Australia Pacific LNG Project

Volume 5: Attachments

Attachment 10: Preliminary Site Investigation - Land Contamination Report - LNG Facility



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Executive Summary

Australia Pacific LNG commissioned WorleyParsons to carry out a Preliminary Site Investigation (PSI) within the Curtis Island study area, which is the location of a proposed Liquefied Natural Gas (LNG) Plant. The PSI forms part of the supporting documentation for an Environmental Impact Statement (EIS) prepared for the Project.

The purpose of the PSI was to investigate the potential occurrence of contamination within the study area which could impact on the construction activities of the proposed LNG facility development.

The methodology of the PSI followed former Department of Environment (DoE) *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* dated May 1998, and other applicable guidelines and standards.

The findings from the site history concluded that the study area was not likely to be contaminated by past land, due to the lack of development and land use in the area. This was confirmed through limited sampling and analysis, which could be used as background soil conditions for future comparison. The area was used for cattle grazing, and cattle grazing leases were granted in 1983.

Groundwater concentrations recorded from a sample collected from one onsite groundwater bore were likely to be representative of background conditions.

There was at least one notifiable activity identified as a livestock dip. This occurred approximately 5km southeast of the study area and therefore would not impact construction works.

It was concluded that the study area was unlikely to be contaminated and should not pose a contamination risk to the proposed LNG facility development.

Contents

1. Introduction 1
1.1 Project description 1
1.2 LNG facility components 1
1.3 Study area 2
1.4 Purpose of the PSI 2
1.5 Scope of work 2
1.6 Legislation 3
1.6.1 Guidelines and standards 3
2. Methodology 5
2.1 Site history 6
2.2 Subsurface investigation 6
2.3 Report preparation 6
3. Existing environment 8
3.1 Study area land use and zoning 8
3.2 Surrounding land use 8
3.3 Topography 8
3.4 Soil profiles and geology (field observations) 8
3.5 Regional geology and soil 9
3.6 Hydrogeology 9
3.7 Regional aquifer data 10
3.8 Study area inspections 10
4. Site history 13
4.1 Land titles and registered plan 13
4.2 Aerial photographs 14
4.3 Anecdotal information 18
4.4 DERM database information 18
4.5 Previous investigations 19
4.5.1 Gladstone LNG EIS (URS 2009) 19
4.5.2 Queensland Curtis LNG EIS (ERM 2009) 19
4.6 Potential impact to receptors 20
4.7 Summary of potential sources of contamination 20

5. Subsurface investigation 21
5.1 Investigation levels 21
5.2 Sampling and analysis program 22
5.3 Data quality objectives 23
5.4 Laboratory analyses 23
5.5 Laboratory QA/QC 24
5.6 Field QA/QC 25
6. Analytical results 27
6.1 Soil 27
6.2 Groundwater monitoring and analyses 27
6.3 Data validation 31
7. Conclusions 35

Figures

Figure 1 Project locality 38
Figure 2 Project description 39
Figure 3 Indicative LNG facility layout 40
Figure 4 Borehole locations 41
Figure 5 Study area geology 42
Figure 6 Former Cadastral boundaries 43
Figure 7 Current Cadastral boundaries 44

Tables

Table 3.1 Summary of soil profiles and observations 9
Table 3.2 Registered Bores 10
Table 4.1 Historical ownership 13
Table 4.2 Anecdotal Summary 18
Table 4.3 EMR and CLR search summary 18
Table 4.4 EMR and CLR current lots 3 and 4 19
Table 5.1 Investigation Levels 21
Table 5.2 Sampling and Analysis Program 22
Table 5.3 Laboratory Methods 24
Table 5.4 Laboratory quality assurance/quality control 24

Table 6.1 Soil Analysis Results Summary 27
Table 6.2 Groundwater monitoring results 28
Table 6.3 Groundwater analytical results (heavy metals filtered) 30
Table 6.4 Groundwater analytical results (TPH/BTEX) 30
Table 6.5 Laboratory program QA/QC summary 32
Table 6.6 Field QA/QC summary 34

Plates

Plate 3.1 View of vehicle access track used to navigate across Curtis Island. 11
Plate 3.2 View of swampy area located in the southern portion of the study area. 11
Plate 3.3 View of tidal mud flat located in the central-western portion of the study area. 11
Plate 3.4 View of the onsite groundwater bore and pump assembly. 12
Plate 3.5 View of dam used for stock watering. The dam is utilised for groundwater pumped from the onsite bore. 12
Plate 4.1 Date: 1959 Film No. QAP925 Run No. 1 Frame No. 30 Scale: 1:23,900 14
Plate 4.2 Date: 1973 Film No. QAP2689 Run No. 6 Frame No. 10 Scale: 1:31,900 15
Plate 4.3 Date: 1999 Film No. QAP5719 Run No. 8 Frame No. 192 Scale: 1:25,900 16
Plate 4.4 Date: 2007 Film No. QAP6266 Run No. 6 Frame No. 75 Scale: 1:40,000 17

Appendices

Appendix A Abbreviations
Appendix B Fieldwork procedures
Appendix C Borelogs and monitoring sheets
Appendix D Equipment calibration certificates
Appendix E Regional groundwater data
Appendix F Historical land titles and registered plan
Appendix G EMR/CLR listing
Appendix H URS and ERM site plans
Appendix I Laboratory reports
Appendix J QA/QC tables
Appendix K Laboratory tables

1. Introduction

The Australia Pacific LNG Pty Limited integrated project (the Project) comprises the further development of Australia Pacific LNG's coal seam gas fields in southern and central Queensland, the establishment of a major gas transmission pipeline, and a liquefied natural gas (LNG) facility with ancillary marine and onshore facilities within the Gladstone State Development Area (GSDA), Gladstone.

Australia Pacific LNG commissioned WorleyParsons to carry out a Preliminary Site Investigation (PSI) within the study area in the Curtis Island Industry Precinct of the GSDA, which is the location of the proposed LNG facility (refer Figure 1). The PSI forms part of the supporting documentation for an Environmental Impact Statement (EIS) prepared for the Project.

1.1 Project description

The Project's LNG facility is proposed to be developed in stages to a maximum ultimate capacity of approximately 18 Million tonnes per annum (Mtpa) of LNG. The ultimate configuration of the LNG facility is yet to be determined, but may comprise up to four LNG trains, each producing up to 4.5Mtpa of LNG. To produce 4.5Mtpa of LNG, each train will require approximately 270 Petajoules (PJ) of coal seam gas (CSG) per annum. This is roughly equivalent to 11 million m^3 of LNG per annum. The facility is planned to operate 24 hours a day, seven days a week.

Establishing the LNG facility will require the construction of wharf and jetty structures to enable the loading of the LNG vessels (refer Figure 2). Construction will also involve a materials offloading facility (MOF) to enable the transfer of personnel, building materials and heavy equipment to the project site for construction and operation. Independent infrastructure services (telecommunications, power, water, and sewage disposal) will also be established.

The construction of the marine infrastructure will involve dredging at the materials offloading facility, jetties, and berth pockets, and the subsequent management of the dredged material.

1.2 LNG facility components

The major components of the LNG facility will include:

- Up to four LNG trains which will generally consist of:
  - Inlet separation
  - Acid gas removal
  - Dehydration
  - Mercury removal
  - LNG refrigeration
  - Liquefaction
  - LNG storage
- Ancillary infrastructure which will generally consist of:
  - Sewage treatment plant

- Advanced water treatment plant
- Flares
- Materials offloading facility
- LNG loading berths
- Ferry terminal.

The proposed facility layout is shown on Figure 3.

1.3 Study area

The LNG facility study area is located on Curtis Island (in the area of the Curtis Island Industry Precinct, GSDA) and in the adjacent areas of Port Curtis. Port Curtis and Curtis Island are directly adjacent to Gladstone on the central Queensland coast (refer Figure 1).

The study area is comprised of Lot 3 on SP225924 and the northwestern portion of Lot 4 on SP225924, which are situated within the midwest corner of Curtis Island adjacent to Laird Point and bound by Graham Creek to the north and Targinie Passage to the west. The area is referred to as Laird Point.

The extent of the study area and site features is shown on Figure 4. Note that Lot 3 is the approximate location of the LNG facility and Lot 4 has been designated as the Curtis Island Infrastructure Corridor which will be a shared area for LNG pipelines.

The LNG facility site will cover approximately 270 hectares (ha), which includes approximately 231ha of land and 39ha of reclamation needed for facility infrastructure and the materials offloading facility. A seabed lease within Port Curtis of approximately 325ha is also proposed. The LNG facility footprint covers approximately 156ha (58%) of the project site. The PSI study area is approximately 453ha.

1.4 Purpose of the PSI

The purpose of the PSI was to assess the potential occurrence of soil contamination that may be present within the study area.

Investigations would be required to determine the nature and extent of any impact, if contamination was identified. The findings of the PSI and subsequent investigations would also be used to support the development of contamination management and/or remediation strategies.

1.5 Scope of work

The scope of work of the PSI was aimed at addressing the required tasks detailed in the Terms of Reference (TOR) dated December 2009. The scope of work included:

- Identifying land used for a Notifiable Activity as listed in Schedule 2 of the *Environmental Protection Act 1994* (EP Act), and land which is listed on the Queensland Environmental Management Register (EMR) or the Queensland Contaminated Land Register (CLR)
- Identifying any potentially contaminated land not listed on the EMR/CLR which may need remediation
- Conducting a PSI consistent with former Department of Environment (DoE) *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* dated May 1998 (DoE

draft guidelines) and other applicable guidelines and standards to determine background contamination levels

- Carrying out additional stages of the PSI if the initial investigation indicates potential or actual contamination. This is to determine the nature and extent of soil contamination, in accordance with the stages outlined in Appendix 5 of DoE draft guidelines
- Describing a remediation and validation sampling plan where contamination has been identified and not remediated.

1.6 Legislation

The PSI report is a supporting document for the Australia Pacific LNG EIS. The PSI process is regulated by the EP Act. The primary objectives of the EP Act are to protect environmental values and human health while allowing developments to be undertaken. The EP Act also shields land owners from the financial burden of others who cause environmental harm. This provides assurance to land owners located adjacent to the Project, that they will not be exposed to any financial hardship as a result of potential environmental degradation or restoration caused by Project activities.

These objectives are achieved through the implementation of an integrated management program administered by the Department of Environment and Resource Management (DERM). The program incorporates policies, subordinate legislation and guidelines that have been refined over the last 15 years. This approach ensures that proposed future developments are ecologically sustainable.

1.6.1 Guidelines and standards

The draft DoE 1998 guideline has been developed as a land use planning tool. It describes the environmental actions required to determine the suitability of land for a proposed change in land use. Accordingly, the draft guideline was relevant to the change in land use proposed by the Project. The draft guideline also provided soil investigation levels, data presentation styles for contamination investigations and guidance on the reporting structure.

To assist with the management of contaminated sites, DERM has maintained databases of confirmed contaminated and potentially contaminated sites in Queensland. Potentially contaminated sites are those that have had one or more notifiable activity carried out on the land. Notifiable activities are listed in Schedule 2 of the EP Act. The databases are referred to as the EMR and CLR. Confirmed contaminated sites are also listed on the EMR, and those that have the potential to cause serious environmental harm are listed on the CLR.

A broader more technical guideline that is followed by environmental practitioners is the National Environment Protection (*Assessment of Site Contamination*) Measure 1999 (NEPM) published by the National Environment Protection Council (NEPC). NEPM consists of a series of technical modules that apply to site investigations. The purpose of this guideline is to establish a nationally consistent approach to assessing contamination, and applies to the general environmental community that includes regulators, environmental practitioners, land owners, developers and industry. The Contaminated Land Section of DERM supports the modules of NEPM, and therefore it is an additional guideline that environmental practitioners should follow when undertaking site contamination investigations in Queensland.

NEPM also references Australian/New Zealand Standards (AS/NZS). These standards provide more technical detail on the stages of site investigations, the approach to determining sampling locations,

sampling techniques, data quality objectives and quality control/quality assurance methods. The Standards that apply to site contamination investigations include:

- AS4482.1-2005 *Guideline to the investigation and sampling of site with potentially contaminated soil Part 1: Non-volatile and semi-volatile compounds*
- AS4482.2.2-1999 *Guideline to the investigation and sampling of site with potentially contaminated soil Part 1: Volatile substances*
- AS/NZS 5667.1:1998 *Water quality – Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*
- AS/NZS 5667.11:1998 *Water quality – Sampling Part 11: Guidance on the sampling of groundwaters.*

2. Methodology

The methodology of the PSI was partly derived from the guidelines and standards specified in:

- AS4482.1-2005 *Guide to Sampling and Investigation of Potentially Contaminated Soil. Part 1: Non-volatile and semi-volatile compounds*
- AS4482.2-1999 *Guide to the sampling and investigation of potentially contaminated soil Part 2: Volatile substances*
- AS/NZS 5667.1:1998 *Water quality – Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*
- AS/NZS 5667.11:1998 *Water quality – Sampling Part 11: Guidance on the sampling of groundwaters*
- DoE draft 1998 guidelines
- NEPM *Schedule B(2) Guideline on Data Collection Sample Design and Reporting*, 1999.

WorleyParsons field procedures are also in general agreement with the above guidelines and standards. A summary of these field procedures is provided in Appendix B.

The purpose of the PSI was to assess the potential occurrence of soil contamination that may be present within the study area. A PSI is generally based on a desktop study, and is often supported by limited sampling and analysis. Limited sampling is generally carried out, when warranted, to provide evidence that land is or is not potentially contaminated. If contamination is identified, then a more detailed investigation should be conducted to assess the nature and extent of the impact. The investigation process should be staged to avoid costly over expenditures, particularly when site history indicates a low risk of contamination being present.

The study area was considered a low risk of containing contamination based on site history. As a result, no detailed subsurface investigations were required. A baseline soil contamination investigation was conducted to establish background soil concentrations, which could be referenced at the decommissioning stage of the LNG facility. The assessment was undertaken using a combination of drilled and hand augered boreholes positioned in accessible areas within the study area.

A limited groundwater assessment was also included in the PSI based on identifying and sampling an existing groundwater bore located within the study area, during the site history review.

The methodology described in Sections 2.1 to 2.3 follows the principles outlined in the DoE draft 1998 guidelines and applicable NEPM schedules for assessing contaminated land and Australian Standards for conducting field investigations. Given the limited area of the Project, these guidelines and standards can be directly applied to this investigation without the need for modification or advice from DERM.

