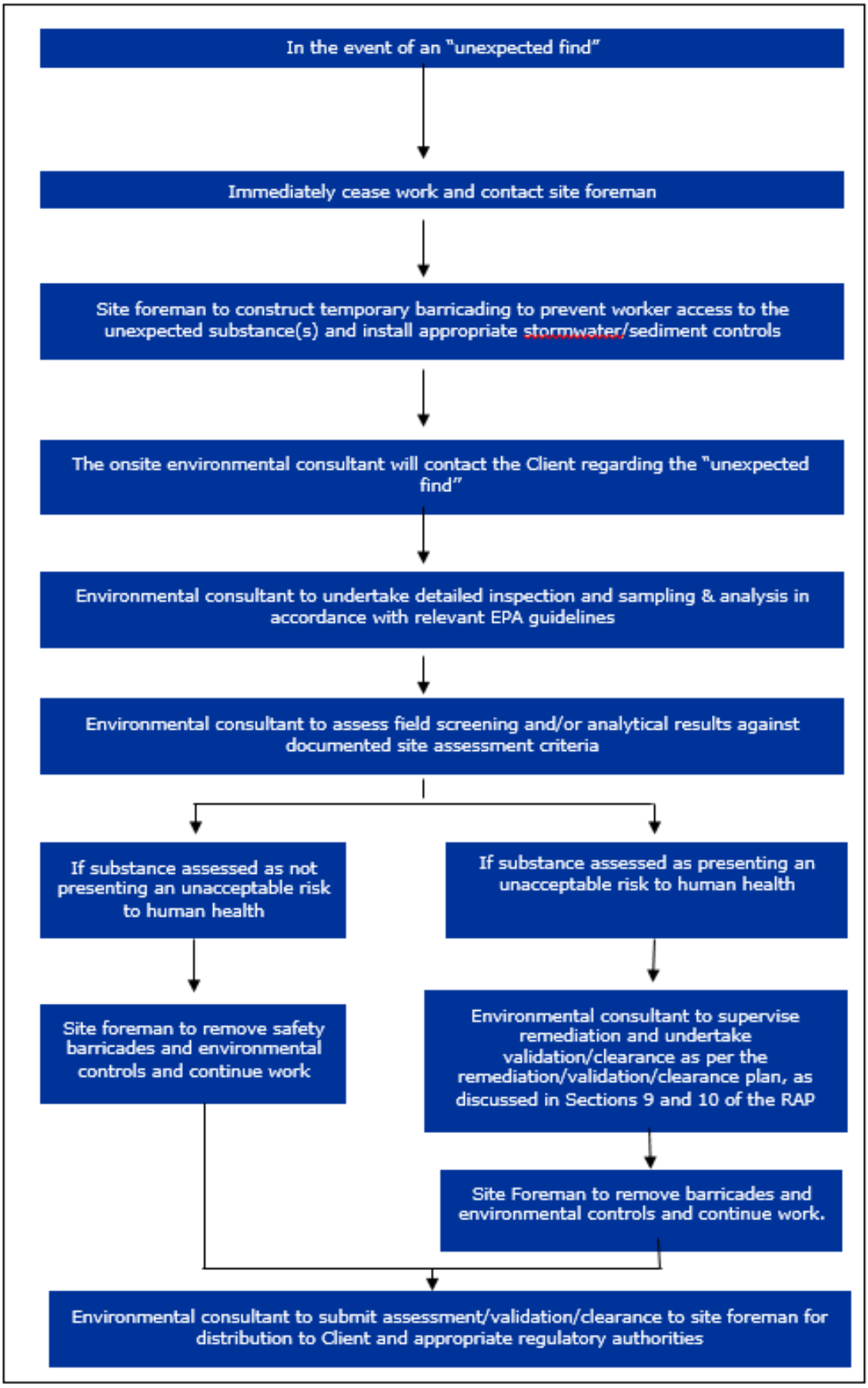
An enlarged version of the unexpected finds protocol, suitable for use on site, should be posted in the Site Office and referred to during the Site Specific Induction by the Principal Contractor.

The sampling strategy for each 'unexpected find' shall be designed by a suitably qualified environmental consultant, in accordance with guidelines made or endorsed by NSW EPA. The strategy will, however, be aimed at determining the nature of the substance – that is, is it hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment.

The sampling frequency of the identified substance / materials shall meet the requirements the *NSW EPA Sampling Design Guidelines* (1995) and / or other relevant guidelines (depending on the COPC and type of find).

Should any unexpected finds require remediation and validation, the works will be conducted in general accordance with **Sections 9** and **10** of this RAP, and with appropriate measures based on the nature of the unexpected find.

Figure 7.1 Unexpected Finds Protocol



10.6.2 Excavation In Landfill Cells – Glenfield Waste Facility

It is considered unlikely that construction of the rail link in the Glenfield Waste Facility will result in the disturbance of existing landfill cells. However, general contingency measures have been developed should construction impact existing filled/partially filled cells, landfill caps and/or landfill liners, and landfill gas/leachate monitoring infrastructure. It is noted however, that should impacts to landfill cells occur, this will be limited to the landfill cap and will not penetrate the existing filled/partially filled landfill cells. A number of contingency measures that may be implemented are presented in the CMP and are summarised below:

- Management of construction works in areas potentially impacted by asbestos via the Asbestos Management Plan included in the CMP;
- Management of excavation work to minimise the potential for surface or groundwater infiltration into the excavations, thereby potentially increasing the volume of leachate in the impacted cells. This will include the routine monitoring of leachate levels and groundwater surrounding the impacted areas using existing monitoring infrastructure;
- Management of landfill gas via the implementation of field screening and personal monitoring programs targeting landfill gasses as detailed in the CMP;
- Management of impacted soils using the Material Management Procedures as detailed in the CMP; and
- Replacement or relocation of existing monitoring wells that may be impacted by the construction work. The impact to existing monitoring wells and the alternate locations of any replacement wells will be subject to negotiations with the proponents of the Glenfield Waste Facility and the NSW EPA to ensure that existing environmental protection licence requirements are satisfied.

Should future design iterations identify that landfill containment may be compromised, a specific work plan will be developed to address potential environmental and/or health and safety issues that may arise.

10.6.3 Other Contingency Scenarios

Aside from unexpected finds and the possibility of disturbance of the existing cells at the Glenfield Waste Facility, a summary of other conditions that can be reasonably expected, associated issues and proposed corrective actions is shown in **Table 10.3** below.

Table 10.3: Contingency Measures

Potential Issue	Proposed Corrective Action
Excessive rain / drainage	Cover stockpiled material with plastic and maintain sediment controls. Retain water treatment equipment on site during excavation works.
Excessive dust	Use local or perimeter sprays as needed, cover stockpiled material will plastic, monitoring weather conditions and/or stop work.
Equipment failure	Maintain spare equipment or parts and identify alternate rental options.
Release of fuel/oil from machinery	Remove source from site, recover oil and make repairs as required.
Excessive noise	Identify source and review noise attenuation equipment. Affix silencers on noisy equipment if necessary or review hours of work.
Excessive odours	Monitoring for volatile compounds using PID in the worker breathing zone and at boundaries of the site. As required, use odour suppressing agents.
Residual groundwater contamination	An assessment of risk (including vapour risk) in relation to the residual impacts may be required. Risk to on-site as well as off-site receptors will need to be ascertained via a Risk Assessment. Based on the findings of the Risk Assessment, ongoing management may be required. This may include monitoring of groundwater impacts, MPE and/or monitored natural attenuation (MNA).

11. Site Management Plan

This section contains procedures and requirements that are to be implemented as a minimum requirement during the remedial works at the site. It is noted that other management controls may be required pending final project approval conditions and CMP requirements.

11.1 Hours of Operation

The working hours for the remediation works are proposed to be restricted to normal business hours as follows:

- 7 am to 6 pm Monday to Friday;
- 8 am to 1 pm Saturday; and
- No work on Sunday or public holidays.

Works which can be undertaken outside the above standard construction hours are limited to:

- Delivery of oversized plant and equipment that police or other authorised authorities determine to require special arrangements to transport along public roads;
- Emergency activities to avoid loss of life or property, or to prevent environmental harm;
- Activities that are inaudible at sensitive receivers; and
- During rail possessions.

11.2 Site Access

During remediation works, perimeter fencing or other appropriate method of defining the work area, will be maintained to restrict access to the works area. It is noted that secure fencing may only be required for remediation works at the refuelling area, where deep excavations and greater equipment/machinery usage will occur, whereas for minor remedial works such as ACM surface picking barrier tape or mesh may be adequate. During the works, traffic entering and exiting the site will be limited to contractor vehicles, remediation equipment (e.g. excavators) and trucks removing waste materials. The frequency and timing of truck movements will be a function of staging of the works by the appointed contractor.

11.3 Sediment Control

The potential for increased sediment load or pollutant load from run-off will be managed by erosion and sediment controls implemented by the appointed contractor. Mitigation measures addressing potential run-off, where appropriate, shall include the following:

- Establishment of erosion and sediment measures prior to works commencing on the site and regular inspection and maintenance to confirm measures are in a functional condition throughout the works;
- Disturbance of site surface cover will be minimised where possible to reduce the potential for off-site tracking of sediment and soil;
- At all site exits, tyres of trucks used for remediation work will be inspected prior to leaving site;
- The work areas will be enclosed within a sediment fence, erected on the down gradient perimeter of the works areas. The controls will ensure all run-off leaving the site is sediment-free;
- On-site stormwater inlets and kerb inlets will be protected using inlet filter devices;

- Good stockpile management practices will be put in place and stockpiled material will be stored within appropriate environmental controls (i.e. covered where practical) and outside of drainage lines;
- Hydrocarbon or other chemically impacted soils to be bioremediated or stockpiled should be placed on paved or lined areas and bunded; and
- Maintenance on all stockpile control measures will be carried out on daily, and during and following major storm events. Maintenance will be logged.

11.4 Stockpile Management

When stockpiling material, the following procedures shall be implemented:

- No stockpiles or other materials shall be placed on footpaths or roadways and will be away from all stormwater infrastructure (including drainage lines, stormwater pits, gutters, etc.) where possible. Where this is not possible, sediment controls will be placed over stormwater grates to prevent ingress of sediment to stormwater drainage lines;
- All stockpiles likely to generate substantial dusts or potential asbestos fibres shall be covered and, if left for more than 24 hours, be stored in a secure area; and
- All stockpiles will be placed on a level area as a low elongated mound.

11.5 Excavation Dewatering

Excavation dewatering may be required during the remediation works. Dewatering or pump out shall be conducted by a licensed contractor with the waste water disposed off-site as 'liquid waste' in accordance with *Waste Classification Guidelines* (NSW EPA 2014).

11.6 Noise

Remediation work shall not give rise to 'offensive noise' as defined in the Protection of the Environment Operations (POEO) Act 1997. All equipment and machinery associated with the remediation work shall be operated by the contractor in accordance with the POEO Act 1997 and its Noise Control Regulations 2000 as well as in accordance with the site's Construction Noise and Vibration Management Plan (CNVMP).

All machinery and equipment used on site will be in good working order and with the fitted with appropriate silencers when necessary.

11.7 Vibration

The use of plant and machinery by the contractor shall not cause vibrations to be felt or capable to be measured at neighbouring premises.

All equipment and machinery associated with the remediation work shall be operated by the contractor in accordance with the site's CNVMP.

11.8 Odour / Volatile Emissions Control

No odours should be detectable at the site boundary and volatile emissions of other potentially volatile substances shall be controlled. Appropriate actions will be taken by the contractor to reduce the odours, which may include odour suppressants or maintenance of equipment.

Equipment and machinery will be adequately maintained to minimise exhaust emissions. No materials shall be burnt on the site.

Further details on the odour and volatile emission control measures is to be included in the CEMP.

11.9 Site Signage and Contact Numbers

A sign shall be displayed adjacent to the site access throughout the duration of the works with the contact details of the contractor and project manager as provided and maintained by the contractor.

11.10 Complaint Reporting and Resolution

Complaints from adjoining site occupants or workers on site will be directed initially to the Principal Contractor on site. Following that, discussion with the client and the complainant will investigate the issue and remedy it as required or applicable.

12. Remediation Works - Health and Safety

A Health and Safety plan (HSP) must be developed prior to the commencement of remediation works. The objectives of the HSP are to:

- Apply standard procedures that reduce risks resulting from the above works;
- Ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- Have procedures to protect other site workers and the general public.

These objectives will be achieved by the following:

- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards and mandatory safety practices and procedures; and
- Provision for contingencies that may arise while operations are being conducted at the site.

This health and safety section does not provide safety information specific to construction and other demolition or excavation activities carried out by contractors, such as the safe operation, maintenance and inspection of plant, etc. Contractors will be required to prepare their own Safe Work Method Statements for their work activities. All parties working on the site shall comply with all applicable Health and Safety legislation, regulations, codes and guidelines.

12.1 Responsibilities

12.1.1 Remediation Supervisor

The remediation supervisor is responsible for ensuring that the work is carried out in accordance with the HSP. This will include:

- Ensuring a copy of the health and safety plan is available at the site during the remediation/validation activities;
- Confirming individuals are competent in performing allotted tasks;
- Liaison with the contractor representatives, as appropriate, regarding safety matters; and
- Investigation and reporting of incidents and accidents.

The remediation supervisor will be confirmed by the nominated contractors prior to the commencement of site remediation works.

12.1.2 Other Members of the Site Workforce

Every individual worker is responsible for conducting their allocated tasks in a safe manner and in accordance with their training and experience. They must give due consideration to the safety of all others in their proximity and cooperate in matters of health and safety. All workers must leave their work areas in such a condition that the location will not be hazardous to others at any time.

12.2 Hazards

The known or potential hazards associated with the work activities are listed below:

- Inhalation hazards associated with the presence of volatile compounds.
- Chemical hazards associated with the presence of contaminated soil;
- Physical hazards, including:

- work in or near excavations;
- operating machinery;
- heat stress and UV exposure;
- underground or overhead services;
- manual handling; and
- noise.