The primary principle when assessing potentially contaminated land is to base the investigation on a comprehensive site history (desktop study). This is to evaluate the potential presence and possible extent of hazardous contaminants.

The site history was the basis for developing a soil sampling and analysis program for this PSI and, on this basis, it was appropriate to conduct a limited soil assessment. This approach ensures that the outcome of the PSI will be defensible against regulatory scrutiny.

2.1 Site history

The site history provides background information on land use and previous site activities that were assessed to determine the potential for contamination and the methodology for sampling and analysis. For this PSI, the site history was obtained from the following sources:

- A review of previous investigations
- Interviews with former land owners or occupiers of the land
- EMR/CLR searches of the study area, as well as surrounding lots (this helped determine the potential for contamination from off-site sources)
- DERM registered groundwater bore data within the vicinity of the study area
- Historical land titles to assess past land use
- Historical aerial photographs to identify historical land uses and possible notifiable activities that may have been carried out, and to potentially identify areas of concern such as derelict structures, staining and dead vegetation.

2.2 Subsurface investigation

A limited subsurface investigation methodology was developed based on site history, EMR/CLR searches and study area inspections that were conducted during the study. The primary aim of the subsurface investigation was to establish background soil and groundwater concentrations, and to target any specific areas identified in the site history that would require further investigation.

The subsurface investigation consisted of six boreholes (BH01, BH03, BH07, BH10, BH12 and BH16) which are shown on Figure 4. WorleyParsons used a hand auger to drill these locations, which were spaced across the footprint of the LNG facility to determine background contaminant concentrations. Hand augering was limited to 0.3m to 1.0m below ground surface (bgs) due to the firm to stiff soil conditions and shallow rock. Six boreholes were considered on the basis of site history, in accordance with AS4482.1-2005 and were sufficient for meeting the purpose of the PSI. Field screening of soil samples was undertaken to determine if volatile organic compounds (VOCs) and industrial residues such as waste, oil, tar or ash were present.

Laboratory analyses included heavy metals (arsenic, cadmium, copper, chromium, lead, mercury, nickel and zinc), and Organochlorine/Organophosphate pesticides (OC/OP pesticides). This is the minimum suite of analyses DERM recommends when assessing potential fill material.

Note that in the absence of commercial/industrial use or notifiable activities occurring on a site, it is standard procedure to target contaminants typically found in fill material, which was the primary rationale for these analyses. No hydrocarbon analyses were undertaken based on the absence of VOCs and industrial residues recorded during the field screening of soil samples.

A groundwater sample was collected from the onsite bore and analysed for heavy metals (filtered) and total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene, total xylenes (BTEX) for the purpose of assessing background groundwater concentrations prior to the study area being disturbed by development works. Field-measured water quality parameters were also recorded which included pH, electric conductivity (EC), temperature (T), redox potential (Redox) and dissolved oxygen (DO).

2.3 Report preparation

The PSI report was prepared in general accordance with:

- DoE draft guidelines
- NEPM (1999), *Schedule B(2) Guideline on Data Collection, Sample Design and Reporting*, dated 1999.

3. Existing environment

3.1 Study area land use and zoning

The study area is comprised of Lot 3 on SP225924 and the northwestern portion of Lot 4 on SP225924. Both are situated within the midwest corner of Curtis Island, and bound by Graham Creek to the north and Targinie Passage to the west. The study area is referred to as Laird Point. The extent of the study area and site features is shown on Figure 4. Note that Lot 3 is the approximate location of the LNG facility and Lot 4 has been designated as the Curtis Island Infrastructure Corridor which will be a shared area for LNG pipelines. The area is situated within the Curtis Island Industry Precinct within the GSDA.

3.2 Surrounding land use

The study area is situated within the south-western corner of Curtis Island and there are no developed areas surrounding the study area. The land surrounding the study area consists of the following:

- North – Graham Creek
- East – native forest
- South – undeveloped land and the proposed location of the Queensland Curtis LNG facility. Environmental and geotechnical investigations were being conducted in this area at the time of this PSI
- West – Targinie Passage.

3.3 Topography

The topography of Curtis Island is predominantly comprised of undulating terrain and tidal flats and salt pans to steeply graded (>30%) low round hills. The study area, located in a small embayment on the southwestern corner of Curtis Island known as Laird Point, is surrounded by steeply sloping low round hills (>20%) to the north, south and east, but is predominantly comprised of gently undulating flats (<2%). The western foreshore flats within the study area extend approximately 200 to 400m from the shore and are traversed by several small drainage lines.

The maximum elevation within the study area is 62m Australian Height Datum (AHD), and this occurs in the southeast corner. The lowest elevation is at the intertidal flats (located between low and high tide levels) on the central to western portion of the study area. The intertidal flats merge into supratidal flats (located between high and spring tide level) which extend up to 15m AHD.

3.4 Soil profiles and geology (field observations)

Soil profiles observed during the subsurface investigation were generally consistent between borehole locations. For each borehole, the soil profile was logged and a photographic record taken. Each soil sample was also field screened for VOCs using a photoionisation detector (PID). The soil profile, photographic record and PID results were included in borelogs, which are provided in Appendix C. The PID was calibrated by the equipment supplier and a copy of the calibration certificate is provided in Appendix D. A summary of the soil profiles and field observations are provided in Table 3.1.

Table 3.1 Summary of soil profiles and observations

Soil Description	Range (mbgs)	Observations of Potential Contamination Impact
Silts, grey to grey/brown, firm to stiff, dry	0.0-1.0	PID Reading = 0.0ppmv
Silty Clays, Sandy Clays, Sandy Gravely Clays, grey to dark grey with various red/brown/orange mottling, moist to wet	1.0-4.0	No PID Reading recorded

Notes: PID – Photoionisation Detector, ppmv – parts per million by volume, mbgs – metres below ground surface

3.5 Regional geology and soil

The geology of the study area was assessed using available 100K mapping sourced from the Queensland Department of Mines and Energy (DME) Geoscience and Resources Database; Mineral and Energy Resources Location and Information Network (MERLIN). This dataset is dated 2007.

The available geological data indicates there are three geologic units which underlay the southwestern corner of Curtis Island (refer Figure 5). These are:

- Wandilla Formation
- Quaternary alluvium (Qa)
- Holocene miscellaneous unconsolidated sediments (Qhe/m).

The study area is predominantly underlain by the Wandilla Formation, but there are inclusions of both the Quaternary alluvium and Holocene miscellaneous unconsolidated sediments which comprise the estuarine channels and banks, intertidal and supratidal flats and coastal grasslands.

The Wandilla Formation, which is part of the Late Devonian to Early Carboniferous aged Curtis Island Group, is comprised of mudstone, quartz greywacke, pale grey chert and lithic sandstone (locally containing silicified oolites), siltstone, jasper, chert and slate; local schist. The Quaternary alluvium is comprised of clay, silt, sand and gravel (floodplain alluvium).

The Holocene miscellaneous unconsolidated sediments are comprised of mud, sandy mud, muddy sand and minor gravel which are located in the central to western portion of the study area.

3.6 Hydrogeology

A search of the DERM groundwater data base produced a list of registered bores within a 5.0km radius of the study area. The search revealed one groundwater bore, No. 91326, located within the study area (Lot 3 on SP225924) and a second groundwater bore, No. 91325, located approximately 4km southeast (Lot 9 on DS220). The details of these bores are summarised in Table 3.2. The bore locations are shown on a DERM plan provided in Appendix E.

Both bores recorded a depth to groundwater of approximately 10m bgs. The salinity of the groundwater from both bores was believed to be moderately saline. This was based on one sample collected from 91325 which recorded an electric conductivity of 12,000µS/cm, and bore 91326 being noted as salty. These details are contained in Bore Cards provided in Appendix E.

Table 3.2 Registered Bores

Bore no.	Distance and direction from site	Use (refer to 4.3)	Comments
91325	4km south (Lot 9 DS220)	Not used	Date Installed – 1993 Total Bore depth – 27.3m Screened Interval – 22.2m-27.3m Static Water Level – ~10m bgs (1993) Geologic formations encountered – Wandilla Formation Groundwater Quality – 12,000µS/cm (1993) Groundwater Yield 3L/second (1993)
91326	Within study area (Lot 3 on SP225924)	Stock watering	Date Installed – 1993 Total Bore depth – 30.3m Screened Interval – 15m-27.3m Static Water Level – ~10.6m bgs (1993) Geologic formation encountered – Wandilla Formation Groundwater Quality – noted as salty (1993) Groundwater Yield – 0.52L/second (1993)

The current and past use of cattle grazing should not have an adverse impact on groundwater quality. Therefore there would be a low risk for these registered bores to be contaminated from such activities.

3.7 Regional aquifer data

Reference to DERM Groundwater Resource map (Map 4, dated 1987, 1:250,000 series) indicated the following aquifer characteristics could be encountered within the study area:

- Bore yield – <5 L/second
- Salinity – 500 to 1,500mg/L
- Suitability – suitable for most purposes. Marginal for human consumption and low salt tolerant crops.

The aquifer yield information illustrated in the DERM Groundwater Resource map was in agreement with the data recorded from the surrounding registered bores (refer Table 3.2). However, the expected salinity of 500 to 1,500mg/L was much lower than the salinities recorded at these bores, which was approximately 120,000µS/cm (refer Table 3.2).

3.8 Study area inspections

Study area inspections were conducted between the 13 and 20 July 2009. The findings of the inspections are summarised below No indicators of potential study area contamination were present, such as staining, odours, rubbish, construction and demolition waste or stressed vegetation.



Plate 3.1 View of vehicle access track used to navigate across Curtis Island.



Plate 3.2 View of swampy area located in the southern portion of the study area.



Plate 3.3 View of tidal mud flat located in the central-western portion of the study area.



Plate 3.4 View of the onsite groundwater bore and pump assembly.



Plate 3.5 View of dam used for stock watering. The dam is utilised for groundwater pumped from the onsite bore.

4. Site history

4.1 Land titles and registered plan

The study area is located within Lot 3 on SP225924 and the northwestern portion of Lot 4 on SP225924. Lot 3 was formed from original Lots 10, 11, 27 and 28 on DS220, while Lot 4 was formed from original Lots 7, 10, 11, 12 and 28 on DS220. The original lots, now cancelled, are shown on Figure 6. Lots 3 and 4 are shown on Figure 7.

Lot 3 is the proposed location of the LNG facility and Lot 4 is the proposed location of the LNG pipeline corridor. The historical land titles for Lots 3 and 4 extended back to the Deed of Grant dated 1958. This identified the original lots that formed the entire southern portion of Curtis Island. The study area is only a small portion of this area. A summary of land tenure of Lots 3 and 4 is provided in Table 4.1.

Other lots have also been noted in Table 4.1. These were included in the amalgamation of the original lots that formed this portion of Curtis Island, but were not part of the study area or LNG facility area. Note that there were no records reviewed for the creation of Lot 2 on SP224898, as this lot was not within the study area or LNG facility area, and its creation was not referenced in the historical title information provided for Lots 3 and 4.

Historical grazing leases were also acquired for Lots 1 to 4 on SP225924 in 1983. A summary of the land ownership and leases held is provided in Table 4.1. Current and historical land titles and registered plans are provided in Appendix F. The former and current cadastral boundaries are shown in Figure 6 and Figure 7.

Table 4.1 Historical ownership

Lot on Plan	Land owner	Year
Lots 1 to 4 SP225924	The Minister for Industrial Development of Queensland	21/8/2009
Lots 1 to 4 SP225924 formed from Lot 1 on SP224899		21/8/2009
Lot 1 on SP224899 cancelled		14/7/09
Lot 2 on SP224899 formed from Lots 7, 12,13, and 28 on DS220 and Lot 2 on SP224898		26/5/2009
Lot 1 on SP224899 formed from Lots 7, 10, 11, 12, 27 and 28 on DS220		26/5/2009
Lots 7, 10, 11, 12, 13, 27 and 28 on DS220 and Lot 2 on SP224898 cancelled		26/5/2009
Lots 7, 10, 11, 12, 13, 27 and 28 on DS220	The State of Queensland (represented by the Department of Infrastructure and Planning)	1958 to 2009
Lot on Plan	Historical grazing lessee	Year
Lots 1 to 4 SP225924	No leases held	21/8/2009 to present
Lots 7, 10, 11, 12, 13, 27 and 28 on DS220	Ross William Graving, Colin Grant Graving and Mark Jon Graving	5/3/1993 to 21/8/2009
	Giuseppe Emmanuelle	17/10/1989-5/3/1993
	Jack Richey	1983-1989

4.2 Aerial photographs

Historical aerial photographs were obtained from DERM, and these include years 1959, 1965, 1973 1980, 1992, 1999 and 2007. The photographs indicated that there has been only grazing land use within the study area, and therefore unlikely to be onsite contamination arising from past land use. Selected aerial photographs of the Laird Point area are provided in Plate 4.1 to Plate 4.4.