In the event of the discovery of any condition that would suggest the existence of a situation more hazardous than anticipated, or of any new hazard that could potentially cause serious harm to personnel or the environment, work will be suspended until the Remediation Supervisor has been notified and appropriate instructions have been provided to field personnel.

12.3 Personal Protective Equipment

All workers who may come into direct contact with contaminated soil will wear the following personal protective equipment:

- Overalls or long sleeved collared shirt;
- Heavy duty outer gloves (e.g. leather) where there is a risk of cuts or abrasions, otherwise nitrile outer gloves if in direct contact with contaminated soil;
- Steel capped boots;
- Safety glasses;
- High visibility vest or jacket; and
- Hard hat.

In the event that workers will be exposed to highly odorous soil conditions during remediation works, the following additional PPE should be adopted:

- Impermeable disposable overalls; and
- Half or full face respirator with organic vapour cartridge.

12.4 Emergency Response

The remediation contractor will be responsible for preparing an emergency response plan, which will provide details on appropriate action and evacuation procedures in the event of an emergency.

In the event of an emergency arising on the site, appropriate action should be taken. Site evacuation procedures should be followed, as necessary.

In the event of an accident: evaluate the seriousness of the injury, and contact emergency services, if necessary; provide first aid, as appropriate, and if safe to do so evacuate the injured person; make the area as safe as possible without jeopardising safety.

If a serious accident occurs, do not disturb the scene, except to make safe and prevent further injury or damage, and keep all unauthorised people out, and report all accidents to the Remediation Supervisor.

12.5 Public Safety

No access to the site by the general public is to occur during the works. Signage on the site boundary warning of deep excavation and access prohibited is required.

13. Conclusions

Remediation works are proposed to be undertaken on the Proposal site to remove identified impacted material. JBS&G have prepared this RAP for the remediation works to make the site suitable for ongoing commercial / industrial use subject to the limitations stated in **Section 14**.

14. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the previous investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

15. References

AECOM (2015) *Moorebank Intermodal Terminal Facility – Stage 1 Rail Access Report*, DRAFT, dated 27 January 2015

ARUP (2008) *Stockland Moorebank Intermodal Terminal Geotechnical Desk Study Report*, dated December 2008

Brooks & Associates (Brooks) (2002) *Heritage Assessment of the Moorebank Defence site at Moorebank*, dated October 2002

CM (2002b) *Site Audit Statement*, Defence National Storage and Distribution Centre, Moorebank Avenue, Moorebank, dated December 2002

Department of Environment and Conservation NSW (DEC) (2007), *Contaminated Sites Guidelines for the Assessment and Management of Groundwater Contamination*, 2007

Department of Health (2009), *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, May 2009

Douglas Partners (DP) (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

EES (2002a) Memorandum: *Review of Investigation Review Report DNSDC*, Moorebank Defence Lands (URS) and Site Audit Statement WRR118 (Dr William Ryall), dated 16 December 2002

Egis (2000) *Preliminary Site Investigation at the Defence National Supply and Distribution Centre*, Moorebank Defence Lands, dated September 2000

Environmental and Earth Sciences (EES) (2002a) *Memorandum: Review of Reports Pertinent to Environmental Investigations Conducted at DNSDC*, Moorebank, NSW, dated 12 December 2002

Golder Associates (Golder) (2010) *Phase 1 Environmental Site Assessment, Stage 1A of Moorebank Intermodal Freight Terminal Development*, dated December 2010

Golder (2011a) *Phase 1 Environmental Site Assessment, SIMTA Rail Corridor Land*, dated November 2011

Golder (2011b) *Preliminary Environmental Site Assessment – SIMTA Site and Associated Rail Corridor*, dated 16 November 2011

HLA (2002a) *Soil and Groundwater Investigation, Precinct H (DNSDC),* Moorebank Defence Lands, dated November 2002, including HLA (2002b) Work Plan Soil and Groundwater Investigation Moorebank Defence Land, dated 17 September 2002

JBS&G (2014), *Sampling, Analysis and Quality Plan Supplementary Contamination Investigations SIMTA Stage 1 Development*, Draft, 2 December 2014, 50342/60216

JBS&G (2015), *SIMTA Intermodal Terminal Facility – Stage 1 Phase 2 Environmental Site Assessment*, dated 18 March 2015, 50342/60868

Milsearch (2002) *Ordnance Investigation*, 2002

National Environmental Protection Council*, National Environment Protection (Assessment of Site Contamination) Measure 1999*, National Environmental Protection Council, *April 2013*

Minister for the Environment (2013), *NSW Contaminated Land Management Act 1997*, 11 January 2013

NSW Department of Environment and Climate Change (DECC) (2009), *Contaminated Sites: Guidelines on Duty to Report Contamination under the Contaminated Land Management Act 1997*, June 2009

NSW DECC (2008), *Guidelines for the Implementing the Protection of the Environment Operations Underground Petroleum Storage Systems*, August 2009

NSW Department of Environment, Climate Change and Water (DECCW) (2010), *UPSS Technical Note: Site Validation Reporting*, January 2010

NSW Department of Environment and Conservation (DEC) (2006) *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme*, 2nd Edition, NSW Environmental Protection Authority, April 2006

NSW Environmental Protection Authority (EPA) (1995), *Contaminated Sites: Sampling Design Guidelines*, September 1995

NSW EPA (2014) *Best Practice Note: Landfarming*, April 2014

NSW EPA (1996), *Environmental Guidelines: Solid Waste Landfills*, January 1996

NSW EPA (2014), *Waste Classification Guidelines Part 1: Classifying Waste*, November 2014

OEH 2011, *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*, NSW Office of the Environment and Heritage, August 2011

Olszowy, H. Torr, P. and Imray, P. (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia, Contaminated Sites Monograph Series No. 4 1995*

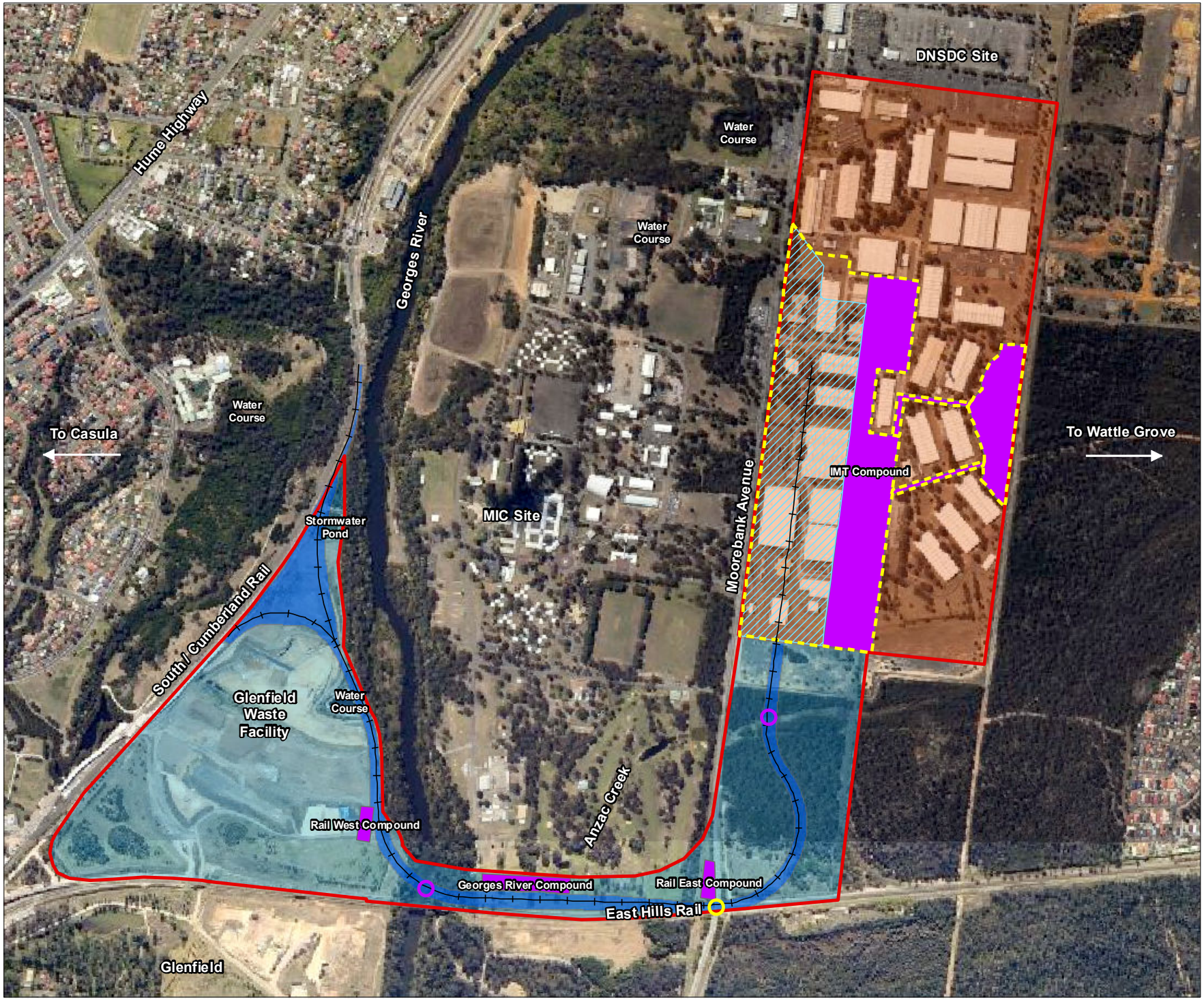
Parsons Brinkerhoff (PB) (2014), *Phase 2 Environmental Site Assessment Moorebank Intermodal Terminal*, 28 May 2014Tactical Group (2014), *Stage 1 Site Plan*, 16 October 2014

Toxikos (2011) *Preliminary screening health risk assessment and literature review*, Moorebank Intermodal Freight Terminal, Moorebank NSW, dated August 2011 (Appendix I of the Urbis 2012 EA).

URS (2002a) *Assessment of DNSDC Buildings – Supplement to Egis 2000 Stage 1 Preliminary Site Investigation of Areas A1 to A6*, dated March 2002

URS (2002b) *Investigation Review Report DNSDC*, Moorebank Defence Lands, dated 10 December 2002

Figures



Legend:

- Project Site
- Stage 1 Site and Construction Area
- Operational Area
- Compound Sites
- SIMTA Site
- Rail Corridor
- Rail Link (including 20m width and variable buffer) and Construction Area
- Proposed Rail Alignment
- Road Crossing
- Creek/River Crossing

All locations approximate

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:12,500

0 200 400
metres

Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

STAGE 1 LOCATION PLAN AND KEY AREAS

FIGURE 1

File Name: 50342_01
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012

Legend:

Cadastral Boundary

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:14,000

0 200 400

metres

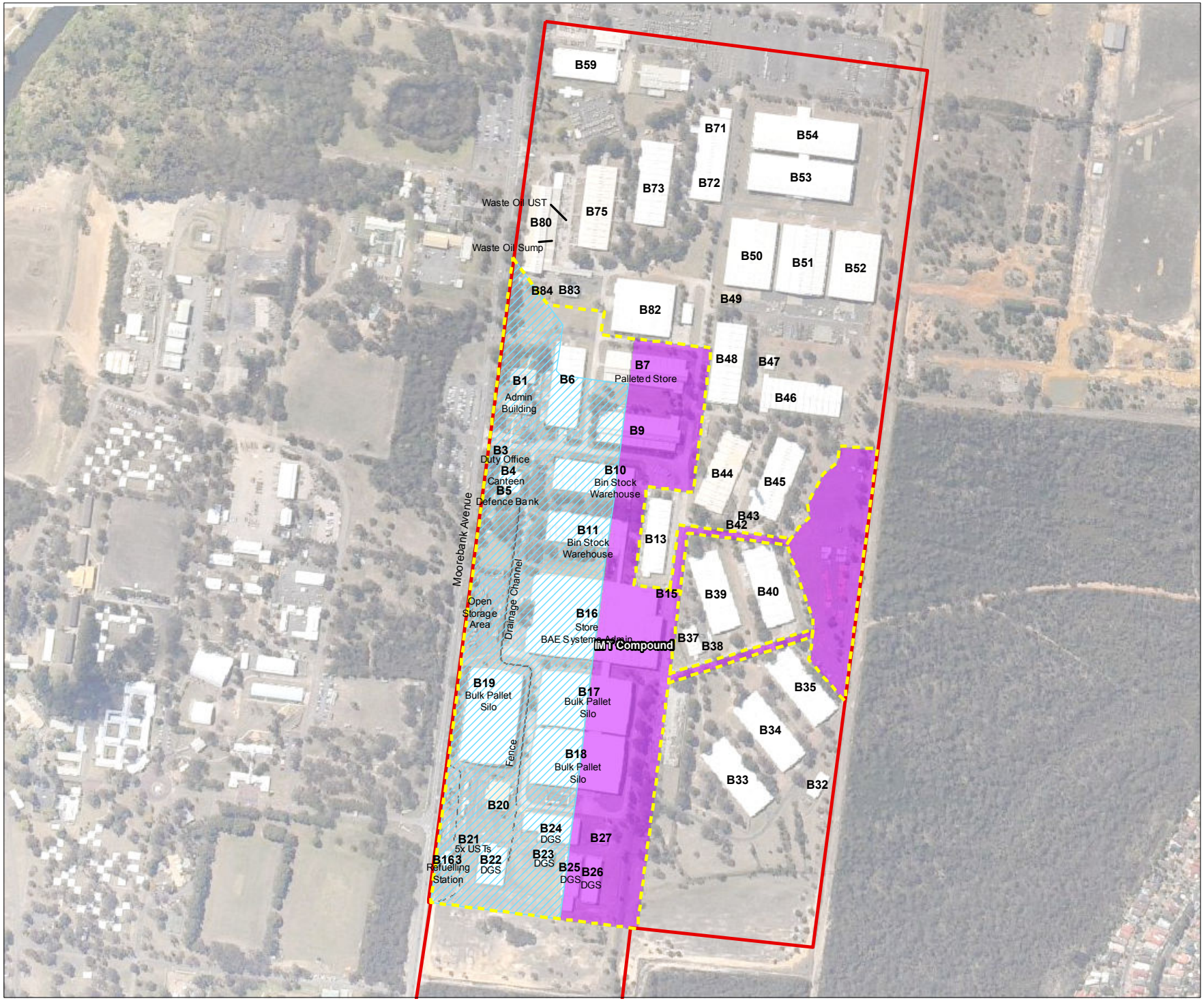
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

CADASTRAL BOUNDARIES

FIGURE 2

File Name: 50342_02
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Stage 1 Site
- Project Site
- Operational Area
- Compound Site
- DGS Dangerous Goods Store

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:8,000

0 100 200

metres

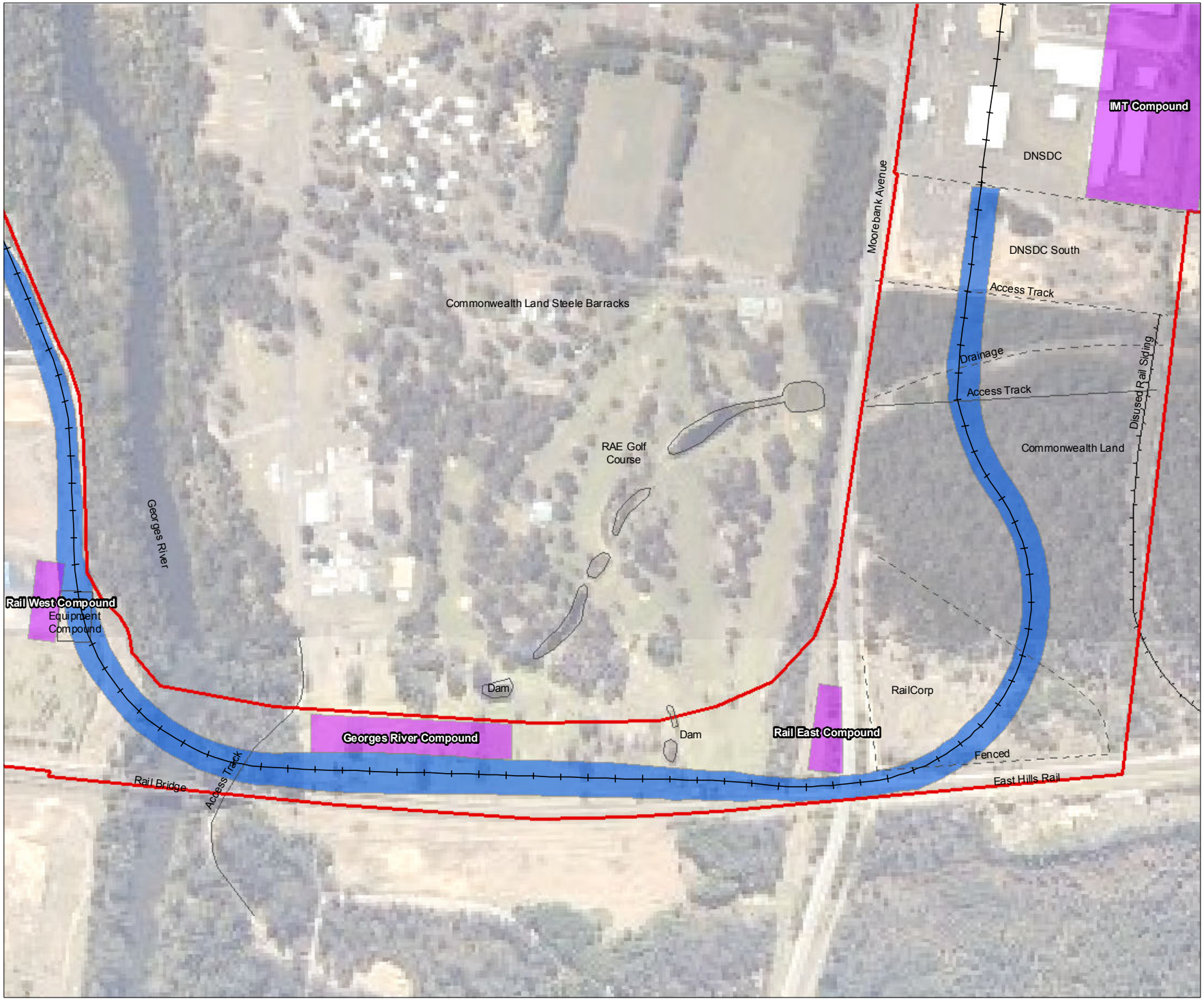
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

STAGE 1 SITE LAYOUT AND BUILDING IDENTIFICATION NUMBERS

FIGURE 3

File Name: 50342_03
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Compound Sites
- Rail Link (including 20m width and variable buffer)
- Proposed Rail Alignment

All locations approximate

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:5,500

0 50 100
metres

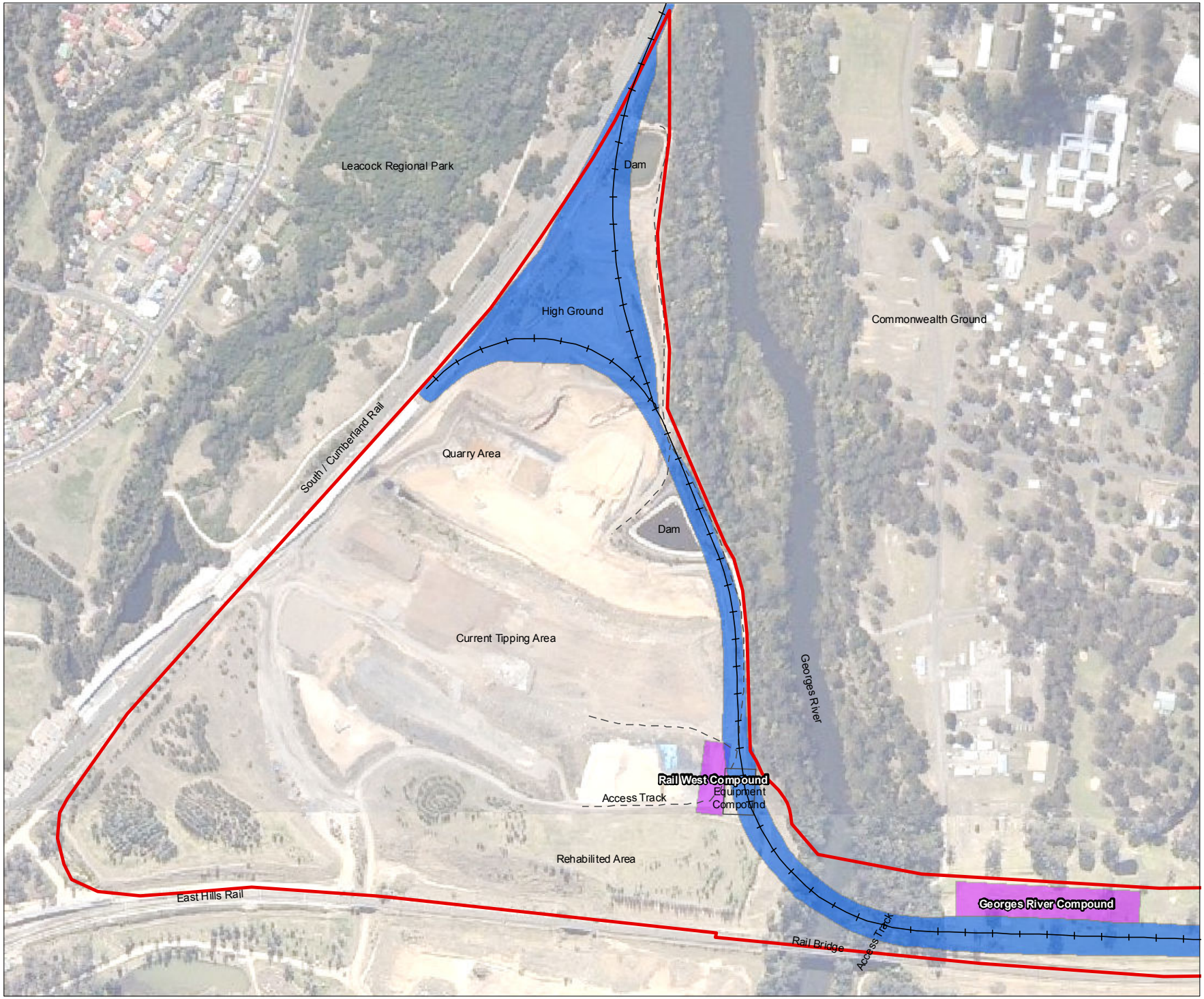
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

SOUTHERN COMMONWEALTH AND RAIL LAND SITE LAYOUT

FIGURE 4

File Name: 50342_04
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Rail Link (including 20m width and variable buffer)
- Compound Sites
- Proposed Rail Alignment

All locations approximate

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:6,000

0 50 100
metres

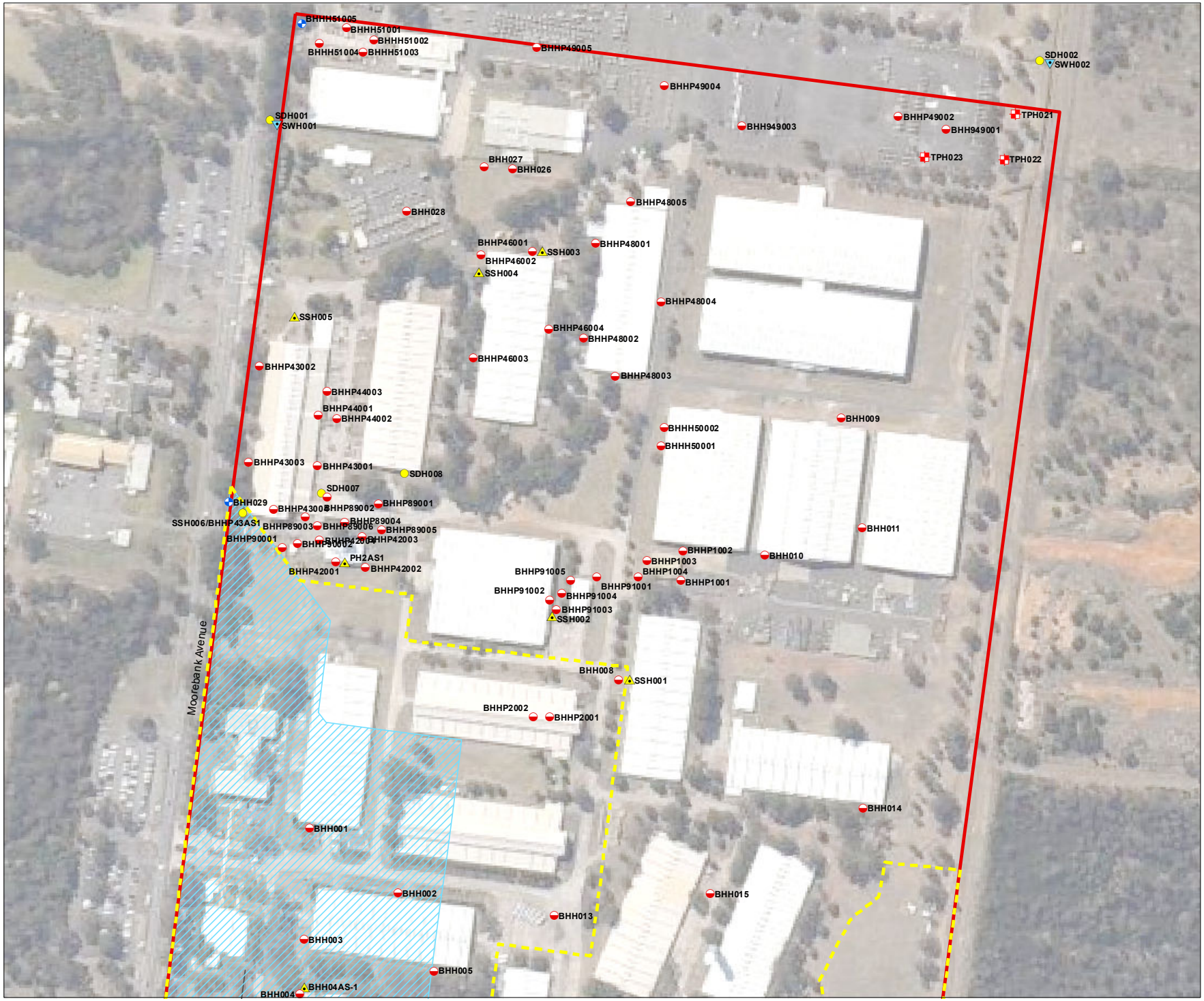
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

GLENFIELD WASTE FACILITY AND WESTERN RAIL LAND SITE LAYOUT

FIGURE 5

File Name: 50342_05
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Stage 1 Site
- Operational Area
- Borehole Location (HLA 2002)
- Monitoring Well Location (HLA 2002)
- Sediment Sample Location (HLA 2002)
- Surface Soil Sample Location (HLA 2002)
- Surface Water Sample Location (HLA 2002)
- Test Pit Sample Location (HLA 2002)