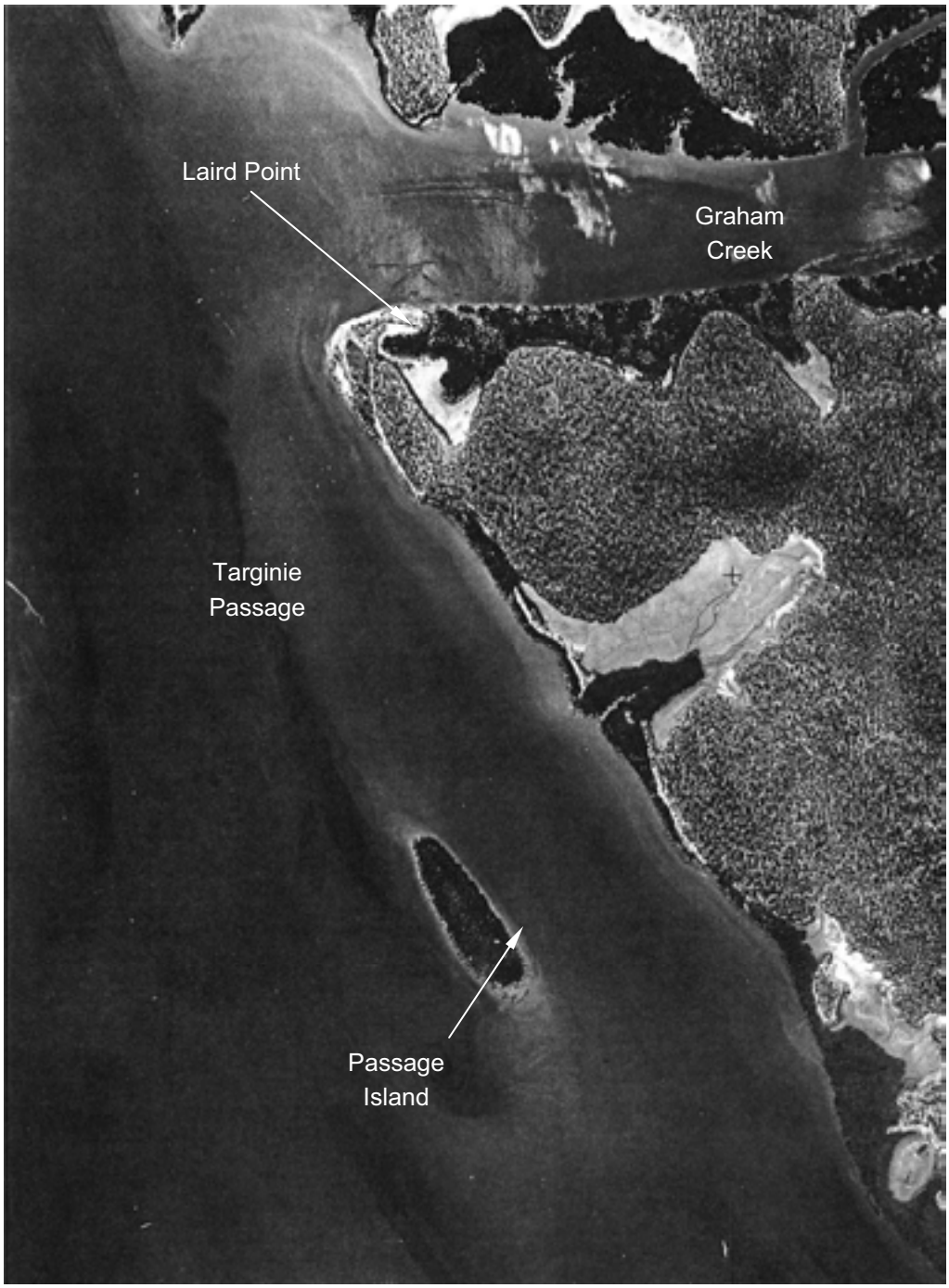


Plate 4.1 Date: 1959 Film No. QAP925 Run No. 1 Frame No. 30 Scale: 1:23,900

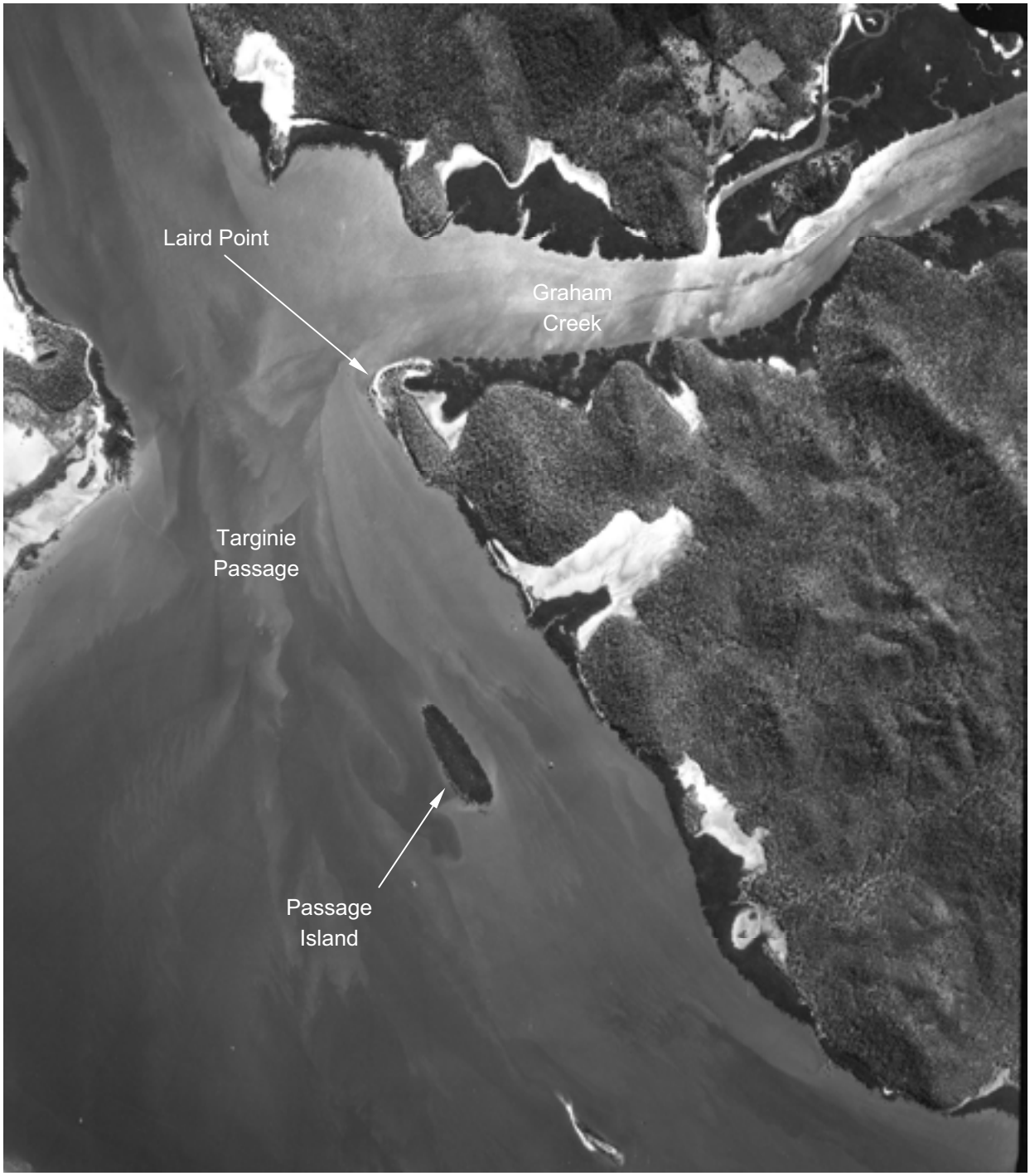


Plate 4.2 Date: 1973 Film No. QAP2689 Run No. 6 Frame No. 10 Scale: 1:31,900

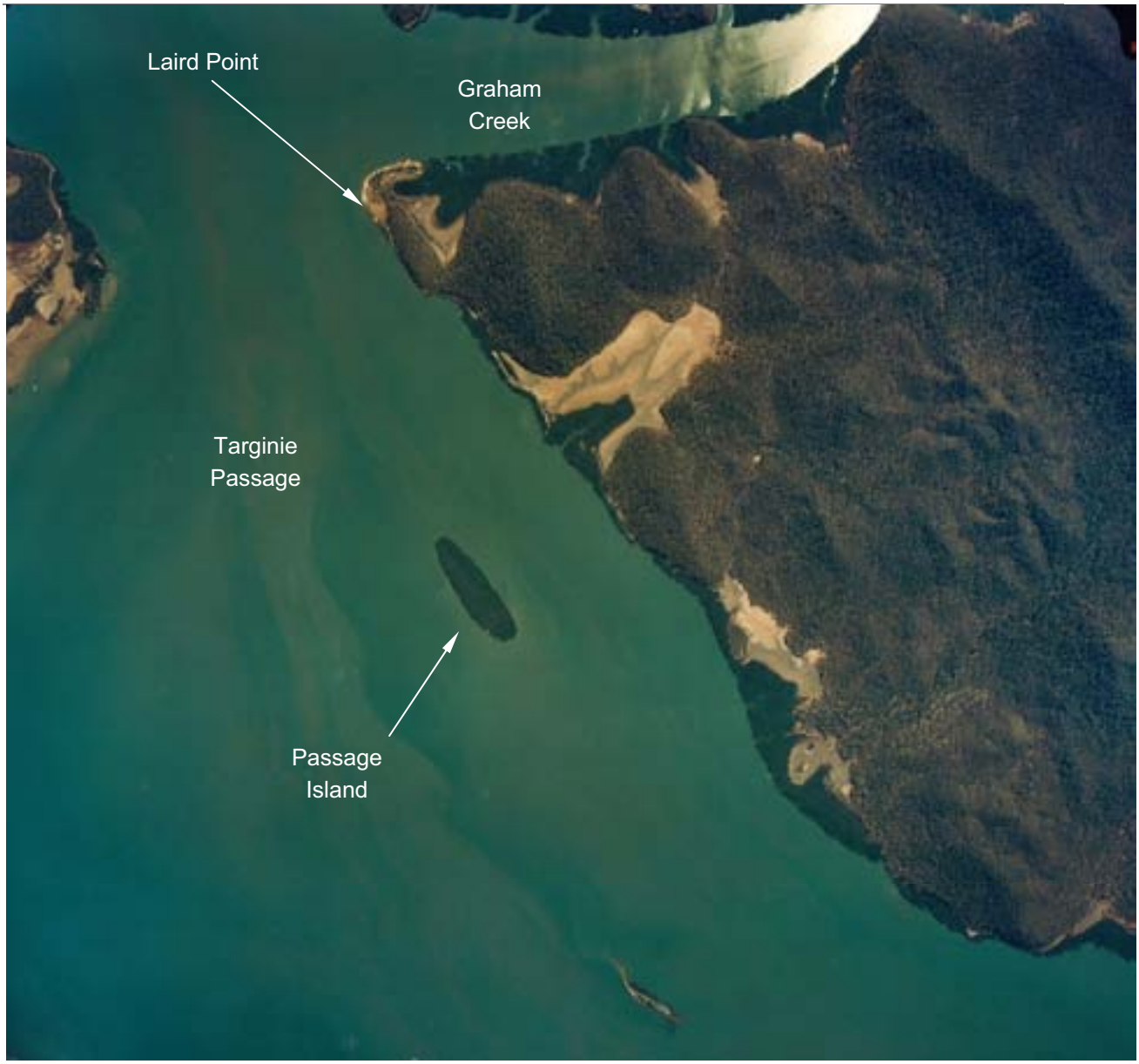


Plate 4.3 Date: 1999 Film No. QAP5719 Run No. 8 Frame No. 192 Scale: 1:25,900



Plate 4.4 Date: 2007 Film No. QAP6266 Run No. 6 Frame No. 75 Scale: 1:40,000

4.3 Anecdotal information

Table 4.2 outlines an anecdotal summary for the study area.

Table 4.2 Anecdotal Summary

Contact	Date	Description
Ross Graving (former land owner)	16/7/09	Mr Graving leased lots on Curtis Island since the early 1990s. He has used the land for cattle grazing. He installed both registered bores listed in Section 3.6 in 1993 to provide stock water during dry periods. The bore located on Lot 9 on DS220 was too salty and has not been used since being installed. The other bore located within the study area is equipped with a submersible pump, and this pumps groundwater to a nearby dam. This is a watering hole for cattle. Mr Graving has completed some limited analysis of the bore water, but no data was available. Mr Graving recalled that results indicated the groundwater was suitable for stock watering. Mr Graving confirmed that no development works, industrial activities or landfilling has occurred within the study area. Mr Graving indicated that there is an abandoned cattle dip and sheds located on Lot 2 on RP602284 (refer Figure 6). There are also disused batteries and farming equipment present within this area.

4.4 DERM database information

A search of the subject lots on the EMR and CLR was conducted on 29 June 2009, which was before the current configuration of the registered lots (i.e. Lots 3 and 4). Accordingly, the search was undertaken for former Lots 11 and 27 on DS220, which were located within the study area. The results confirmed that neither lot was listed for a notifiable activity. A copy of the EMR and CLR search is provided in Appendix G.

A cadastral map showing the former lot boundaries is shown in Figure 6 and current lot boundaries in Figure 7. A search of the surrounding lots to assess potential off-site contamination indicated that none of the surrounding lots were listed for a notifiable activity. Accordingly the potential for off-site contamination to exist was considered low. The results are summarised in Table 4.3.

Table 4.3 EMR and CLR search summary

Lot/Plan description	Date searched	Result
Lot 1 RP602284	25 June 2009	Not listed on the EMR/CLR
Lot 2 RP602284	25 June 2009	Not listed on the EMR/CLR
Lot 6 DS220	25 June 2009	Not listed on the EMR/CLR
Lot 7 DS220	25 June 2009	Not listed on the EMR/CLR
Lot 9 DS220	25 June 2009	Not listed on the EMR/CLR
Lot 10 DS220	25 June 2009	Not listed on the EMR/CLR

Lot/Plan description	Date searched	Result
Lot 11 DS220	25 June 2009	Not listed on the EMR/CLR
Lot 27 DS220	25 June 2009	Not listed on the EMR/CLR
Lot 28 DS220	25 June 2009	Not listed on the EMR/CLR

Although not listed on the EMR, the disused cattle dip (a notifiable activity) was present on Lot 2 on RP602284. This lot was not within the study area.

Note that at the time of the EMR and CLR search, current Lots 3 and 4 were not created. A listing of these lots on the EMR or CLR was subsequently searched and the results indicated that neither was present. These results are shown in Table 4.4.

Table 4.4 EMR and CLR current lots 3 and 4

Lot/Plan description	Date searched	Result
Lot 3 SP225924	30 November 2009	Not listed on the EMR/CLR
Lot 4 SP225924	30 November 2009	Not listed on the EMR/CLR

4.5 Previous investigations

4.5.1 Gladstone LNG EIS (URS 2009)

URS Australia conducted a PSI within the Hamilton Point area, which is located in the southwestern corner of Curtis Island (URS, 2009). URS investigated the disused dip located on former Lot 2 on RP602284. A site plan showing the location of soil samples is provided in Appendix H.

Soil samples collected near the disused cattle dip indicated there were elevated arsenic concentrations present in surface soil and in soil at 0.5m bgs. Arsenic concentrations ranged from 707mg/kg to 1,160mg/kg. No OC/OP pesticide concentrations were detected, which suggested this was an old dip used during the era when arsenic was the chemical of choice for cattle farmers.

URS did not delineate the arsenic impact or investigate groundwater concentrations near the disused dip. Heavy metal analyses also indicated that concentrations exceeded DERM Environmental Investigation Levels, and these included copper, chromium, manganese and vanadium. However, the concentrations were considered representative of background conditions.