All locations approximate

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0 | Date: 23-Mar-2015

Drawn By: SE | Checked By: BG

Scale 1:4,000

0 40 80

metres

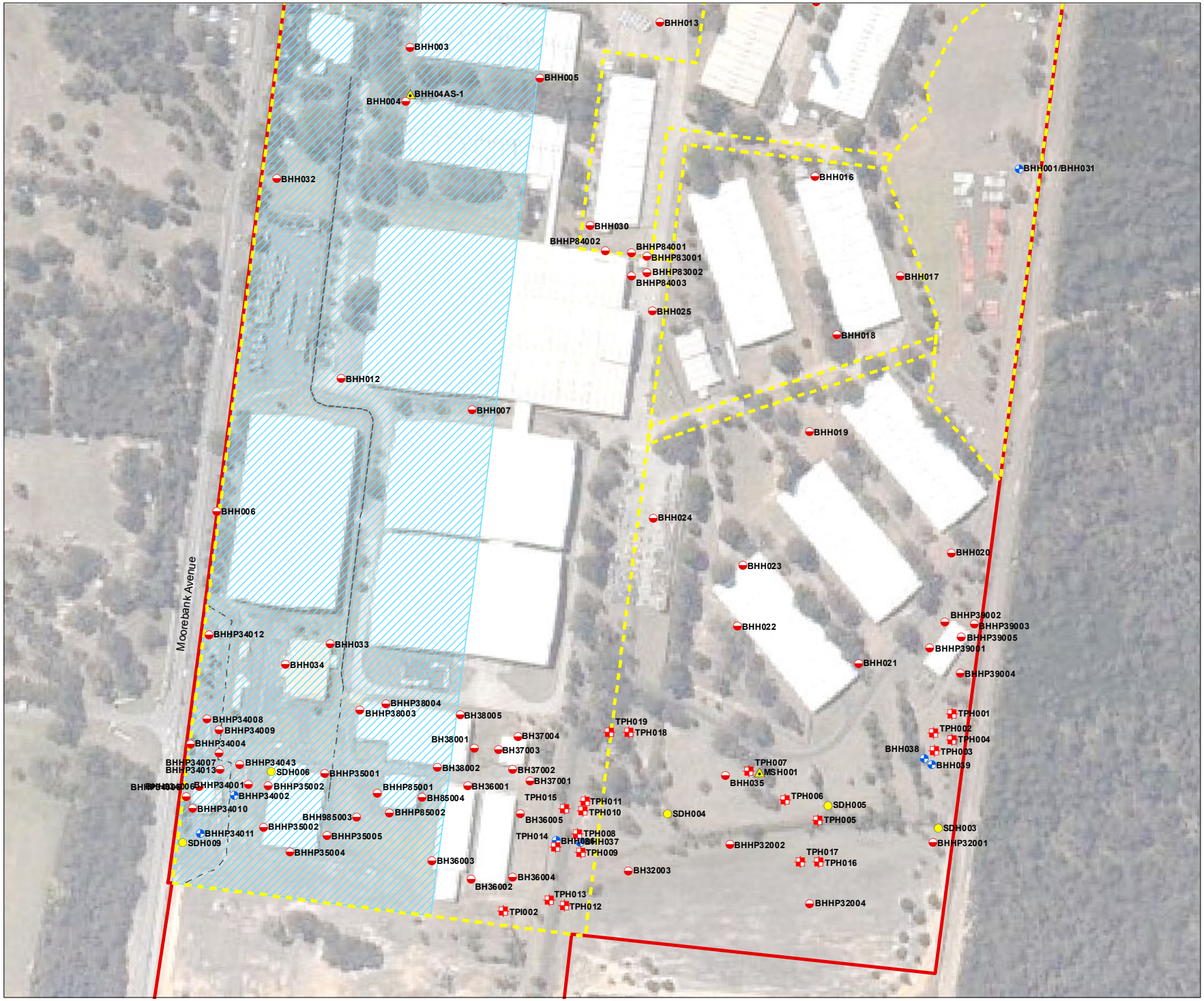
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

STAGE 1 SITE - HISTORICAL SAMPLE LOCATIONS - NORTH

FIGURE 6A

File Name: 50342_06A
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Stage 1 Site
- Operational Area
- Borehole Location (HLA 2002)
- Monitoring Well Location (HLA 2002)
- Sediment Sample Location (HLA 2002)
- Surface Soil Sample Location (HLA 2002)
- Surface Water Sample Location (HLA 2002)
- Test Pit Sample Location (HLA 2002)

All locations approximate

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:4,000

0 40 80
metres

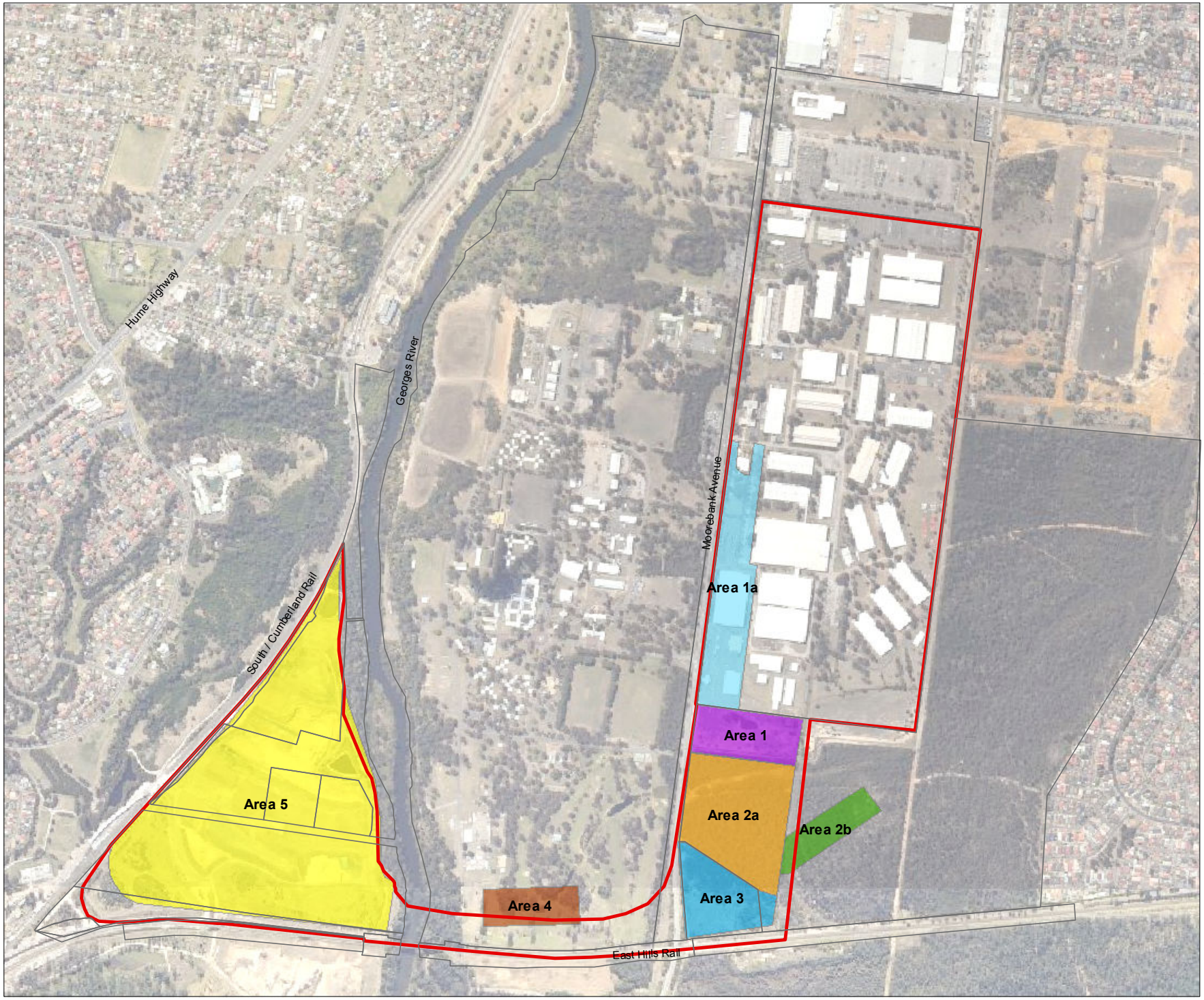
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

STAGE 1 SITE - HISTORICAL SAMPLE LOCATIONS - SOUTH

FIGURE 6B

File Name: 50342_06B
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Cadastral Boundary
- Area 1a
- Area 1 - Unauthorised Dumping Area
- Area 2a - Illegal Dumping Identified
- Area 2b - Former Grenade Range
- Area 3 - Area of Land Filling
- Area 4 - Former Mock Viet Cong Village
- Area 5 - Glenfield Quarry and Waste Disposal Facility

All locations approximate

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:14,000

0 200 400
metres

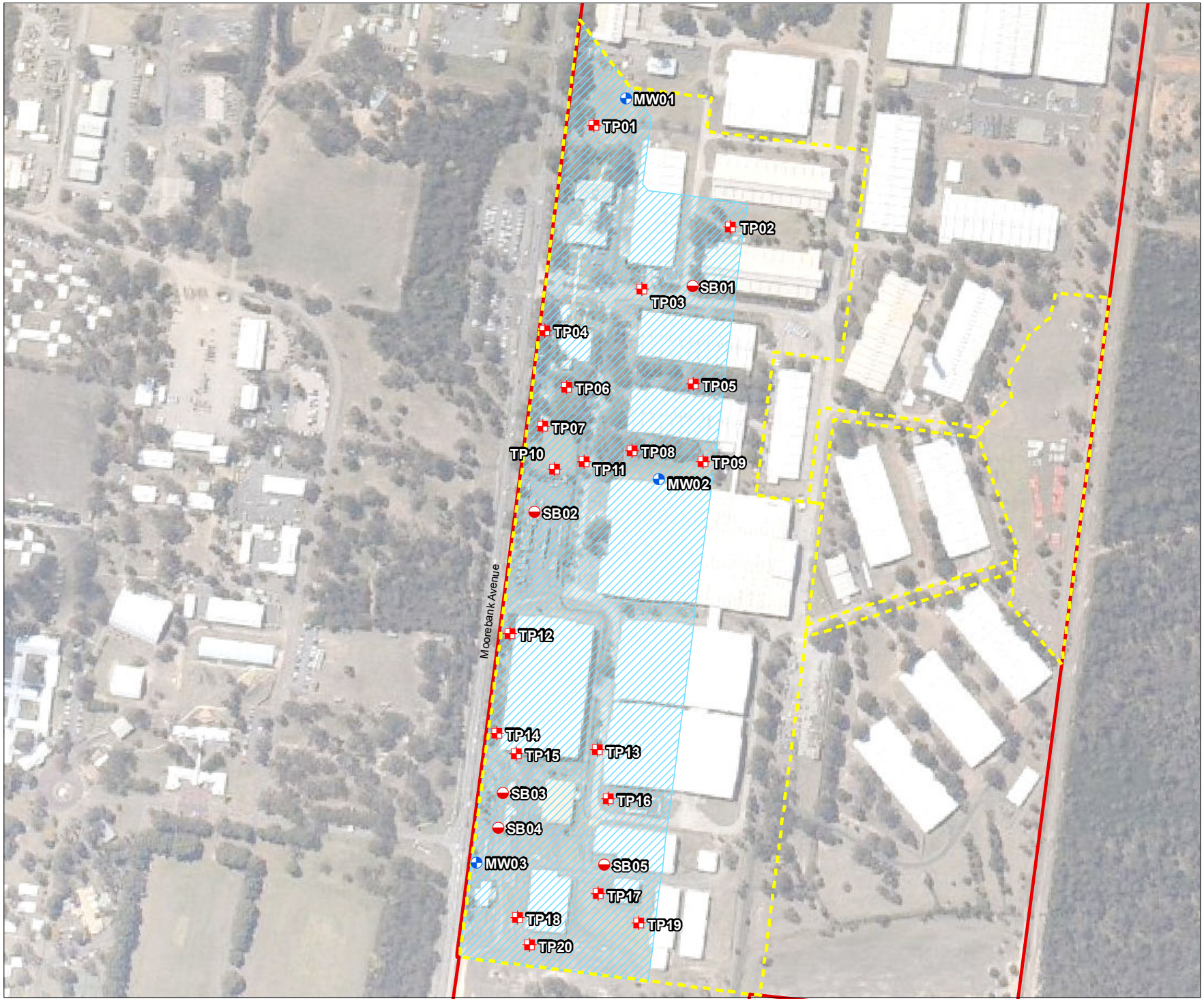
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

PREVIOUS AREAS OF INTEREST (GOLDER 2011)

FIGURE 7

File Name: 50342_07
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Stage 1 Site
- Operational Area
- Borehole Location
- Monitoring Well Location
- Test Pit Location

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:5,500

0 50 100
metres

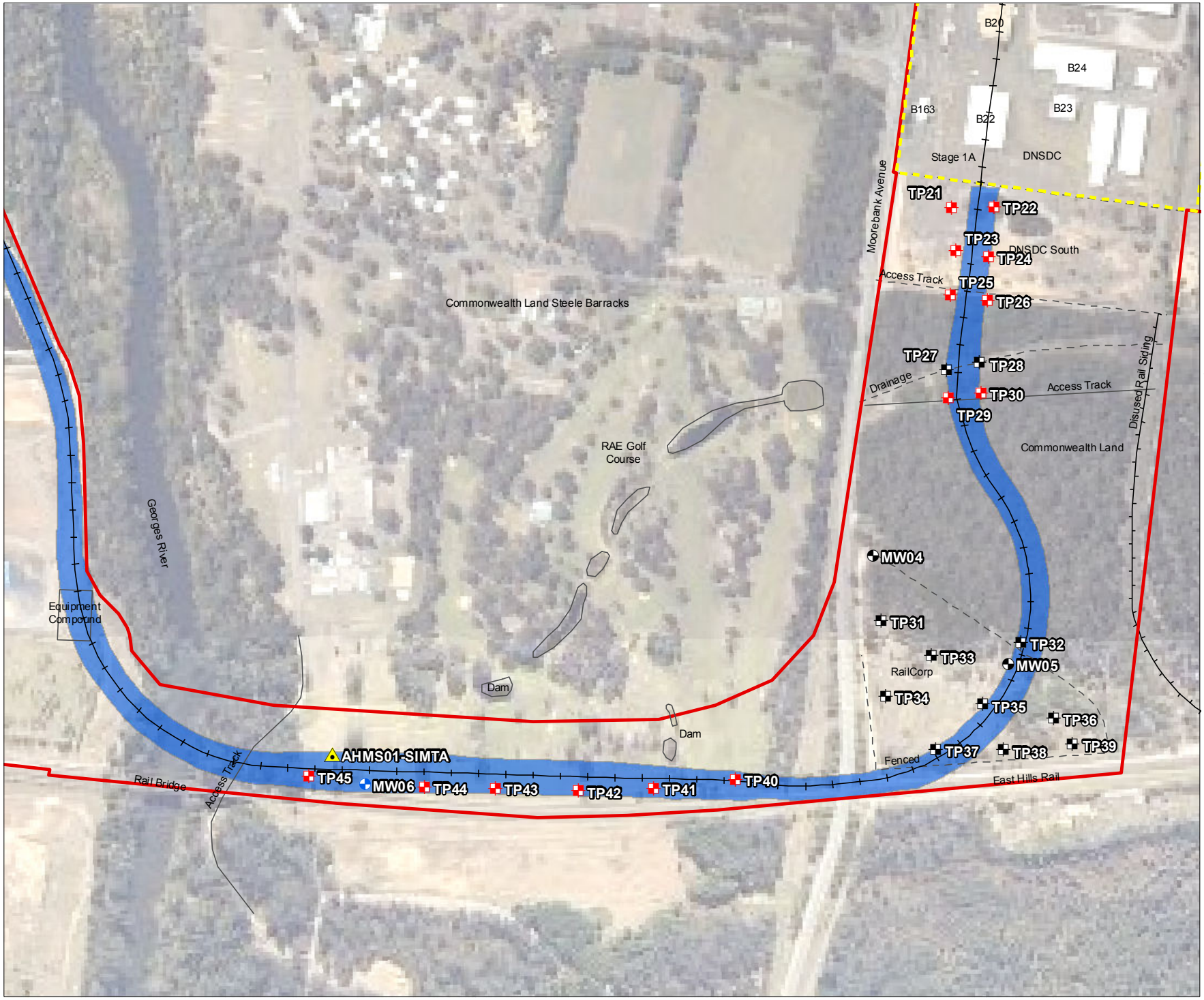
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

2014 INVESTIGATION LOCATIONS STAGE 1 SITE

FIGURE 8

File Name: 50342_08
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Stage 1 Site
- Rail Link (including 20m width and variable buffer)
- Proposed Rail Alignment
- Monitoring Well Location
- Test Pit Location
- Incomplete Monitoring Well Location (area inaccessible)
- Incomplete Test Pit Location (area inaccessible)
- Archaeological Sample Location (sampled by Golder Associates, 2015)

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:5,500

0 50 100
metres

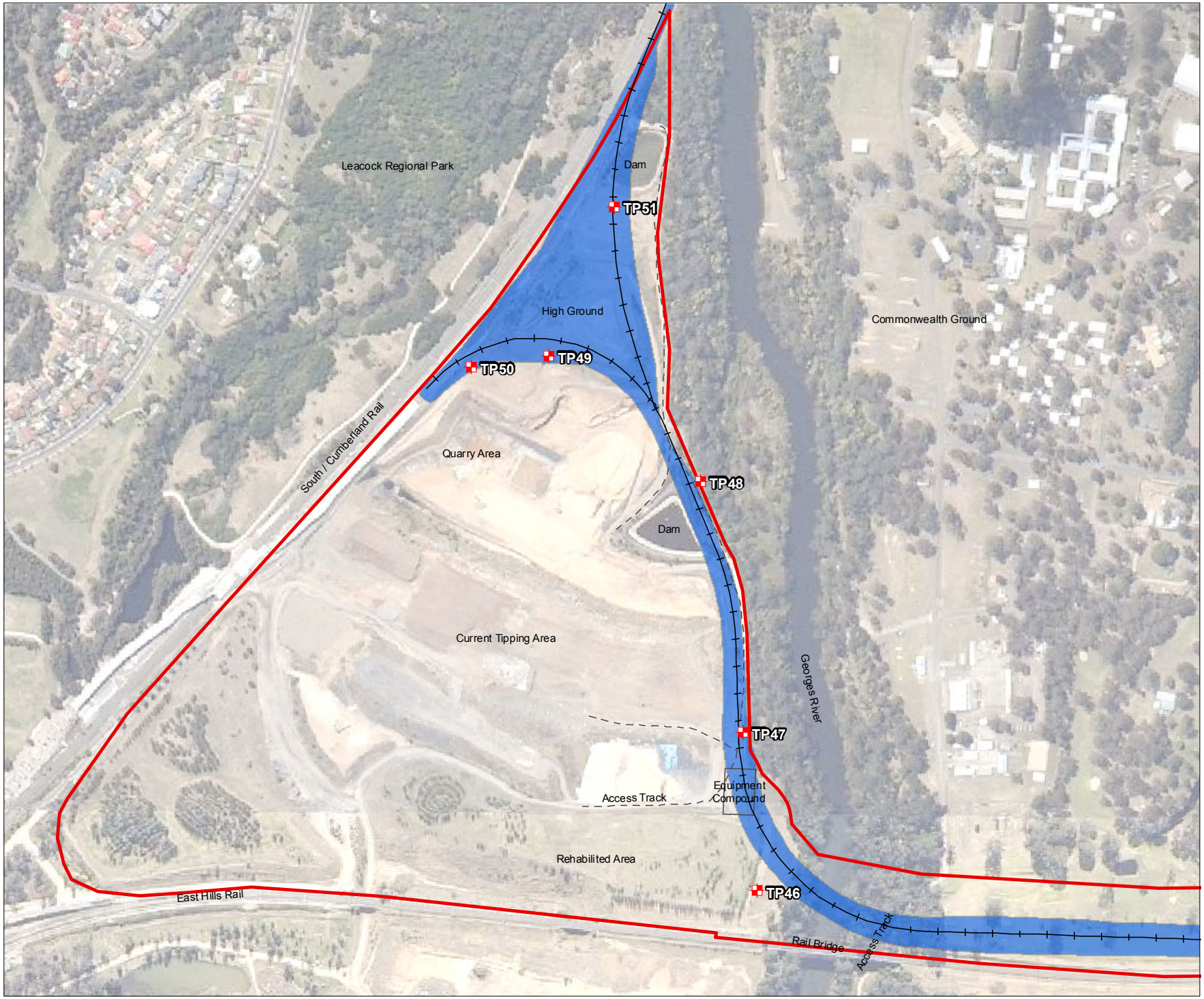
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

2014 INVESTIGATION LOCATIONS SOUTHERN COMMONWEALTH AND RAIL LAND

FIGURE 9

File Name: 50342_09
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Rail Link (including 20m width and variable buffer)
- Proposed Rail Alignment
- Test Pit Location

TP47 and TP48 were shared test pits with Golder Associates

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:6,000

0 50 100
metres

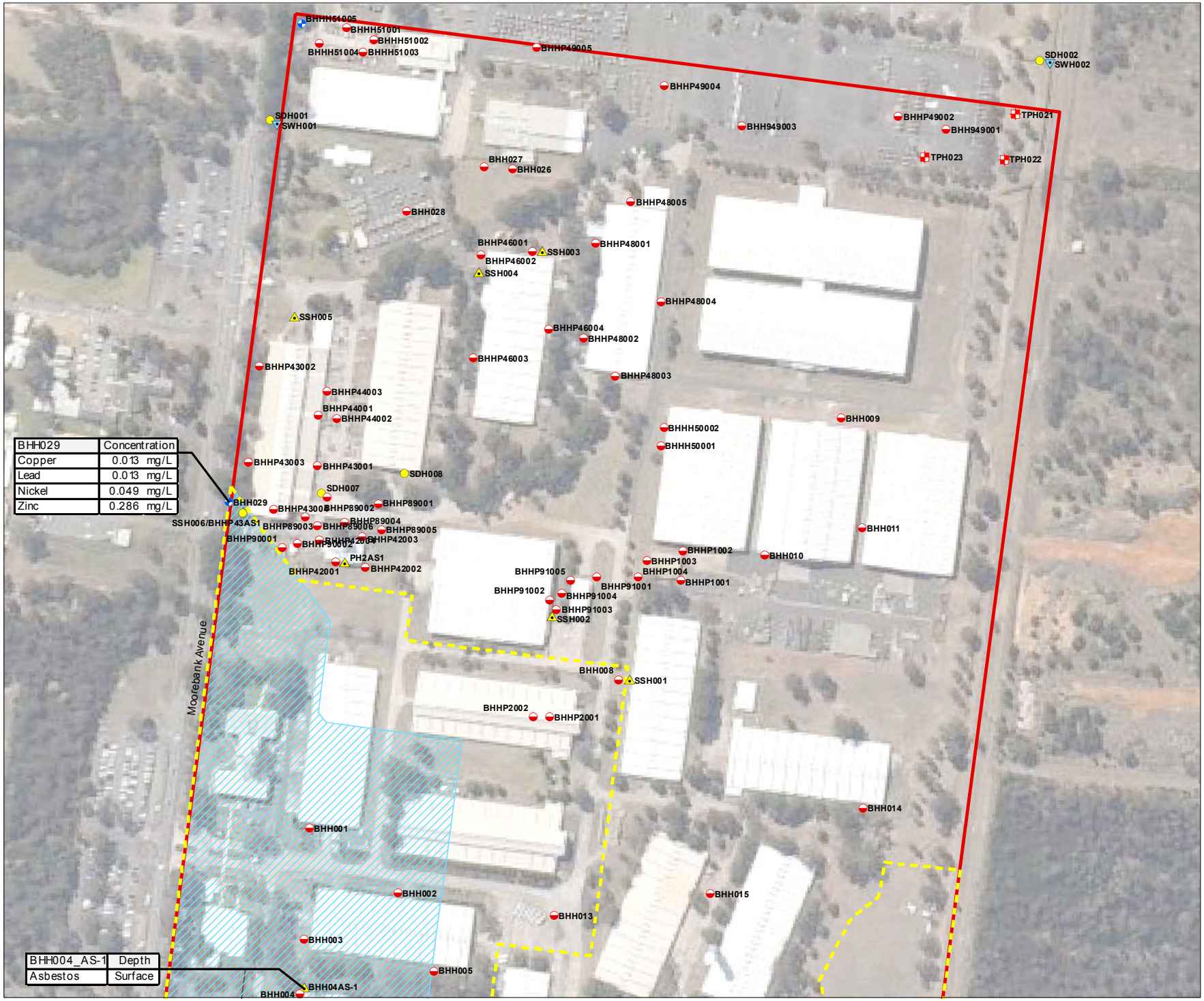
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

2014 INVESTIGATION LOCATIONS GLENFIELD WASTE FACILITY AND WESTERN RAIL LAND

FIGURE 10

File Name: 50342_10
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



BHH029	Concentration
Copper	0.013 mg/L
Lead	0.013 mg/L
Nickel	0.049 mg/L
Zinc	0.286 mg/L

BHH004_AS-1	Depth
Asbestos	Surface

Legend:

- Project Site
- Stage 1 Site
- Operational Area
- Borehole Location (HLA 2002)
- Monitoring Well Location (HLA 2002)
- Sediment Sample Location (HLA 2002)
- Surface Soil Sample Location (HLA 2002)
- Surface Water Sample Location (HLA 2002)
- Test Pit Sample Location (HLA 2002)

All locations approximate

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:4,000

0 40 80

metres

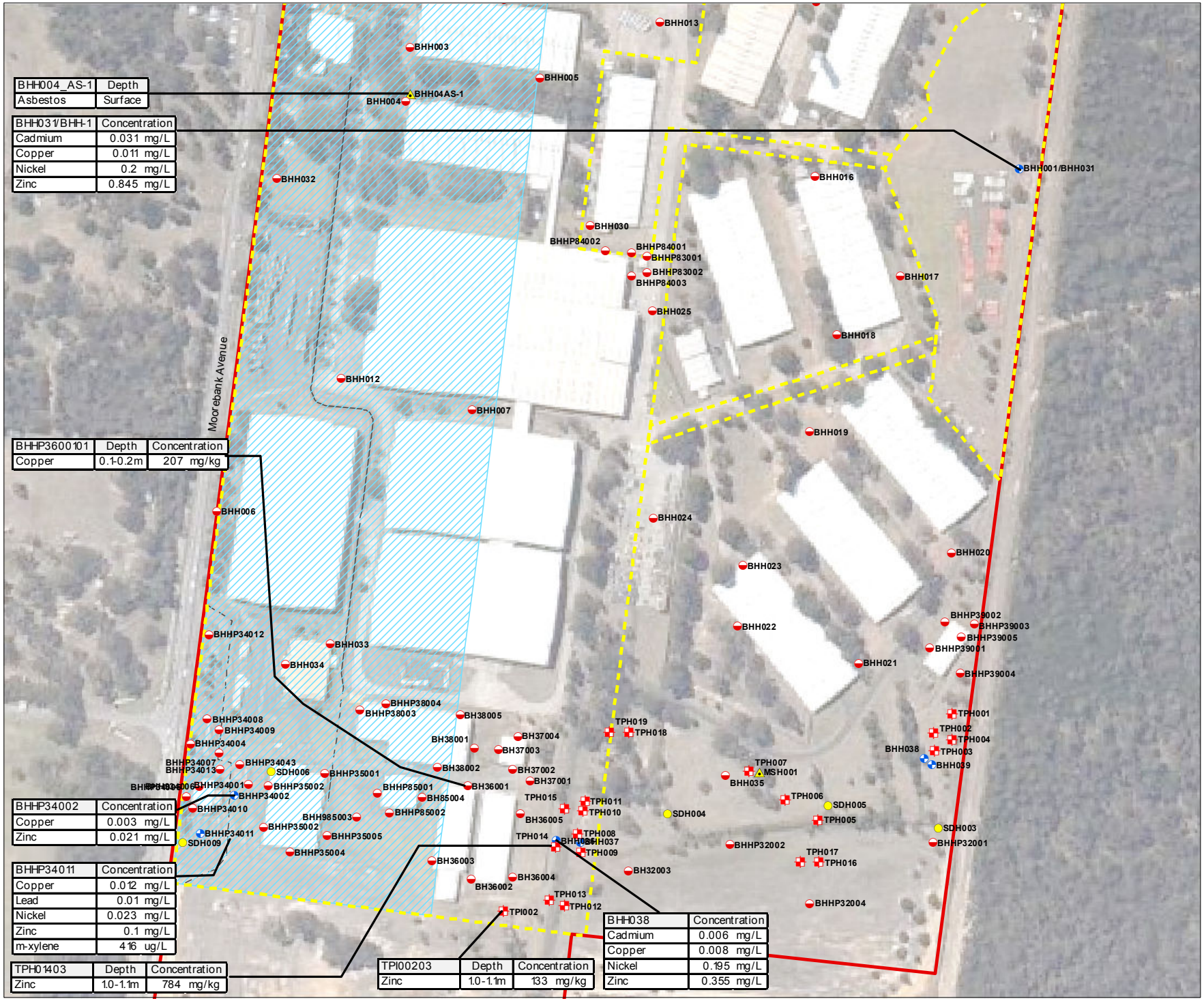
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