Based on the information reviewed, elevated arsenic within the disused cattle dip area (and potentially groundwater) should not pose a risk to the study area, given that the dip area is approximately 5km from the study area.

4.5.2 Queensland Curtis LNG EIS (ERM 2009)

ERM conducted a Stage 1 and Preliminary Stage 2 investigation within an area presumed to be a former cattle dip site (refer Figure 4). Six boreholes were drilled in the area and 25 soil samples analysed for OC/OP pesticides and heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). A site plan showing the locations of soil samples is provided in Appendix H. Note that the location of the suspected cattle dip was within Lot 4 on SP225924, but not within the footprint of the proposed LNG facility (refer Figure 4).

Analytical results indicated that OC/OP pesticides were not detected and heavy metal concentrations did not exceed NEPM (1999) Health-based Investigation Levels (HILs) for commercial/industrial settings. Also, the heavy metal concentrations did not exceed NEPM (1999) HILs for Residential A settings or DERM phyto-toxicity guidelines, which are criteria often used to determine if land is contaminated.

These findings indicated that the suspected cattle dip area may not be significantly contaminated, and therefore should not impact the construction activities of the proposed LNG facility. WorleyParsons confirmed through a discussion with Ross Graving (former lessee of the land) that he believed this was not a cattle dip but a stock watering location. The pit shown on the figure provided in Appendix H was possibly a hand dug well. The period during which this watering location was used was believed to be before 1983, when the first registered lease was recorded.

4.6 Potential impact to receptors

The nearest potential contaminant receptors to the study area would include:

- The existing registered bore (91326) present in the study area, which is only used for stock watering and would likely be decommissioned during the construction of the proposed LNG facility and therefore should not be considered a permanent receptor
- The surrounding registered bore (91325), which is located approximately 4km south of the study area and is not used for any beneficial purpose
- Targinie Passage, Graham Creek and the marine environment which borders the northern and western boundaries of the study area.

The current condition and land use of the study area should not pose a risk to these receptors.

A potential risk is future construction activities. The earthworks undertaken during the construction of the LNG facility would pose a potential risk of discharging stormwater and sediment into Targinie Passage. However, a comprehensive construction environmental management plan will be developed as part of the development works, and these management actions will minimise the risks and the potential to impact Targinie Passage.

4.7 Summary of potential sources of contamination

Based on the site history, there is a low potential for contamination to be present within the study area. This was confirmed through a limited soil sampling and analysis program undertaken as part of this PSI. The analytical results are discussed in Section 6. These results could be used as baseline soil concentrations for future comparison with other PSIs conducted at, or in the vicinity of, the study area.

5. Subsurface investigation

5.1 Investigation levels

WorleyParsons referenced the following investigation levels for the purposes of this investigation.

Soil investigation levels

- DERM (1999) Unpublished guidelines for petroleum hydrocarbons
- NEPM (1999) HIL A for Residential A settings
- DERM Phyto-toxicity guidelines for copper and zinc
- NEPM (1999) HIL F for commercial/industrial settings.

NEPM (1999) HIL F was selected to assess the land's suitability for commercial/industrial use. NEPM (1999) HIL A and DERM phyto-toxicity guidelines are generally used to assess if land is contaminated, but are not necessarily the only guidelines used for all circumstances for all sites.

Groundwater guidelines

- Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ) 2000, marine water guidelines (95% protection)
- New Zealand Ministry for the Environment (NZME) 1999, *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand Module 5 Tier 1 Groundwater Acceptance Criteria*, with reference to the groundwater screening criteria for stock watering based on livestock health.

The referenced investigation levels are summarised in Table 5.1.

Table 5.1 Investigation Levels

Analyte	NEPM (1999) HIL A (mg/kg)	NEPM (1999) HIL F (mg/kg)	DERM (1999) Draft EILs for TPH/BTEX (mg/kg)	NZ ME (1999) Stock Water Screening Criteria (µg/L)	ANZECC/ARMCANZ (2000) Marine Water Guidelines (µg/L)
Copper	200*	5,000	NE	NE	1.3
Zinc	400*	35,000	NE	NE	15
Arsenic	100	500	NE	NE	NE
Cadmium	20	100	NE	NE	5.5
Chromium (VI)	100	500	NE	NE	27.4
Lead	300	1,500	NE	NE	4.4
Nickel	600	3,000	NE	NE	70

Analyte	NEPM (1999) HIL A (mg/kg)	NEPM (1999) HIL F (mg/kg)	DERM (1999) Draft EILs for TPH/BTEX (mg/kg)	NZ ME (1999) Stock Water Screening Criteria (µg/L)	ANZECC/ARMCANZ (2000) Marine Water Guidelines (µg/L)
Mercury	15	75	NE	NE	0.4
TPH (C_6-C_9)	NE	NE	100	>S(1)	NE
TPH (C_{10}-C_{14})	NE	NE	100	4,000	NE
TPH (C_{15}-C_{28})	NE	NE	1,000	>S(2)	NE
TPH (C_{29}-C_{36})	NE	NE	1,000		NE
Benzene	NE	NE	1	4,000	700
Toluene	NE	NE	NE	8,000	NE
Ethylbenzene	NE	NE	NE	4,000	NE
Total Xylenes	NE	NE	NE	8,000	NE
Total BTEX	NE	NE	7	NE	NE
Benzo(a)pyrene	1	5	1	NE	NE
Aldrin & Dieldrin	10	50	NE	NE	NE
Chlordane	50	250	NE	NE	NE
Heptachlor	10	50	NE	NE	NE
DDT, DDD and DDE	200	1,000	NE	NE	NE

Notes: * = Queensland DERM phyto-toxicity guidelines. NE – Not Established. (1) Represents C_7-C_9. (2) Represents >C_{15}. >S – criteria greater than the solubility limit of the compound.

5.2 Sampling and analysis program

The sampling and analysis program that was undertaken is summarised in Table 5.2 (refer Figure 4).

Table 5.2 Sampling and Analysis Program

Sample No.	Depths	Analyses
BH01	0.0–0.05	Heavy Metals and OC/OP Pesticides
	0.3–0.4	Stored
	0.9–1.0	Stored
BH03	0.0–0.1	Heavy Metals
	0.4–0.5	Stored
BH07	0.0–0.05	Heavy Metals and OC/OP Pesticides

Sample No.	Depths	Analyses
	0.2–0.3	Stored
	0.5–0.6	Stored
BH10	0.0–0.1	Heavy metals
BH12	0.0–0.1	Heavy metals
	0.9–1.0	Stored
BH16	0.0–0.1	Heavy metals
	0.4–0.5	Stored
*BH16	0.0–0.1	Heavy Metals
*DUP01	0.0–0.1	Heavy metals

Notes: * BH16 (0.0-0.1m) = QA/QC field triplicate of BH16 (0.0-0.1m). *DUP01 = QA/QC field duplicate of BH16 (0.0-0.1m).

5.3 Data quality objectives

Data quality objectives (DQOs) were qualitative criteria that ensured data was of sufficient quality and quantity to achieve the objectives of the study. The DQOs were as follows:

- Problem statement – is the subject study area suitable for commercial/industrial use?
- Study question – does contaminated soil exist at concentrations that exceed the referenced investigation levels?
- Information needed to address the study question include:
  - Site history
  - Site geology (fill)
  - Current soil concentrations
- Site boundary – defined by the study area shown in Figure 4
- Design analytic approach – analytical results exceeding the referenced investigation levels are to be targeted for subsequent delineation, followed by a decision to proceed with remediation and validation if warranted
- Limits of tolerance – contaminated soil that is not remediated will require risk assessment to identify the impact on the objectives of the Project
- Data collection – information used to optimise the design of the sampling and analysis program includes site history, and minimal variation in soil type and concentration.

5.4 Laboratory analyses

The primary laboratory used during the field investigation was Australian Laboratory Services (ALS). The secondary laboratory, which performed intra-laboratory analyses on field triplicate samples, was Advanced Analytical Australia (AAA). These laboratories were National Association of Testing Authorities (NATA) accredited for the laboratory analyses that were undertaken. The laboratory preparation and analysis methods are summarised in Table 5.3.

Table 5.3 Laboratory Methods

Analytes	Soil/Water	Preparation and Analysis Methods
Heavy metals (arsenic, cadmium, copper, chromium, lead, mercury, nickel, zinc)	Soil	Preparation by USEPA 200.2 Mod. Hot Block Acid Digestion Analysis by American Public Health Association (APHA) 21st ed., 3120; USEPA SW 846 – 6010 (ICP-AES)
Mercury	Soil	Preparation by USEPA 200.2 Mod. Hot Block Acid Digestion Analysis by AS 3550, APHA 21st ed., 3112 Hg – B (FIM-ASS)
Heavy metals (arsenic, cadmium, copper, chromium, lead, mercury, nickel, zinc)	Water	Preparation by USEPA SW846-3005 Method 3005 Nitric/Hydrochloric acid digestion Analysis by APHA 21st ed., 3125; USEPA SW846 – 6020, ALS QWI-EN/EG020 (ICP-MS)
Mercury	Water	Preparation by USEPA SW846-3005 Method 3005 Nitric/Hydrochloric acid digestion Analysis by AS 3550, APHA 21st ed. 3112 Hg – B
OC/OP pesticides	Soil	Preparation by In-house mechanical agitation (tumbler) Analysis by USEPA SW 846 – 8270B analysed by Capillary GC/MS
TPH (volatiles)	Water	Preparation by In-house mechanical agitation (tumbler) Analysis by USEPA SW 846 - 8015A. Sample extract is analysed by Capillary GC/FID
TPH (semi-volatiles)/BTEX	Water	Analysis by USEPA SW 846 - 8260B Water samples are directly purged to a capillary GC/MS for analysis

Copies of the laboratory reports, Chain of Custody forms and Sample Receipt Advice are provided in Appendix I.

5.5 Laboratory QA/QC

Laboratory quality assurance/quality control (QA/QC) procedures are summarised in Table 5.4 and discussed in Section 6.3. Laboratory QA/QC reports are also attached to the laboratory reports provided in Appendix I.

Table 5.4 Laboratory quality assurance/quality control

QA/QC procedure	Description
Laboratory duplicate samples	Laboratory duplicate samples are a randomly selected sample, which is split

QA/QC procedure	Description
	and tested to provide an indication of the precision of the laboratory method and sample heterogeneity.
Method blanks	Method blanks monitor potential laboratory contamination that could affect laboratory results.
Laboratory control samples	Laboratory control samples are solutions prepared in the laboratory that are spiked with a known concentration of the contaminants of concern. The spiked solution is free of matrix interferences that often affect sample results. Analysis of the laboratory control sample indicates the precision and accuracy of the laboratory method and is independent of matrix interferences.
Surrogate recovery	Surrogate recovery is used to demonstrate correct sample preparation and absence of matrix effects in the test method.
Matrix spike recovery	The matrix spike is a measure of the matrix interference that may be present in a field sample. Initially, a known concentration of the contaminants of concern is added to a field sample. The analytical result is then compared to the known concentrations of the spike and field sample.

5.6 Field QA/QC

Field quality assurance/quality control (QA/QC) procedures incorporated decontamination measures, field sampling techniques and QA/QC protocols to maintain sample integrity and maximise the reliability of analytical results. The field QA/QC procedures followed include:

- Collecting soil samples that represented discrete soil types
- Handling samples using new latex gloves to minimise cross contamination between sampling locations
- Cleaning sampling tools used to collect soil samples
- Cleaning groundwater probes and field instruments before these were used to purge/collect groundwater samples
- Placing samples in laboratory supplied containers that were specific to the analyses being performed. Note that there were two non-conformances relating to container type, which is discussed in Section 6.3
- Storing samples in a chilled state until delivered to the laboratory.

Field QA/QC sampling was undertaken for the purpose of providing an assessment of field sampling techniques and analytical reliability. QA/QC samples included field duplicates, field triplicates and rinsate blanks. Field QA/QC results are discussed in Section 7 and summarised in tables provided in Appendix J.

The frequency of field QA/QC sampling for soil was as follows:

- Field duplicate and triplicate samples were prepared at a rate of one sample per 20 samples analysed, which was in accordance with AS4482.1-2005. The duplicate sample was analysed by the primary laboratory (ALS) and the triplicate sample analysed by the secondary laboratory

(AAA). These QA/QC samples were only analysed for heavy metals because the frequency of analysis for the other analytes (OC/OP pesticides and TPH/BTEX) were too few

- Rinsate samples were prepared based on one rinsate sample per day per equipment used which was in accordance with AS4482.1-2005. The rinsate samples were prepared by pouring deionised water over a new nitrile sampling glove. Rinsate samples were analysed for heavy metals. Analysis of TPH/BTEX and pesticides were not considered necessary for QA/QC analysis given that these compounds were unlikely to be present based on site history, which was confirmed by subsequent laboratory analyses.

No groundwater QA/QC samples were prepared on the basis that only one groundwater sample was collected for analyses.

6. Analytical results

6.1 Soil

Soil sampling occurred on 14 and 19 July 2009. Boreholes locations are shown on Figure 4. A summary of the analytical results are shown in Table 6.1. Analytical tables that include the results for heavy metals and OC/OP pesticides are provided in Tables 1 to 3 in Appendix K.

Table 6.1 Soil Analysis Results Summary

Analyte	Number of samples analysed	Exceedence of referenced guideline	Maximum concentrations reported (mg/kg)	Actions taken
Heavy metals (refer Table 1, Appendix K)	6	None	Arsenic – 36 Cadmium – <1 Copper – 50 Chromium – 68 Lead – 9 Mercury – <0.1 Nickel – 25 Zinc – 39	No Action
OC/OP pesticides (refer tables 2 and 3, Appendix K)	2	None	OC Pesticides – <0.05 to <0.2 OP Pesticides – <0.05 to <0.2	No Action

None of the analytical results exceeded the referenced guidelines. This was expected as the site history indicated that there was a low potential for contamination to be present. The concentrations provided in Tables 1 to 3 in Appendix K can be used as baseline contaminant concentrations for heavy metals and OC/OP pesticides.

Hydrocarbon compounds were not included in the soil laboratory analysis program because field PID screening results indicated that hydrocarbons were not likely to be present. This result combined with the site history suggested that hydrocarbon compounds were unlikely to be present. Therefore the baseline concentration for hydrocarbon compounds can be taken as below the laboratory's limit of reporting.