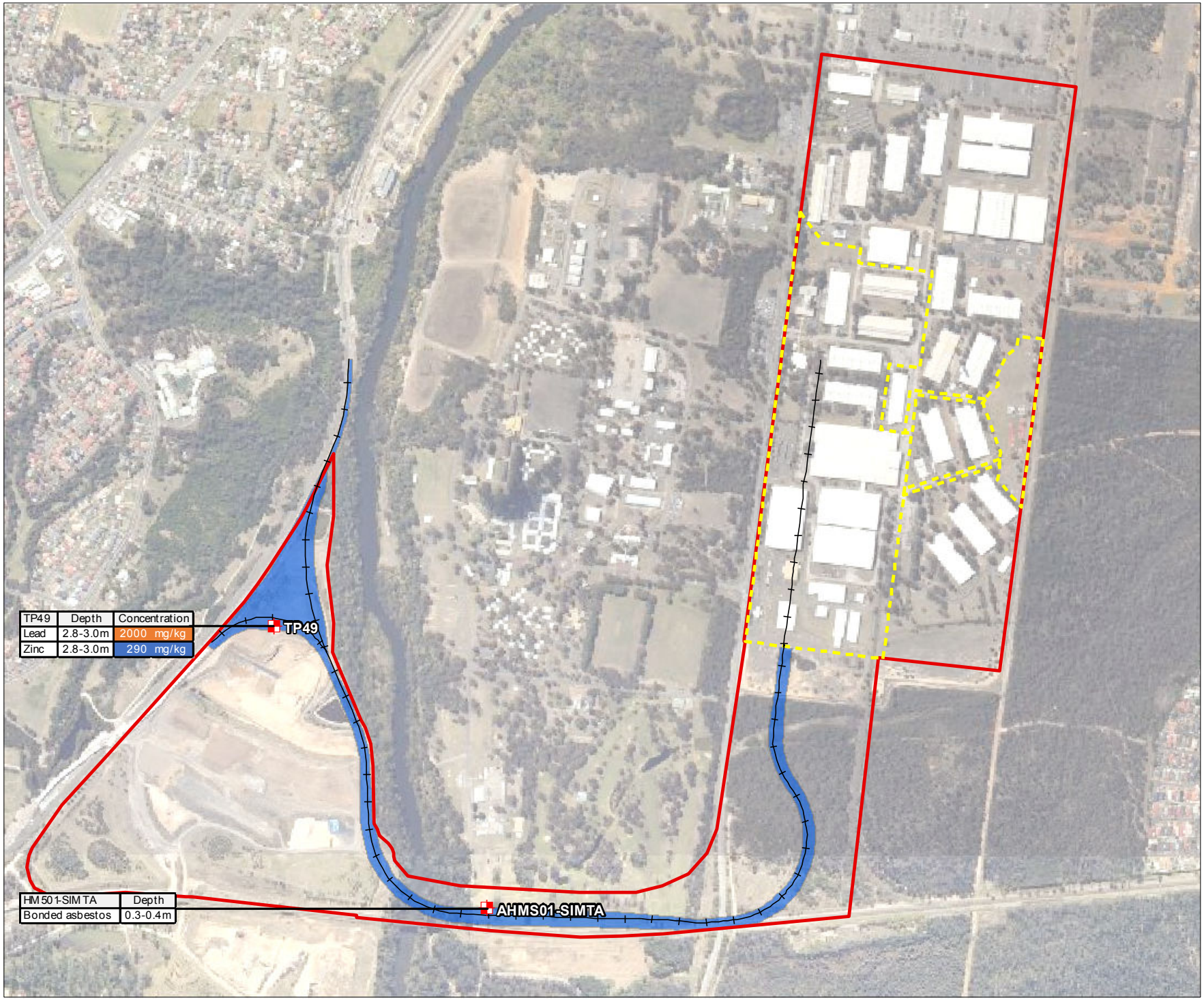
STAGE 1 SITE - HISTORICAL EXCEEDANCES - NORTH

FIGURE 11A

File Name: 50342_11A
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



File Name: 50342_11B
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Stage 1 Site
- Rail Link (including 20m width and variable buffer)
- Proposed Rail Alignment
- Sample Location - Soil Analytical Exceedance

Exceeds Human Health Criteria

Exceeds Ecological Criteria

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0 | Date: 23-Mar-2015

Drawn By: SE | Checked By: BG

Scale 1:12,000

0 200 400

metres

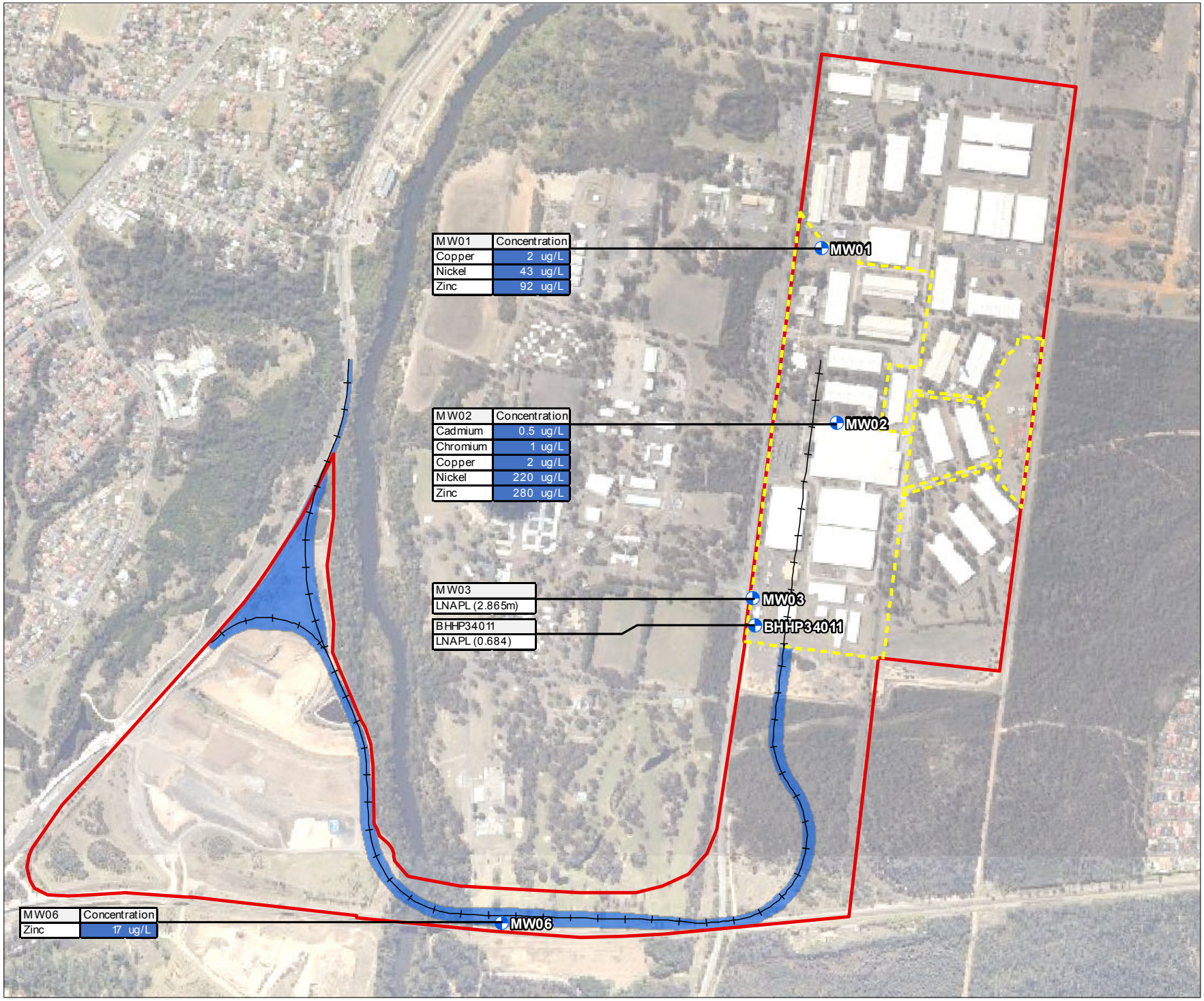
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

SOIL ANALYTICAL EXCEEDANCES

FIGURE 12

File Name: 50342_12
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Stage 1 Site
- Rail Link (including 20m width and variable buffer)
- Proposed Rail Alignment
- Sample Location - Groundwater Analytical Exceedance

Exceeds Human Health Criteria

Exceeds Ecological Criteria

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:12,000

0 200 400

metres

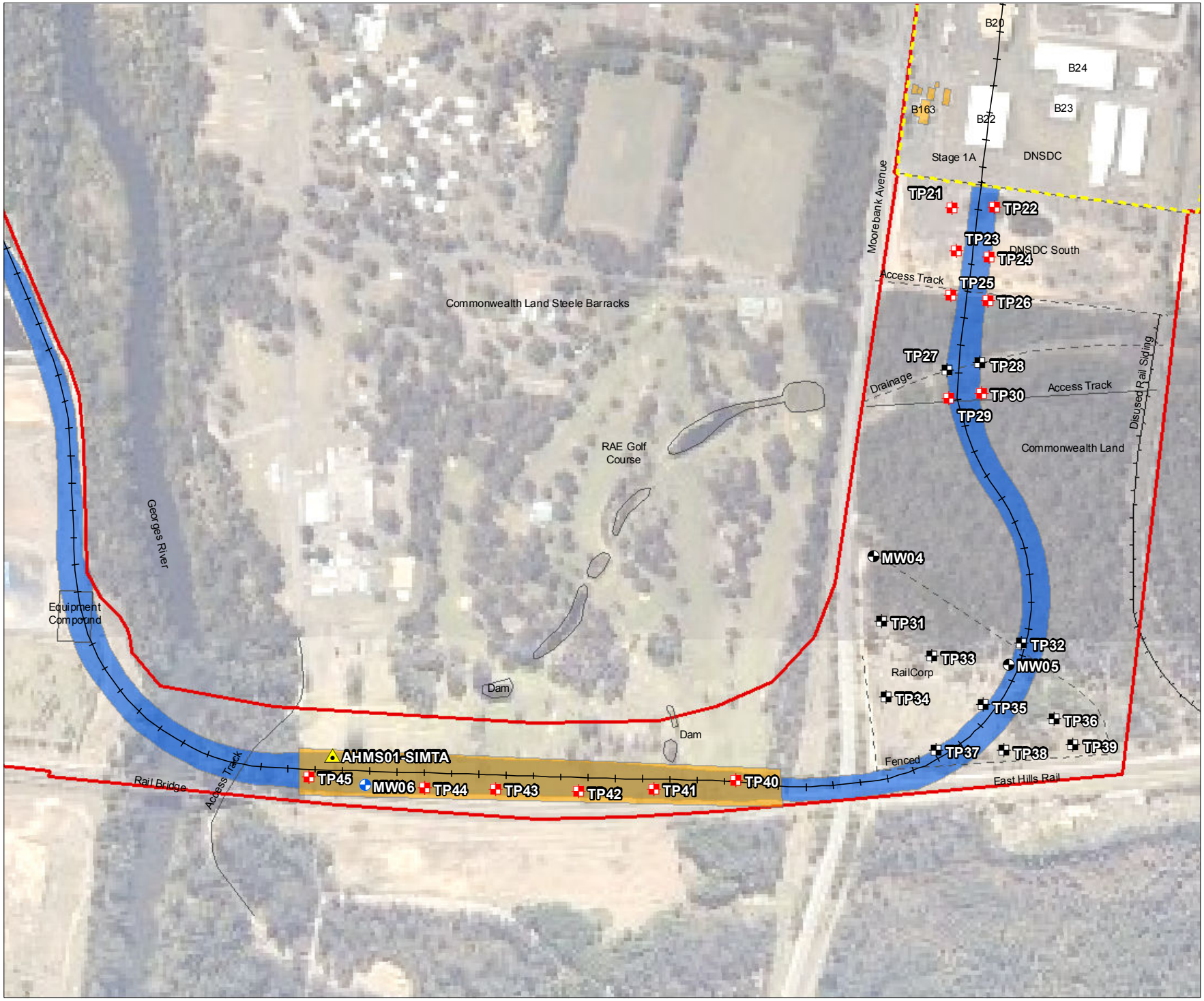
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