6.2 Groundwater monitoring and analyses

Groundwater monitoring of the onsite bore occurred on 18 July 2009. The bore included a submersible pump which was used by Mr Ross Graving (former lessee) to pump groundwater for use as stock water. WorleyParsons powered the pump using a 60kw petrol-driven generator that was brought to Curtis Island. The pump was activated for the purposes of purging and sampling groundwater.

The process for collecting a groundwater sample first involved purging the well of a sufficient volume of groundwater. Purging was meant to be completed when field-measured water quality parameters (pH, electrical conductivity, turbidity, dissolved oxygen, redox) varied by less than 10% between consecutive readings.

However, after 156L were purged there was an unexplained drop in EC, T, and redox. These parameters were recorded after every 26L of groundwater was purged. The water quality parameters recorded during purging and at the time of sampling are shown in Table 6.2. Note that the water quality parameters recorded at 1215 (time) represented the sample that was collected for analysis.

The water quality parameters were recorded using a multimeter water quality probe, which was calibrated by the equipment supplier. The water quality parameters were recorded on field sheets which are provided in Appendix C. The equipment calibration sheet is also provided in Appendix D.

The laboratory analyses of water samples included heavy metals (filtered) and TPH/BTEX. No measurement of the depth to groundwater was possible, due to the installed pump and discharge pipe which were not easily removable.

Table 6.2 Groundwater monitoring results

Time	pH	Electrical conductivity ($\mu S/cm^2$)	Turbidity (ºC)	Redox (mV)	Dissolved oxygen (mg/L)	Total volume purged (L)
1158	5.87	1,965	24.8	-85	2.94	26
1201	6.15	1,761	25.3	-97	2.5	52
1204	6.21	1,352	25.3	-105	2.4	78
1207	6.18	1,319	25.5	-99	2.29	104
1209	6.15	1,243	25.5	-95	1.19	130
1215*	6.21	818	25	-63	1.43	156

Notes: * = Parameters measured at the time of sampling.

These water quality parameters indicated groundwater was:

- Low salinity
- Near neutral pH
- Likely to be within reducing conditions (i.e. Redox <200mV).

Table 6.2 indicates that the monitoring data for EC, Redox and DO recorded during purging were trending downward as the purged volume increased. This is not fully understood, as sufficient volumes were purged to obtain a representative groundwater sample from the surrounding formation. A possible explanation for the change in the initial two readings could be that stagnant water was being purged from the well.

The dissolved oxygen content of the sample was not likely to be representative of groundwater conditions due to the use of a submersible pump. This would have agitated the sample to an extent and may have caused higher DO concentration than the actual conditions.

The groundwater analytical results for heavy metals (filtered) and TPH/BTEX are shown in Table 6.3 and Table 6.4.

The analytical results indicated:

- There was no BTEX concentrations detected above the ANZECC/ARMCANZ marine water guidelines or TPH detected above the NZME stock water screening criteria

- There were no heavy metal concentrations detected above the ANZECC/ARMCANZ marine water guidelines, with the exception of copper. Given the low concentrations reported, and the lack of a contaminant source, it was concluded that the copper concentration was likely to be naturally occurring.

The detection of TPH C_{10}-C_{14} and C_{15}-C_{28} was not expected, given there were no sources of fuel in the area. The TPH concentration was investigated further by ALS. ALS interpreted the gas chromatograph for the TPH analysis which indicated the TPH concentrations were a possible mix of substituted phenols (2,6 Di isopropyl Phenol), carbamates (ethyl N-benzylcarbamate) and fatty acids (Hexadecanoic acid).

The source of these potential compounds was not known, but the interpretation of the gas chromatograph can only be used as a guide. Further analysis would be needed to determine the likely contaminants present, but this was considered unnecessary given the low concentrations reported.

Table 6.3 Groundwater analytical results (heavy metals filtered)

Sample No.	Arsenic mg/L	Cadmium mg/L	Chromium mg/L	Copper mg/L	Lead mg/L	Nickel mg/L	Mercury mg/L	Zinc mg/L
GW LP	0.002	<0.0001	<0.001	0.004	<0.001	0.003	<0.0001	0.005
ANZECC/ARMCANZ 2000	NE	0.0055	0.0274	0.0013	0.0044	0.070	0.0004	0.015

Notes: ANZECC/ARMCANZ 2000 – Marine guidelines for 95% protection of species. NE = Not Established

Table 6.4 Groundwater analytical results (TPH/BTEX)

Sample No.	Benzene µg/L	Toluene µg/L	Ethyl benzene µg/L	Total Xylenes µg/L	Total BTEX µg/L	TPH C_6-C_9 µg/L	TPH C_{10}-C_{14} µg/L	TPH C_{15}-C_{28} µg/L	TPH C_{29}-C_{36} µg/L
GW LP	<1	<2	<2	<4	<2	<20	60	300	<50
ANZECC/ARMCANZ (2000)	700	NE	NE	NE	NE	NE	NE	NE	NE
NZME (1999) Stock water screening criteria	4,000	8,000	4,000	8,000	8,000	>S(1)	4,000	>S(2)	

Notes: NE – Not Established. (1) Represents C_7-C_9. (2) Represents >C_{15}. >S – criteria greater than solubility limit of the compound.

6.3 Data validation

The findings of the laboratory data validation process are summarised in Table 6.5. The results indicate that ALS's laboratory analytical data, with secondary confirmation by AAA, was of sufficient quality for the purpose of the investigation. The QA/QC laboratory reports are provided in Appendix I.

Table 6.5 Laboratory program QA/QC summary

Category	Laboratory	Exceedences	Sample No.	Comment
Holding times	ALS	7	BH01 (0.0-0.05), BH03 (0.0-0.1m), BH07 (0.0-0.05m), BH10 (0.0-0.1m), BH12 (0.0-0.1m), BH16 (0.0-0.1m) and DUP02	The moisture content of these samples was not analysed within the recommended holding time of seven days. The moisture content was measured one day beyond the recommended holding time for all samples except BH16 (0.0-0.1m), which was six days after the recommended holding time. The impact this non-conformance had on the analytical results would likely have been minimal. This is because the samples would have been immediately chilled at the ALS laboratory upon receipt, which should have resulted in minimal loss of moisture content (i.e. evaporation).
	AAA	None	N/A	N/A
Method blank	ALS	None	N/A	N/A
	AAA	None	N/A	N/A
Laboratory duplicates	ALS	None	N/A	N/A
	AAA	Not performed because of the small sample size of one soil sample.		
Matrix spike	ALS	Lead	Non-WorleyParsons soil sample and batch	The matrix spike recovery of lead from an anonymous sample (i.e. non-WorleyParsons soil sample) was 300% which exceeded the upper recovery limit of 130%. This non-conformance would have no impact on the analytical results reported for this PSI. This was because this result was likely caused by characteristics inherent in this sample, and this sample was not collected as part of this PSI.
	ALS	DDT	Anonymous Sample	The matrix spike recovery of DDT from an anonymous sample (i.e. non-WorleyParsons soil sample) was 48.9% which was lower than the lower recovery limit of 70%. This non-conformance would have no impact on the analytical results reported for this PSI. This is because this result was likely caused by characteristics inherent in this sample, and this sample was not collected as part of this PSI.

Category	Laboratory	Exceedences	Sample No.	Comment
	AAA	None	N/A	N/A
Surrogate recovery	ALS	None	N/A	N/A
	AAA	AAA did not perform surrogate recoveries because there were no organic analyses undertaken.		
Laboratory control spike	ALS	Lead and dimethoate	1208206-002 and 1207561-002	Lead and dimethoate spiked recoveries were 114% and 137%, which exceeded the dynamic control limits of 113% and 129%, respectively. ALS reported that these results were within ALS's static control limits and therefore deemed acceptable.
	AAA	AAA did not perform laboratory control spike recoveries.		
Sample receipt	ALS	Two non-conformances were reported for sample containers	BH01 (0.0-0.0m) and BH07 (0.0-0.1m)	These samples were analysed for OC/OP pesticides and should have been stored in acid-washed glass jars instead of zip-locked bags. The effect on the laboratory analyses would likely be minimal because the use of glass jars pertains to TPH analyses. The reason is that the use of plastic can result in an increase in TPH concentration due to pthalates present in the plastic. This would not have an impact on the OC/OP pesticide result.
	AAA	None	N/A	N/A

Notes: N/A – Not Applicable.

The analysis of rinsate samples and relative percent difference (RPD) results for field duplicates and triplicates samples are presented in Tables 1 and 2 in Appendix J.

A summary of the field QA/QC results are in Table 6.6.

Table 6.6 Field QA/QC summary

Number of analyses performed	Number of field duplicates and triplicates	Comments
Heavy metals (soil) – 6	1	Greater than 1:20 sampling requirement achieved. No RPD results exceeded the 40% RPD criteria.
Heavy metals (groundwater) – 1	0	No duplicate or triplicate results were prepared due to the low number of analyses performed.
OC/OP pesticides (soil) – 2	0	No duplicate or triplicate results were prepared due to the low number of analyses performed.
TPH/BTEX (groundwater – 1)	1	No duplicate or triplicate results were prepared due to the low number of analyses performed.
Rinsates – 2	n/a	No trace concentrations of heavy metals were reported in either rinsate sample. The samples were prepared by pouring deionised water over clean sampling gloves. The results indicated that the sample gloves were not likely to be contaminated prior to use and therefore would not affect the results of the laboratory analysis.

Table 6.5 and Table 6.6 indicated that there were no QA/QC non-conformances that would affect the analytical data, and therefore concluded that this was of sufficient quality for interpretation.

7. Conclusions

Based on the results of the PSI, the following is concluded:

- The study area has not been used for a notifiable activity, nor has there been development work undertaken within the study area, which suggests that the potential for contamination to exist is low.
- Past and current land use has been cattle grazing. This represented a minimal risk to surrounding receptors, which included one onsite groundwater bore, Graham Creek and Targinie Passage. The groundwater bore is approximately 30m deep and was constructed by the former lessee who used the bore for stock watering during dry periods.
- The suggestion that the study area was unlikely to be contaminated was confirmed by limited soil sampling and analysis. The soil analyses could be used as baseline concentrations for future comparison. Groundwater concentrations recorded from a sample collected from one onsite groundwater bore were likely to be representative of background conditions.
- A disused cattle dip approximately 5km from the study area is located on former Lot 2 RP602284, which represents a notifiable activity. This lot is not listed on the EMR and/or CLR; but elevated arsenic concentrations were confirmed by the Gladstone LNG field study in the area surrounding the disused cattle dip. Given the distance to the study area, there is a minimal risk of contamination from this dip impacting the soil or underlying groundwater within the proposed Australia Pacific LNG facilities.
- A suspected cattle dip located within Lot 4 on SP225924, which is the adjacent lot to the southern property boundary of Lot 3 (proposed LNG facility site), was not impacted by heavy metals or OC/OP pesticides based on soil analyses performed by the Queensland Curtis LNG field study. Further investigation by WorleyParsons, via a discussion with the previous lessee of this land, indicated that the suspected cattle dip was a stock watering location from a period before the first recorded lessee for this area (i.e. 1983).

Based on the above, it is concluded that the study area is unlikely to be contaminated and should not pose a contamination risk to the proposed LNG facility development.

References

AS4482.1-2005 *Guide to Sampling and Investigation of Potentially Contaminated Soil. Part 1: Non-volatile and semi-volatile compounds*

AS4482.2-1999 *Guide to the sampling and investigation of potentially contaminated soil Part 2: Volatile substances*

AS/NZS 5667.1:1998 *Water quality – Sampling Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*

AS/NZS 5667.11:1998 *Water quality – Sampling Part 11: Guidance on the sampling of groundwaters*

Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ) 2000, Marine water guidelines (95% protection)

DoE *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland, dated 1998*

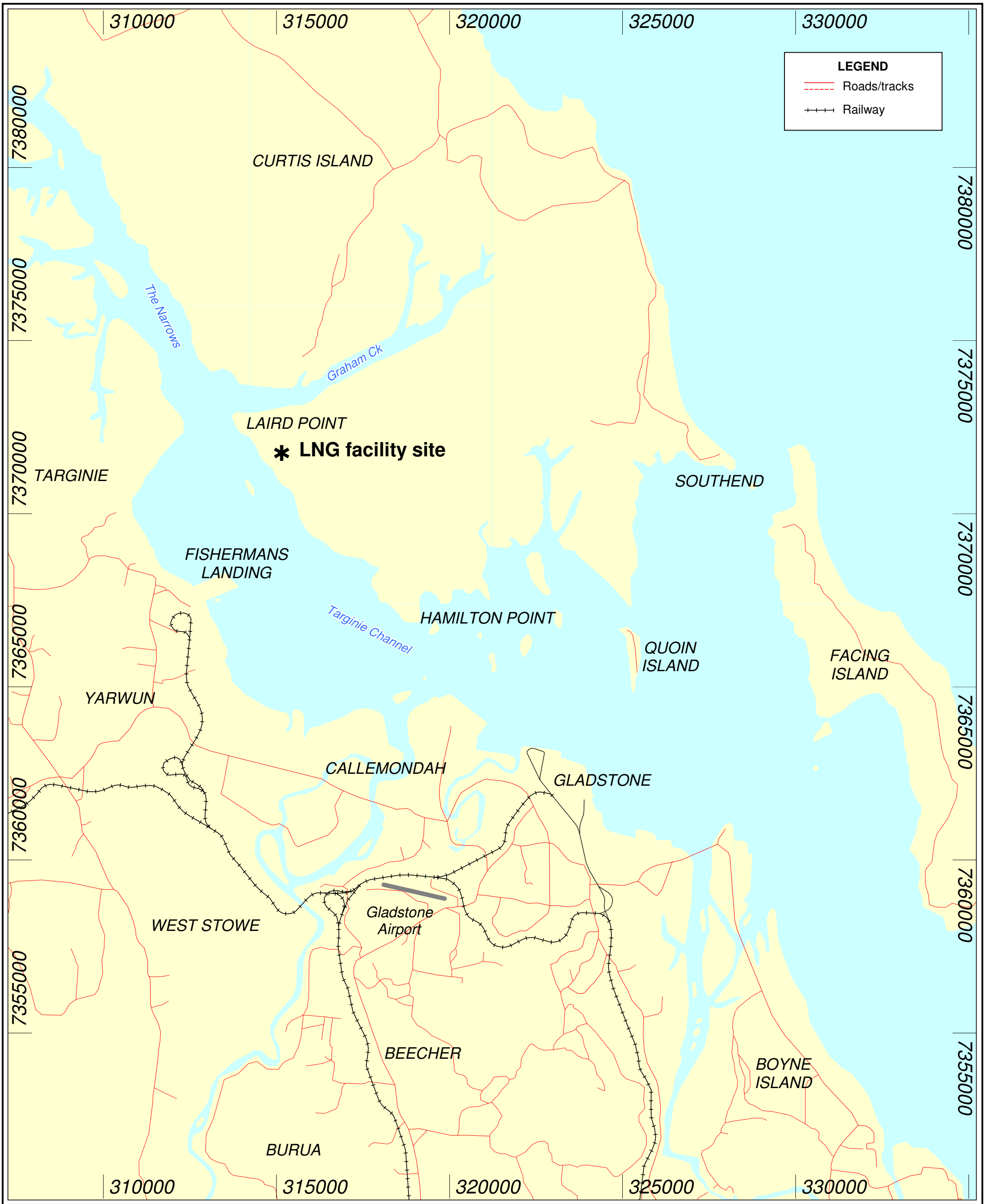
ERM, 2009 *Queensland Curtis LNG Project: LNG Facility and Associated Infrastructure Phase I and II Environmental Site Assessment, dated 20 April 2009*

National Environment (Assessment of Site Contamination) Protection Measure (NEPM) 1999 *Schedule B(2) Guideline on Data Collection Sample Design and Reporting, 1999*.