GROUND WATER ANALYTICAL EXCEEDANCES

FIGURE 13

File Name: 50342_13
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012



Legend:

- Project Site
- Stage 1 Site
- Rail Link (including 20m width and variable buffer)
- Proposed Rail Alignment
- Monitoring Well Location
- Test Pit Location
- Incomplete Monitoring Well Location (area inaccessible)
- Incomplete Test Pit Location (area inaccessible)
- Archaeological Sample Location (sampled by Golder Associates, 2015)
- Approximate Remedial Areas

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:5,500

0 50 100

metres

Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

SOUTHERN COMMONWEALTH AND RAIL LAND AND APPROXIMATE REMEDIATION AREA

FIGURE 14

File Name: 50342_14
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012

Legend:

- Investigation Area
- Stage 1 Boundary
- UST (Approximate Location)

2014 Sample Locations

- Borehole Location
- Monitoring Well Location
- Test Pit Location

Previous Sample Locations

- Borehole Location (HLA 2002)
- Monitoring Well Location (HLA 2002)
- Sediment Sample Location (HLA 2002)
- Surface Soil Sample Location (HLA 2002)
- Surface Water Sample Location (HLA 2002)
- Test Pit Sample Location (HLA 2002)
- Approximate Remedial Areas

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:600

0 10 20
metres

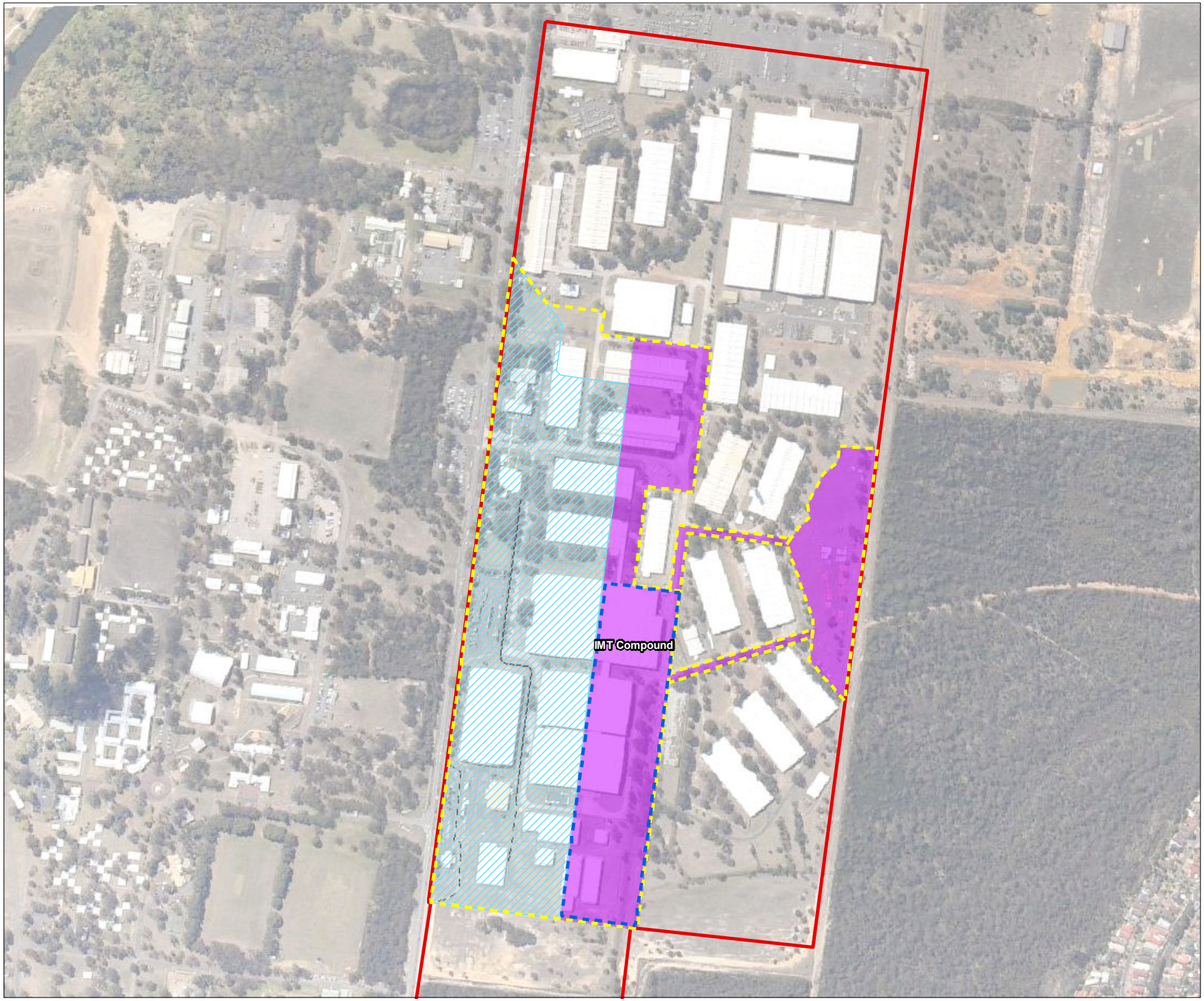
Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

REFUELLING AREA AND UNDERGROUND STORAGE TANK FARM AND APPROXIMATE REMEDIATION AREAS

FIGURE 15

File Name: 50342_15
Reference: Near Map www.nearmap.com, imagery date 08-01-2015, accessed 24-02-2015



Legend:

- Stage 1 Site
- Project Site
- Operational Area
- Compound Site
- Propsed On-Site Bioremediation Area

JBS&G

Job No: 50342

Client: Qube Property Management

Version: R03 Rev 0	Date: 23-Mar-2015
Drawn By: SE	Checked By: BG

Scale 1:8,000

0 100 200

metres

Coor. Sys. GDA 1994 MGA Zone 56

SIMTA Intermodal Terminal Facility - Stage 1

PROPOSED BIOREMEDIATION AREA

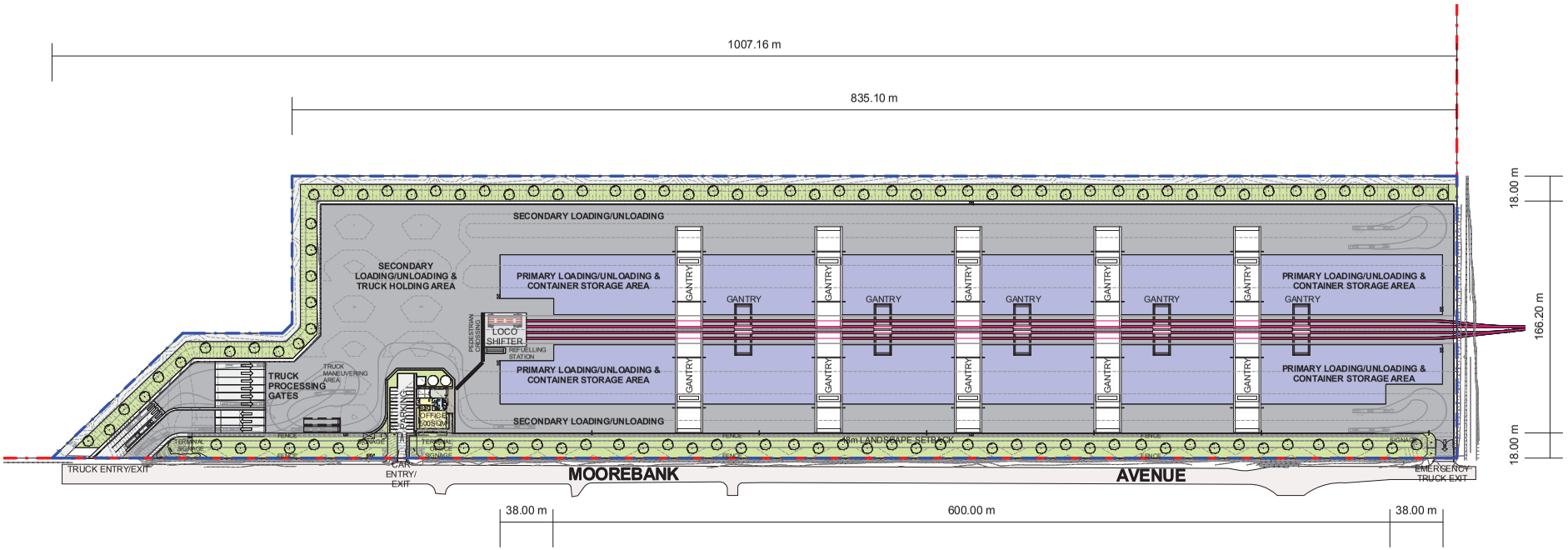
FIGURE 16

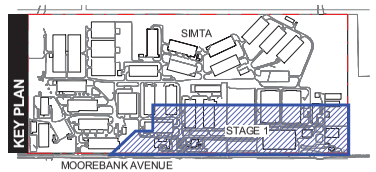
File Name: 50342_16
Reference: Near Map www.nearmap.com, imagery date 08-09-2012, accessed 09-10-2012

Appendix A: Terminal Site Plan

TERMINAL - SITE PLAN

STATE SIGNIFICANT DEVELOPMENT APPLICATION





LEGEND

- SIMTA SITE BOUNDARY
- STAGE 1 BOUNDARY

NOTES:
1. ALL LEVELS ARE INDICATIVE & SHOULD BE READ IN CONJUNCTION WITH CIVIL ENG. DWGS FOR FINAL LEVELS OF ALL EARTH WORKS
2. ALL SERVICES RELOCATION TO BE CONFIRMED BY ENG.

Issue	Description	Date	Ver	Auth
A	issue for information	16/12/2014		
B	issue for information	23/01/2015		
C	issue for information	06/02/2015		

north

Notes
ALL DIMENSIONS ARE APPROXIMATE AND ARE TO BE VERIFIED BY A REGISTERED LAND SURVEYOR.

Project
SIMTA INTERMODAL TERMINAL FACILITY (STAGE 1)

Project Address
MOOREBANK AVENUE, MOOREBANK, NSW

Owner / Developer
SIMTA

Project Manager
TACTICAL GROUP

Architect
REIDCAMPBELL
Architecture, Interiors, Planning
ACN 002 033 801 ABN 26 317 605 875
Level 15, 124 Walker Street
North Sydney NSW 2060 Australia
Tel: 61 02 9954 9011 Email: sydney@reidcampbell.com
Fax: 61 02 9954 4946 Web: www.reidcampbell.com

Drawing Title
TERMINAL - SITE PLAN

Drawn	Print Date	Scale @ A1
JJ	6/02/2015 7:26:41 PM	As indicated

Project Number
112110

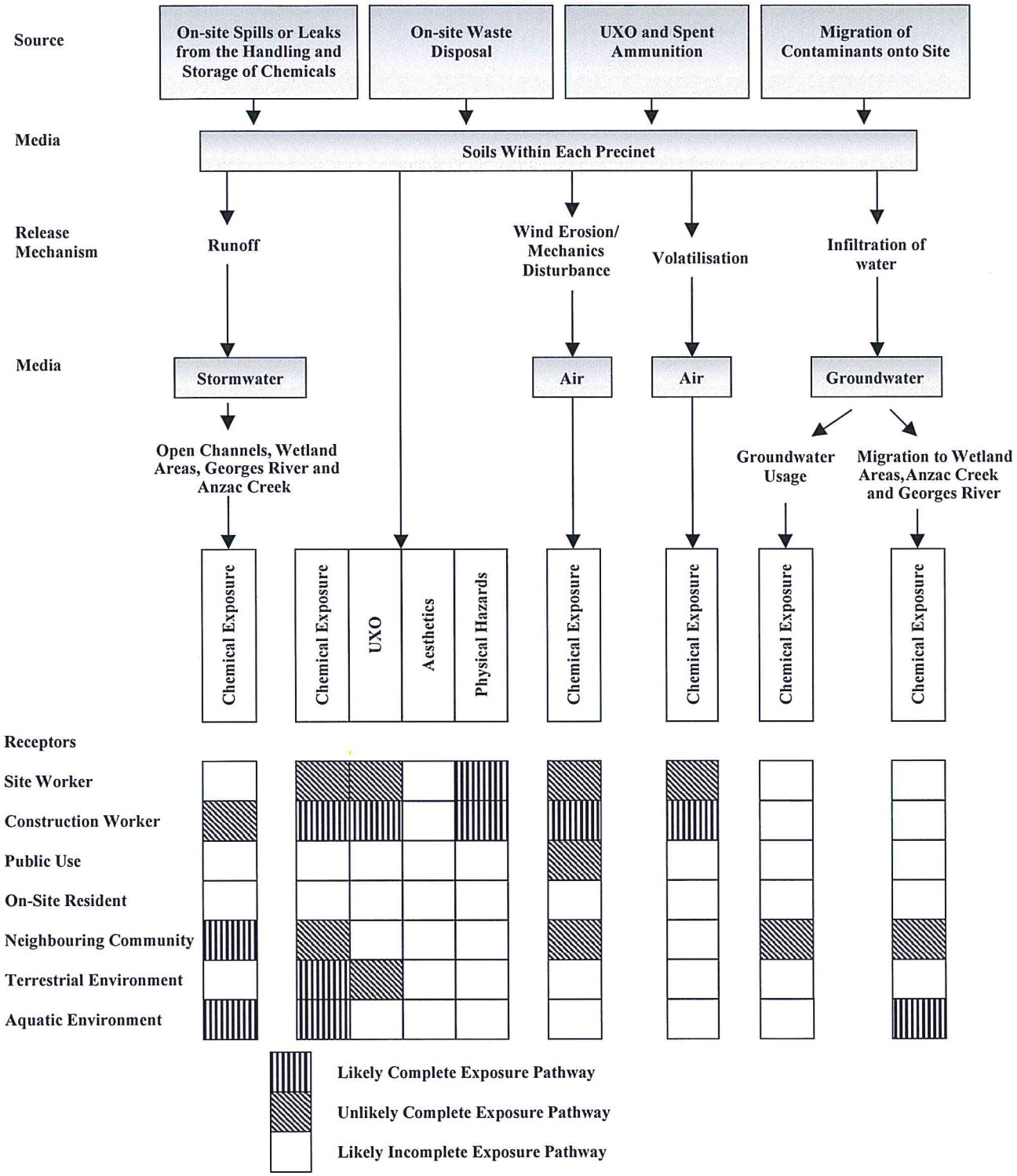
Drawing Number
A1101

Issue
C

C:\Revit\112110_Moorebank Intermodal_TEMP MASTER OUTPUT FILE_SSD_R13_rebuild.rvt

Appendix B: Conceptual Site Model (URS, 2002)