New Zealand Ministry for the Environment (NZME) 1999*, Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zeal*and Module 5 Tier 1 Groundwater Acceptance Criteria

URS, 2009 Preliminary Site Assessment – *Santos Gladstone Liquefied Natural Gas (GLNG) Project, dated 13 February 2009*

Figures



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SCALE - 1:100,000 (at A3)

Map Grid of Australia Zone 56
GDA 1994

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0	04/10/2009	Issued for use	WT	DH		
B	04/10/2009	Re-issued for squad check	WT	DH		

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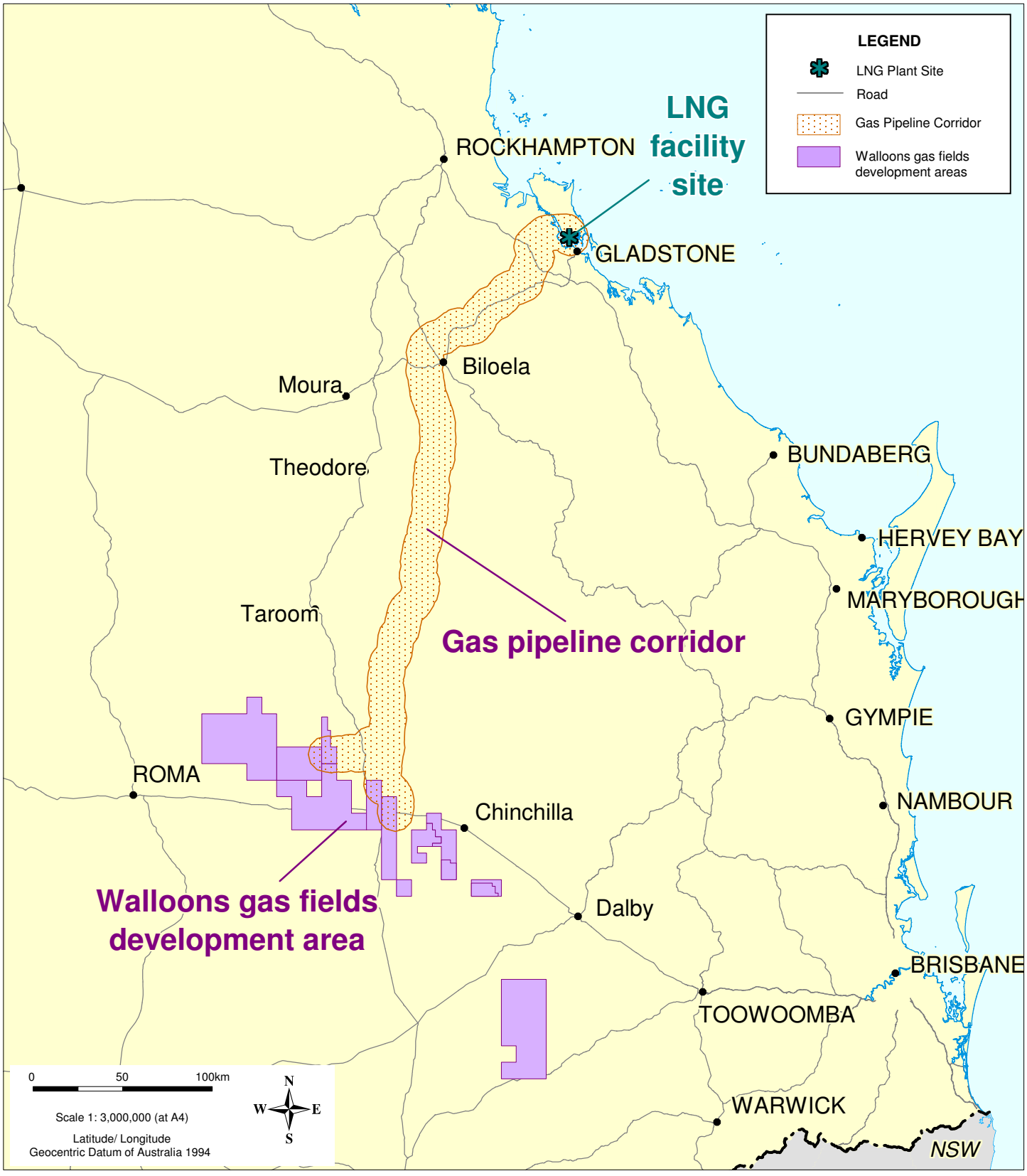
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Figure 1- Project Locality

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0025	Rev: 0

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

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Gas Pipeline Corridor 10km Buffer of Route 3C provided by Origin Energy 25/08/2009

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0	05/10/2009	Issued for use	WT	DH		
C	05/10/2009	Re-issued for squad check	WT	DH		

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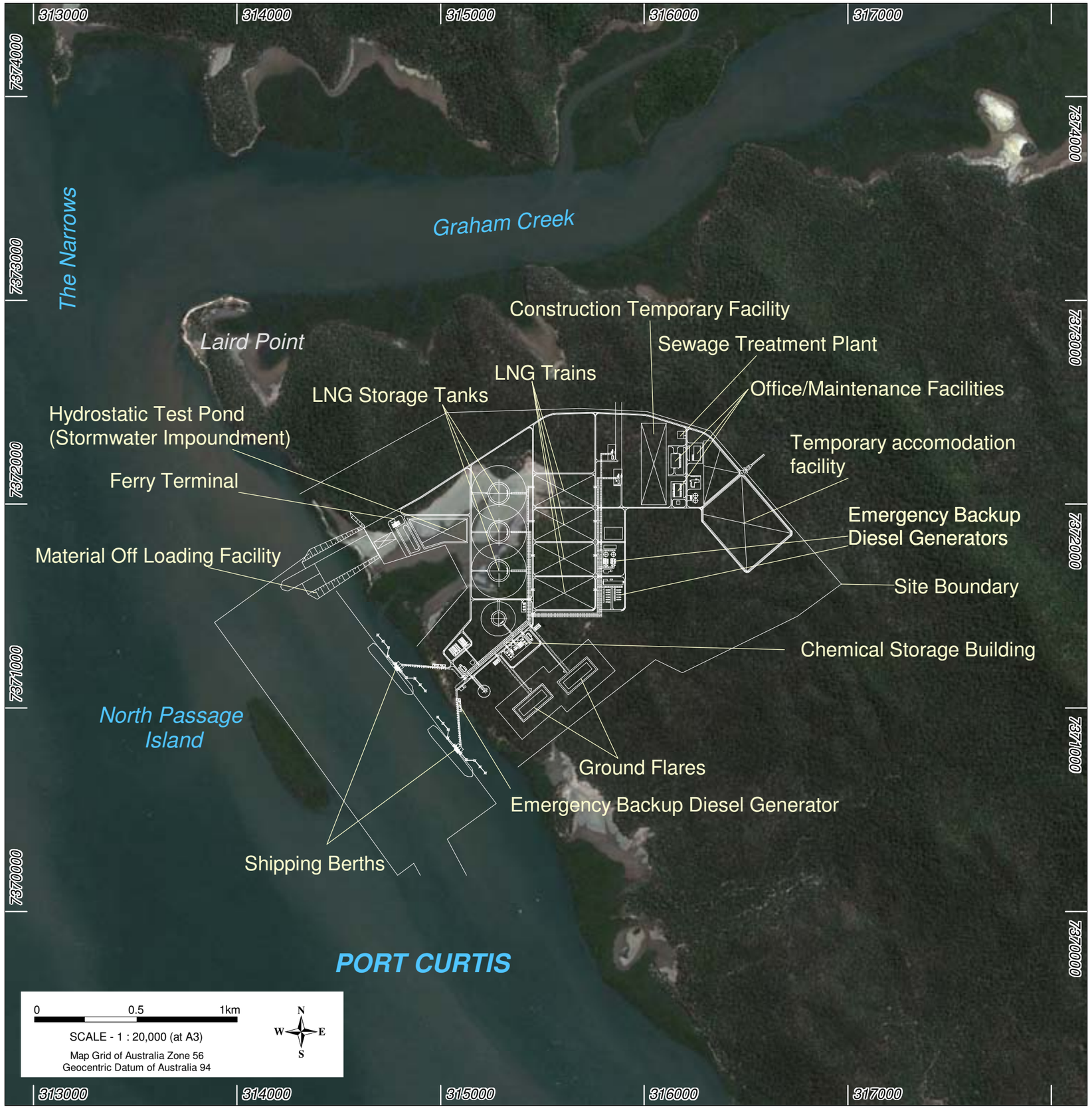
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Figure 2 - Project Description

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0024	Rev: 0

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Satellite imagery captured by GeoEye-1 on 24 March 2009

Indicative sites supplied by Bechtel. Indicative Plant Layout supplied by Bechtel - CAD Drawing No. P1-000-10005

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0	14/01/2010	Issued for use	JC	KM		
C	14/01/2010	Re-issued for squad check	JC	JC		

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Figure 3: Indicative LNG Facility

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0027	Rev: 0

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313000 314000 315000 316000 317000

7374000 7373000 7372000 7371000 7370000

BH12
BH16
BH01
BH03
BH10
BH07
LP GW
ERM Dip Site
Intertidal Flat

LEGEND

- Groundwater Well Sites *(collected by A. Kochnieff July 2009)*
- Soil Sampling Sites *(collected by A. Kochnieff July 2009)*
- *ERM Dip Site*
- Riverine system (drainage lines) *(Qld Water Bodies & Wetland Regional Ecosystems data)*
- Study Area Boundary

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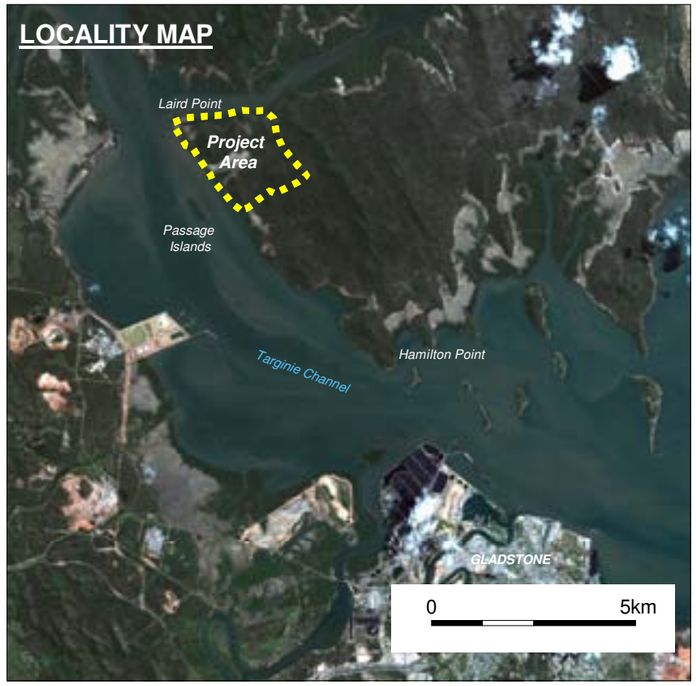
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SCALE - 1 : 20,000 (at A3)

UTM Zone 56S
WGS 84

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LOCALITY MAP



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Figure 4 - Borehole Locations

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0057	Rev: 0

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

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Geology Legend

Holocene Miscellaneous Unconolidated Sediments (Qhe/m-Yarrol/Scag). Mud, sandy mud, mudd
estuarine channels and banks, supratidal flats and coastal grasslands

Wandilla Formation (DCCW). Mudstone, lithic sandstone
(locally containing silicified oolites), siltstone, jasper, chert, slate; local schist

Quaternary Alluvium (Qa). Clay, silt, sand, gravel; floodplain alluvium

Geology data sourced from 1:100,000 vector dataset purchased from Department of Mines & Energy. Data captured at 1:25 000 scale. The data set is sourced from the Department's Geoscience and Resources Database (GRDB), a component of the Mineral and Energy Resources Location and Information Network (MERLIN) corporate database.