Figure 2
Conceptual Model



Appendix C: Previous Analytical Results

SOIL & GROUNDWATER INVESTIGATION
PRECINCT H (DNSDC)
MOOREBANK DEFENCE LAND

Prepared for

Commonwealth of Australia
Property Disposal Task Force
Level 8, 220 Pitt Street
Sydney NSW 2000

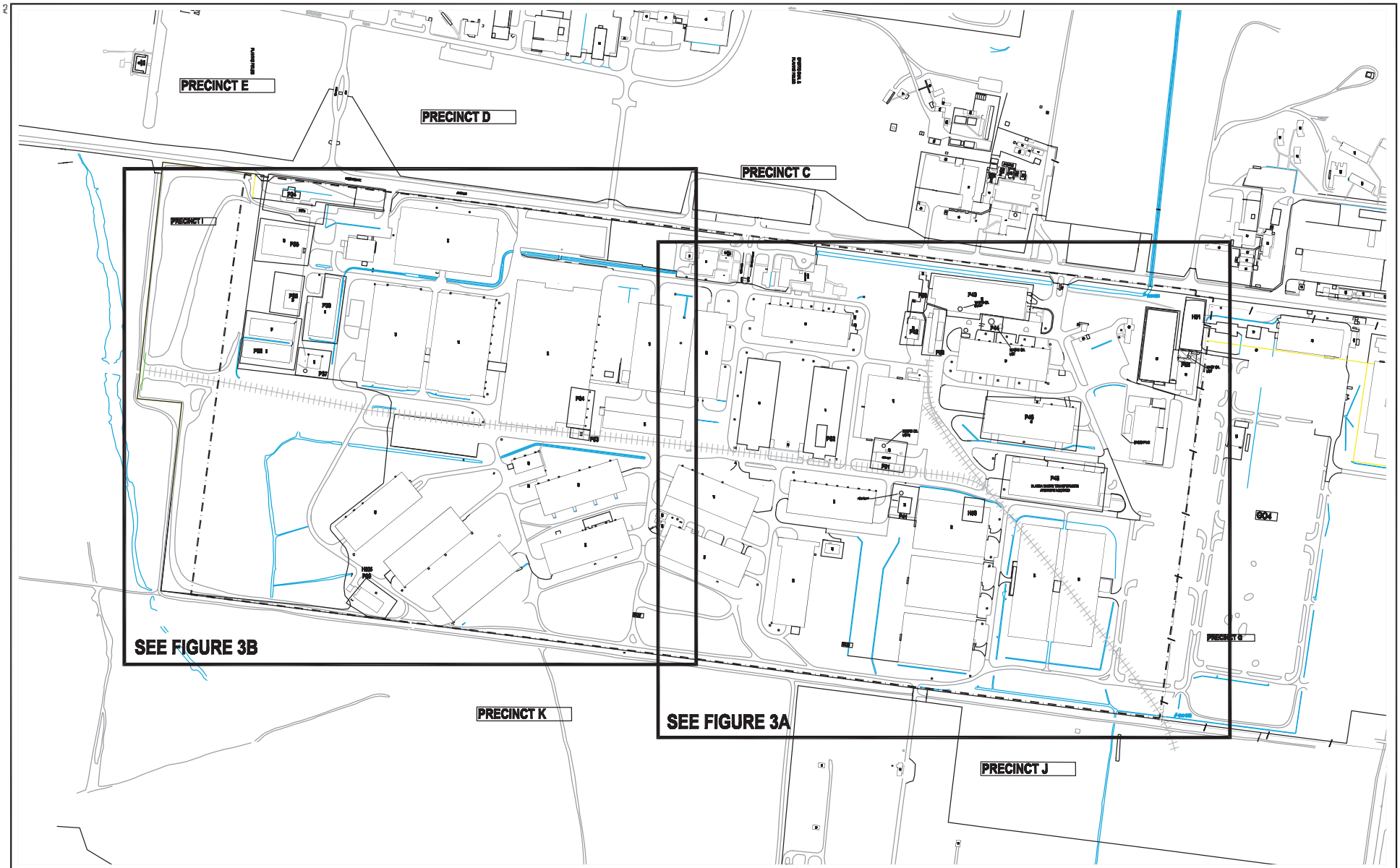
HLA-Envirosciences Project No D0307

by

Rachael Casson
Environmental Scientist

Sedat Tasdemir
Senior Environmental Scientist

8 November 2002

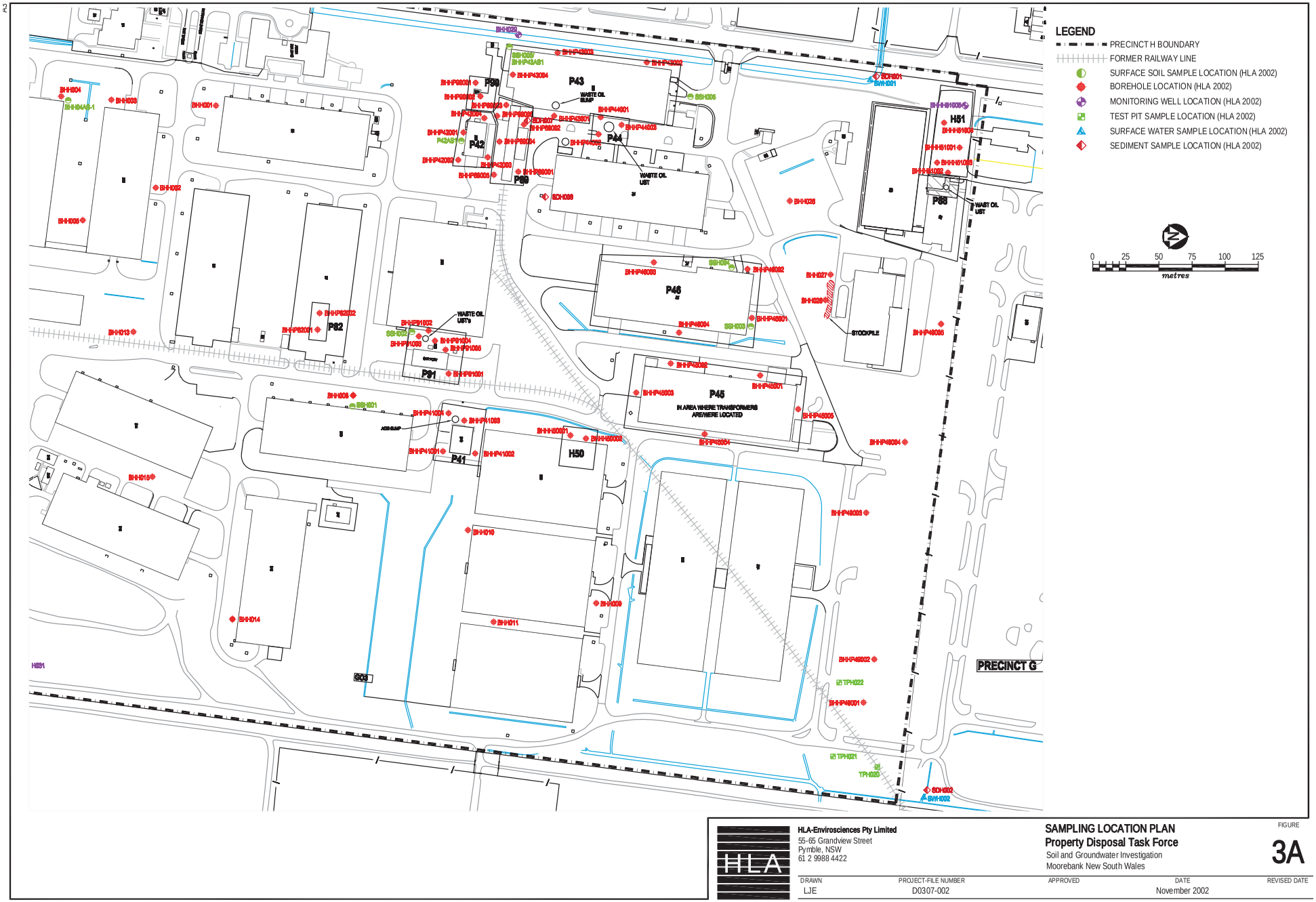


HLA-Envirosciences Pty Limited
55-65 Grandview Street
Pymble, NSW
61 2 9988 4422

AREA LOCATION PLAN
Property Disposal Task Force
Soil and Groundwater Investigation
Moorebank New South Wales

FIGURE
2

DRAWN	PROJECT-FILE NUMBER	APPROVED	DATE	REVISED DATE
LJE	D0307-002		November 2002	



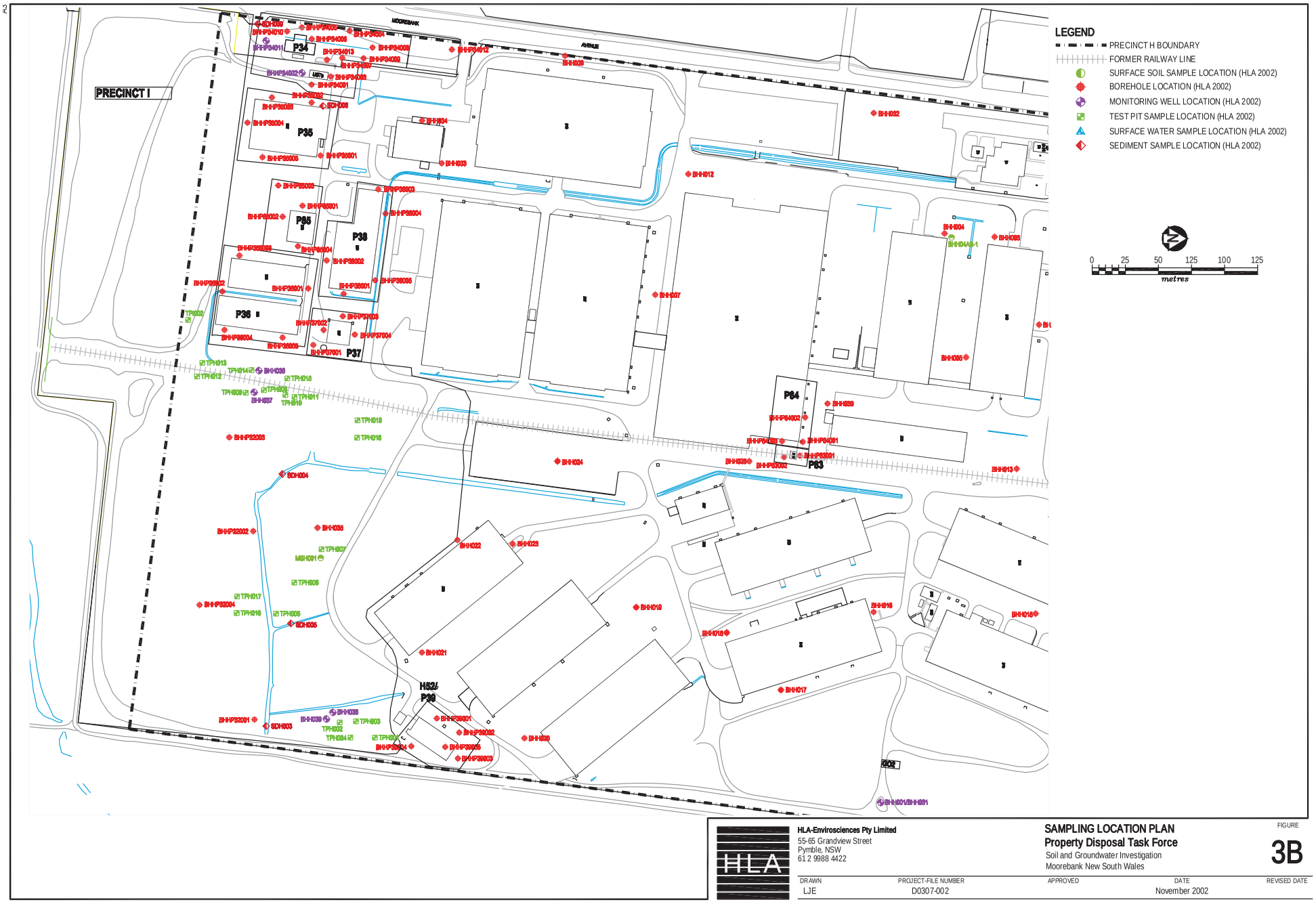
HLA

HLA-Envirosciences Pty Limited
55-65 Grandview Street
Pymble, NSW
61 2 9988 4422

SAMPLING LOCATION PLAN
Property Disposal Task Force
Soil and Groundwater Investigation
Moorebank New South Wales

FIGURE
3A

DRAWN	PROJECT-FILE NUMBER	APPROVED	DATE	REVISED DATE
LJE	D0307-002		November 2002	



HLA

HLA-Envirosciences Pty Limited
55-65 Grandview Street
Pymble, NSW
61 2 9988 4422

SAMPLING LOCATION PLAN
Property Disposal Task Force
Soil and Groundwater Investigation
Moorebank New South Wales

FIGURE
3B

DRAWN	PROJECT-FILE NUMBER	APPROVED	DATE	REVISED DATE
LJE	D0307-002		November 2002	