313000 314000 315000 316000 317000

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A A'

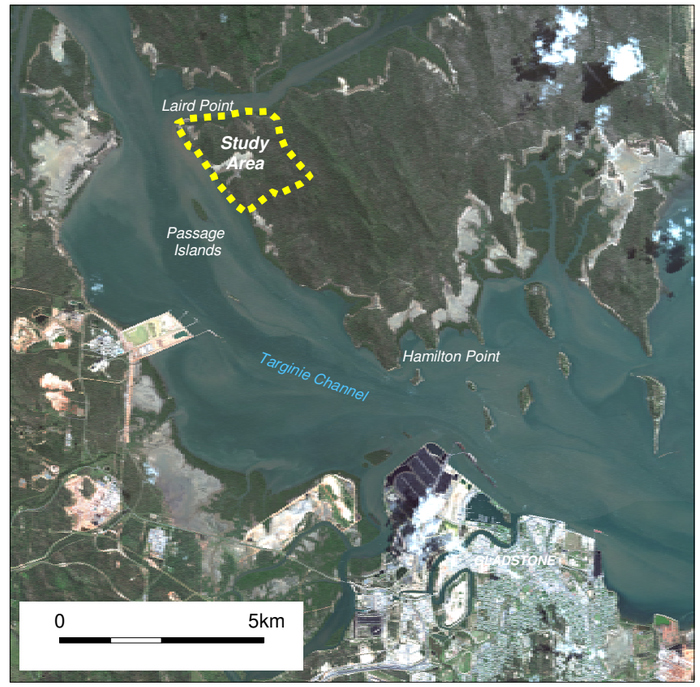
BH14 BH12 BH13 BULLDUST002 BH16 BH11 A04 A01 A02 A06 A08 A03 A05 BH01 BH02 BH17 BH18 BH03 BH04 BULLDUST001 SWAMP LP GW BH05 BH06 BH07 BH08 BH09B BH09 BH15 BH10 A07

Loading Berth Option 2a

Loading Berth Option 1b

LEGEND

- Soil sampling sites *(collected by WorleyParsons July 2009)*
- Groundwater well *(collected by WorleyParsons July 2009)*
- *Rocky outcrop*
- Riverine system (drainage lines) *(Qld Water Bodies & Wetland Regional Ecosystems data)*
- A — A' *Cross section (refer to Figure 3.2)*
- Study area boundary
- LNG Plant study area
- Indicative LNG plant layout



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Satellite imagery captured by GeoEye-1 on 24 March 2009
Indicative Plant Layout supplied by Bechtel. Drawing No. P1-000-10005

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SCALE - 1:20,000 (at A3)

Map Grid of Australia Zone 56
Geocentric Datum of Australia 1994

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Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
0	02/12/2009	Issued for use	MM	DHe	DHo	
G	02/12/2009	Issued for customer review	MM	DHe	DHo	

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Figure 5 Study Area Geology

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0020	Rev: 0

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LEGEND

- Cadastral parcel (showing lot on plan numbers)
- Tracks

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Satellite imagery (GeoEye-1 on 24 March 2009) - AAM Hatch 2009

Tracks digitised from aerial imagery 01/04/2009

0 1 2km

SCALE - 1:40,000 (at A3)

Map Grid of Australia Zone 56
Geocentric Datum of Australia 1994

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B	27/01/2010	Re-issued for squad check	WT	DH		

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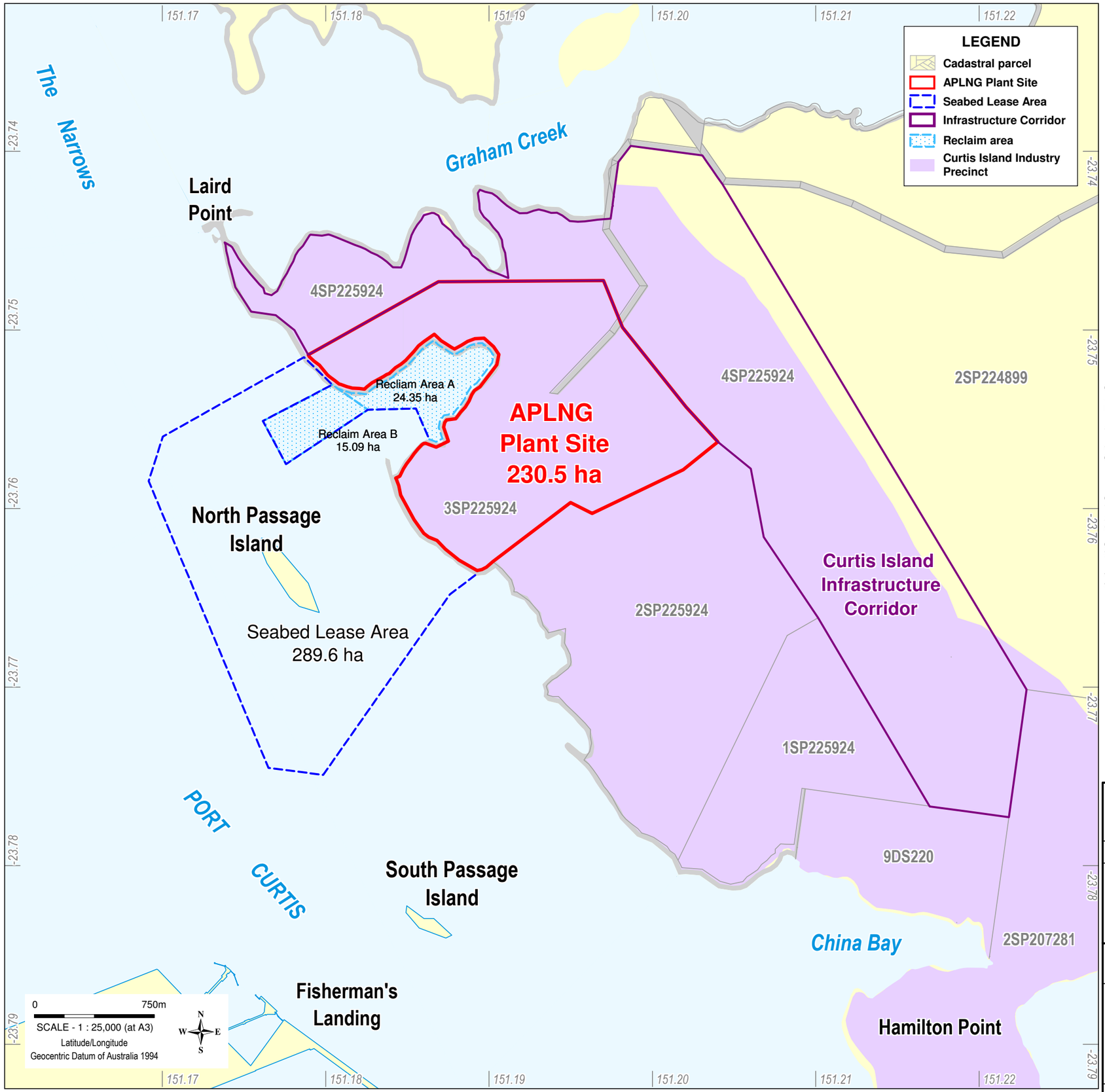
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Figure 6: Former Cadastral Boundaries

Project No: 301001-00752	Figure: 00752-00-EN-DAL-068	Rev: 0

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Reclaim Area, and Seabed Lease Area extracted from Drawing 3751-1-02 and Bechtel drawing "Civil Site Seabed Lease Boundary" on 02/10/2009.
Proposed cadastral boundaries extracted from Survey Plan SP225924 on 5/10/2009.

Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
0	20/10/2009	Issued for use	WT	DH		
B	20/10/2009	Re-issued for squad check	WT	DH		

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Figure 7: Current Cadastral Boundaries

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0054	Rev: 0

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Appendix A Abbreviations

AAA	Advanced Analytical Australia
AHD	Australian Height Datum
ALS	Australian Laboratory Services
ANZECC/ARMCANZ	Australian and New Zealand Environment and Conservation Council/Agriculture and Resource Management Council of Australia and New Zealand
APHA	American Public Health Association
AS/NZS	Australian/New Zealand Standards
BTEX	Benzene, Toluene, Ethylbenzene, total Xylenes
CLR	Queensland Contaminated Land Register
CSG	Coal Seam Gas
DERM	Department of Environment and Resource Management
DME	Department of Mines and Energy
DO	Dissolved Oxygen
DoE	Department of Environment (DoE)
DQOs	Data Quality Objectives
EC	Electric Conductivity
EIS	Environmental Impact Statement
EMR	Environmental Management Register
EP Act	*Environmental Protection Act 1994*
GC/MS	Gas Chromatography/Mass Spectrometry
GSDA	Gladstone State Development Area
ha	hectares
HILs	Health-based Investigation Levels (HILs)
ICP-AES	Inductively Coupled Plasma-Atomic Emission Spectrometry
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry
LNG	Liquefied Natural Gas
mbgs	Metres below ground surface
MERLIN	Mineral and Energy Resources Location and Information Network (MERLIN)
MOF	Materials Offloading Facility
Mtpa	Million tonnes per annum
NATA	National Association of Testing Authorities

NEPC	National Environment Protection Council
NEPM	National Environment Protection (*Assessment of Site Contamination*) Measure 1999
NZME	New Zealand Ministry for the Environment
OC pesticides	Organochlorine pesticides
OP pesticides	Organophosphate pesticides
PID	Photoionisation Detector
ppmv	parts per million by volume
PSI	Preliminary Site Investigation
Qhe/m	Holocene miscellaneous unconsolidated sediments (Qhe/m)
Redox	Redox Potential
RPD	Relative Percent Difference
T	Temperature
TOR	Terms of Reference
TPH	Total Petroleum Hydrocarbons

Appendix B Fieldwork procedures

Task	Description
Field Equipment	Field monitoring was performed using hired equipment (e.g. PID, water quality meter) that was fit for purpose and calibrated by the supplier prior to use.
Sampling Handling	Samples were handled using clean nitrile gloves and were placed in clean laboratory supplied containers.
Decontamination	Sampling equipment (trowel and dewatering pump) were cleaned in phosphate free detergent and thoroughly rinsed in de-mineralised water between sample locations.
Groundwater Sampling	The groundwater sampling procedure required wells to be purged and monitored for water quality parameters (pH, T, EC, DO, Redox) prior to groundwater sampling. Sampling commenced once water quality parameters (primarily pH and EC) stabilised based on two consecutive readings within a 10% difference. Purging was done using a submersible pump. Groundwater samples were collected using clean disposable bailers. Groundwater samples requiring metal analyses were field filtered using a 0.40µm in-line filer that was attached to the disposable bailer.
QA/QC	QA/QC included preparation of field duplicates and field triplicates at the rate of 1:20 samples analysed. Equipment rinsates were prepared during the course of fieldwork. The frequency was not in accordance with AS4481.1 (one per day) on the basis that most soil samples were recovered by hand and without the use of a sampling tool. As a result, there was a low risk of cross contamination as new gloves were used to handle samples. Trip blanks were also prepared and placed in those eskys that contained samples registering elevated PID readings.
Sample Identification and Records	Samples were given a unique label and cross checked with the Chain of Custody for errors prior to dispatch. Field observations were recorded on soil logs and water sampling sheets, as well as in field notebooks as appropriate.
Sample Storage and Transport	Samples were stored on ice or in a chilled state until delivered to the laboratory. Samples were delivered to the laboratory under Chain of Custody documentation.

Appendix C Borelogs and monitoring sheets

Borelogs

Project Number: 301001-00752

Date of Field Work: 19/07/2009

Client: Australian Pacific LNG **Project Name**: Curtis Island Facility **Location:** Laird Point, Curtis Island	**RL Surface:** NA
Drill Rig: 52mm Hand auger	**LOGGER:** Alex Kochnieff

Depth of Strata Change (m)	Sample Description	Drilling and Sampling	
		Sample Type	Depth (m)
	BH01		
0.0 – 0.3 (Natural)	Gravely SILT: Grayish brown, dry, loose, abundant very fine to boulder sized coarse fragments and boulders, abundant very fine to medium roots. Becoming light gray at 0.05m.	Disturbed	(0.0 – 0.05m)
0.3 – 0.7 (Natural)	Silty CLAY (minor sand): Brown with red mottle, dry, firm, very plastic, moderately sticky, few very fine to fine coarse fragments and few very fine roots	Disturbed	(0.3 – 0.4m)
0.7 – 1.0 (Natural)	Clayey SILT: Pinkish white with yellow mottle, dry, strong, weathered. Becoming gray/brown at 1.0m	Disturbed	(0.9 – 1.0m)
	Borehole terminated at 1.0m for sampling requirements		



Project Number: 301001-00752

Date of Field Work: 19/07/2009

Client: Australian Pacific LNG **Project Name**: Curtis Island Facility **Location:** Laird Point, Curtis Island		**RL Surface:** NA	
Drill Rig: 52mm Hand auger		**LOGGER:** Alex Kochnieff	
Depth of Strata Change (m)	**Sample Description**	**Drilling and Sampling**	
		Sample Type	Depth (m)
	BH03		
0.0 – 0.5 (Natural)	SILT: Light gray, dry, strong, many fine to stone sized coarse fragments, abundant very fine to coarse roots @ 0.3 Brown	Disturbed	(0.0 – 0.1m) (0.4 – 0.5m)
	Borehole terminated at 0.5m – refusal on boulders		



Project Number: 301001-00752

Date of Field Work: 18/07/2009

Client: Australian Pacific LNG **Project Name**: Curtis Island Facility **Location:** Laird Point, Curtis Island		**RL Surface:** NA	
Drill Rig: 52mm Hand auger		**LOGGER:** Alex Kochnieff	
Depth of Strata Change (m)	**Sample Description**	**Drilling and Sampling**	
		Sample Type	Depth (m)
	BH07		
0.0 – 0.05 (Natural)	Silty gravely LOAM: Very dark grayish brown, dry , loose, abundant very fine to coarse sized coarse fragments	Disturbed	(0.0 – 0.05m)
0.05 – 0.3 (Natural)	Gravely SILT: Gray, dry, loose, abundant very fine to boulders size coarse fragments, many fine to coarse roots.	Disturbed	(0.2 – 0.3m)
	Borehole terminated at 0.3m – refusal on boulders		



Project Number: 301001-00752

Date of Field Work: 18/07/2009

Client: Australian Pacific LNG **Project Name**: Curtis Island Facility **Location:** Laird Point, Curtis Island		**RL Surface:** NA	
Drill Rig: 52mm Hand auger		**LOGGER:** Alex Kochnieff	
Depth of Strata Change (m)	**Sample Description**	**Drilling and Sampling**	
		Sample Type	Depth (m)
	BH10		
0.0 – 0.3 (Natural)	Clayey SILT: Gray, dry, firm, abundant fine to boulder size coarse fragments, common very fine roots.	Disturbed	(0.0 – 0.1m)
	Borehole terminated at 0.3m – refusal on boulders		



Project Number: 301001-00752

Date of Field Work: 19/07/2009

Client: Australian Pacific LNG **Project Name**: Curtis Island Facility **Location:** Laird Point, Curtis Island	**RL Surface:** NA
Drill Rig: 52mm Hand auger	**LOGGER:** Alex Kochnieff

Depth of Strata Change (m)	Sample Description	Drilling and Sampling	
		Sample Type	Depth (m)
	BH12		
0.0 – 0.4 (Natural)	Gravely SILT: Dark reddish brown, dry, loose, abundant very fine-boulder coarse fragments, abundant very fine-coarse roots	Disturbed	(0.0 – 0.1m)
0.4 – 1.0 (Natural)	Silty CLAY: Dark red with light red mottle, dry, weathered, loose, abundant very fine-boulder coarse fragments, abundant very fine-medium roots	Disturbed	(0.9 – 1.0m)
	Borehole terminated at 1.0m for sampling requirements		

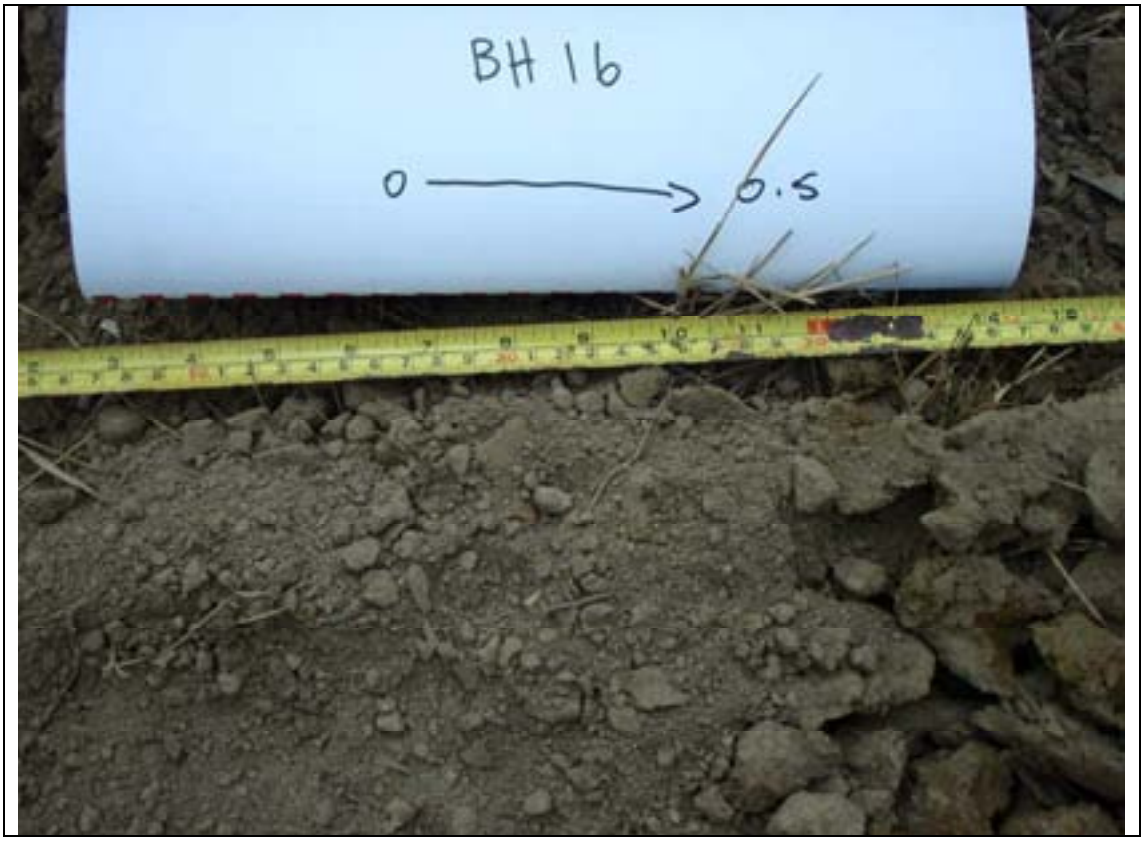


Project Number: 301001-00752

Date of Field Work: 14/07/2009

Client: Australian Pacific LNG **Project Name**: Curtis Island Facility **Location:** Laird Point, Curtis Island	**RL Surface:** NA
Drill Rig: 52mm Hand auger	**LOGGER:** Alex Kochnieff

Depth of Strata Change (m)	Sample Description	Drilling and Sampling	
		Sample Type	Depth (m)
	BH16		
0.0 – 0.3 (Natural)	SILT: Grayish brown dry, firm, common fine to medium course fragments, common fine to coarse roots	Disturbed	(0.0 – 0.1m)
0.3 – 0.5 (Natural)	CLAY: Dark yellowish brown, dry, firm, non-sticky, very plastic, common fine to medium course fragments, few fine roots	Disturbed	(0.4 – 0.5m)
	Borehole terminated at 0.5m – refusal on boulders		



BORE DEVELOPMENT, PURGING AND GROUNDWATER SAMPLING DATA SHEET

BORE No: GWLP Well

Project No 30180108752 Project Name APNG Plant Level Pt

Development

Date: Done by:

Development Method

Time Started SWL (start) Volume Removed Bore Depth (start)

Time Stopped SWL (end) Discharge Rate Bore Depth (end)

Comments NAPL Present (If yes thickness)

Field Analyses

Development

Time	Vol Removed (L)	EC (uS/cm)	pH	T (C)	Redox (mV)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Comments (Color, turbidity)

Purging

Date: 19/7/09 Done by: AK

Purge Method Electrical/Petrol Pump Purge Depth NA

Time Started 11:55 SWL (start) NA Bore Volume NA Bore Depth (start) NA

Time Stopped 12:15 SWL (end) NA Volume Removed 156 L Bore Depth (end) NA

Comments NAPL Present NA

(If yes thickness)

Field Analyses

Purging

Time	Vol Removed (L)	EC (uS/cm)	pH	T (C)	Redox (mV)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Comments (Color, turbidity)
11:58	26	1765	8.87	24.8	-95		2.94	clear
12:01	26	1761	6.15	25.3	-97		2.50	
12:04	26	1355	6.21	25.3	-105		2.4	
12:07	26	1319	6.18	25.5	-99		2.29	
12:09	26	1343	6.15	25.5	-95		1.49	
1215	26	1315	6.21	25.0	-83		1.43	

Sampling Date: 19/7/09 Done by: AK

Sampling Method Pump Sampling Depth NA

Time Started SWL (start) NA

Time Stopped SWL (end) NA

Comments

Groundwater Disposal Record

	date	Litres	disposal method
devmt			
purging	19/7/09	156	discharge to ground

Checked By:

Appendix D Equipment calibration certificates

allara instrument hire equipment pty ltd abn 72 644 176 608

allara instrument hire

ph 1300 137 067 www.allara.com.au

Picking Slip

Invoice To	Delivery To
WORLEY PARSONS 333 ANN ST BRISBANE QLD 4000	333 ANN ST BRISBANE QLD 4000

Quote No: QQ508	No.:	Purchase Order No.:
Salesperson: RANDALL KELLY	Order Date: 10-Jul-2009	Rental Period: 2 Weeks

Phone:	Fax:	Phone:	
Contact: GREG MORGAN	Client Code: WORLE005	Contact: GREG MORGAN	Mobile:
Start Date: 10-Jul-2009 08:30 AM		End Date: 26-Jul-2009 05:00 PM	

Qty	Description	Sent	Returned
PID'S			
1	Minirae 3000 (#592-001292)	☑	☐
1	MR3 Probe	☑	☐
1	MR3 Travel adaptor	☑	☐
1	MR3 Download cable	☑	☐
1	MR3 Power supply	☑	☐
1	MR3 Water Trap	☑	☐
1	MR3 Manual	☑	☐
1	MR3 Software	☑	☐
1	MR3 drycell adaptor	☑	☐
1	MR3 screwdriver	☑	☐
1	MR3 Allen key	☑	☐
1	MR3 carry case	☑	☐

Notes

Instrument to be exchanged on Friday 17th and new calibration certificate supplied.

Melbourne: 7-11 Ceylon Street, Nunawading VIC 3131 Sydney: Suite 8, 17-23 Myrtle Street, North Sydney NSW 2060
Brisbane: Suite 4, 931 Kinsford Smith Drive, Eagle Farm QLD 4009 Perth: Suite 17, 231 Balcatta Road, Balcatta WA 6021
Phone: 1300 137 067 Fax: 03 9877 1230 e: hire@allara.com.au

Gas Detection Air Sampling & Monitoring Environmental & Water Quality Monitoring
allara instrument hire equipment pty ltd
ABN 72 644 176 608
Ph 1300 137 067
Melbourne: 7-11 Ceylon Street, Nunawading, VIC 3131 Ph 03 8878 3380 Fax 03 9877 1230
Sydney: Suite 8, 17-23 Myrtle Street, North Sydney NSW 2060 Ph 02 9954 6552 Fax 02 8904 1825

PID Calibration Certificate

Instrument Mini Rae 3000
Serial No. 592-001292

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
	Recharge OK?	✓	
Switch/keypad	Operation	✓	
Display	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
Pump	Operation	✓	
	Filter	✓	
	Flow	✓	
	Valves, Diaphragm	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	PID	✓	
Alarms	Beeper	✓	Low: 50ppm; High: 100ppm; TWA: 10ppm; STEL: 25ppm
	Settings	✓	
Software	Version	✓	
Data logger	Operation		
Download	Operation		
Other tests:			

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Diffusion mode Aspirated mode

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No	Gas bottle reading	Instrument Reading
PID Lamp	592-001780	97.4ppm Isobutylene		19887	97.4 ppm	97.4ppm

Calibrated by: MA Martyn Andrew

Calibration date: 10/07/2009 0:00

Next calibration due: 9/08/2009 0:00

Appendix E Regional groundwater data

GROUNDWATER DATABASE

BORE CARD REPORT - PUBLISHABLE

REG NUMBER 91325

REGISTRATION DETAILS

OFFICE	Rockhampton	**BASIN**	1310	**LATITUDE**	23-46-48	**MAP-SCALE**	104
DATE LOG RECD		**SUB-AREA**		**LONGITUDE**	151-13-11	**MAP-SERIES**	M
D/O FILE NO.	520/001(66)	**SHIRE**	3360-GLADSTONE REGI	**EASTING**	318603	**MAP-NO**	9150
R/O FILE NO.	81-01038	**LOT**	9	**NORTHING**	7368993	**MAP NAME**	GLADSTONE
H/O FILE NO.		**PLAN**	DS220	**ZONE**	56	**PROG SECTION**	
		ORIGINAL DESCRIPTION	POR 9	**ACCURACY**	SKET	**PRES EQUIPMENT**	
				GPS ACC			
GIS LAT	-23.780005626	**PARISH NAME**	1405-CURTIS			**ORIGINAL BORE NO**	OFFICE LICENSE ONLY
GIS LNG	151.219760929	**COUNTY**	DEAS THOMPSON			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACE	
FACILITY TYPE	SF	**DATE DRILLED**	13/09/1993			**DATA OWNER**	
STATUS	EX	**DRILLERS NAME**	J AUSTON			**CONFIDENTIAL**	
ROLES	WS	**DRILL COMPANY**	STOLZENBURG DRILLING				
		METHOD OF CONST.	ROTARY				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	13/09/1993	1	Polyvinyl Chloride	5.900	WT	141	0.00	27.30
A	13/09/1993	2	Perforated or Slotted Casing		AP	141	22.20	27.30
A	13/09/1993	3	Gravel Pack	6.000	GR		22.20	27.30

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	1.00	TOPSOIL
2	1.00	2.70	BROWN CLAYS
3	2.70	7.50	BROWN CLAY AND BOULDERS
4	7.50	22.70	WHITE BAKED CLAY
5	22.70	27.27	BROWN MUDSTONE

STRATIGRAPHY DETAILS

REG NUMBER 91325

SOURCE	RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
DNR	1	0.00		WANDILLA FORMATION

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	22.22	27.27	MDST	13/09/1993	-10.60	N	COND 12000	3.00	Y	FR	WANDILLA FORMATION

PUMP TEST DETAILS PART 1

**** NO RECORDS FOUND ****

PUMP TEST DETAILS PART 2

**** NO RECORDS FOUND ****

BORE CONDITION

**** NO RECORDS FOUND ****

ELEVATION DETAILS

**** NO RECORDS FOUND ****

WATER ANALYSIS PART1

**** NO RECORDS FOUND ****

WATER ANALYSIS PART 2

**** NO RECORDS FOUND ****

WATER LEVEL DETAILS

**** NO RECORDS FOUND ****

WIRE LINE LOG DETAILS

**** NO RECORDS FOUND ****

FIELD MEASUREMENTS

REG NUMBER 91325

**** NO RECORDS FOUND ****

SPECIAL WATER ANALYSIS

**** NO RECORDS FOUND ****

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 26/07/2000		Y 26/07/2000	Y 26/07/2000				

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES

GENERAL NOTES

**** NO RECORDS FOUND ****

REG NUMBER 91326

REGISTRATION DETAILS

		BASIN	1310	**LATITUDE**	23-45-06	**MAP-SCALE**	104
OFFICE	Rockhampton	**SUB-AREA**		**LONGITUDE**	151-11-38	**MAP-SERIES**	M
DATE LOG RECD		**SHIRE**	3360-GLADSTONE REGI	**EASTING**	315916	**MAP-NO**	9150
D/O FILE NO.	520/001(66)	**LOT**	11	**NORTHING**	7372089	**MAP NAME**	GLADSTONE
R/O FILE NO.	81-01038	**PLAN**	DS220	**ZONE**	56	**PROG SECTION**	
H/O FILE NO.		**ORIGINAL DESCRIPTION**	POR 11	**ACCURACY**	SKET	**PRES EQUIPMENT**	
				GPS ACC			
GIS LAT	-23.75174937	**PARISH NAME**	1405-CURTIS			**ORIGINAL BORE NO**	OFFICE LICENSE ONLY
GIS LNG	151.193783893	**COUNTY**	DEAS THOMPSON			**BORE LINE**	-
CHECKED	Y	**PROPERTY NAME**					
		FIELD LOCATION				**POLYGON**	
						RN OF BORE REPLACE	
FACILITY TYPE	SF	**DATE DRILLED**	10/09/1993			**DATA OWNER**	
STATUS	EX	**DRILLERS NAME**	J AUSTON			**CONFIDENTIAL**	
ROLES	WS	**DRILL COMPANY**	STOLZENBURG DRILLING				
		METHOD OF CONST.	ROTARY				

CASING DETAILS

PIPE	DATE	RECORD NUMBER	MATERIAL DESCRIPTION	MAT SIZE (mm)	SIZE DESC	OUTSIDE DIAM (mm)	TOP (m)	BOTTOM (m)
A	13/09/1993	1	Polyvinyl Chloride	5.900	WT	141	0.00	30.00
A	13/09/1993	2	Perforated or Slotted Casing		AP	141	15.00	27.30
A	13/09/1993	3	Gravel Pack	6.000	GR		15.00	27.30

STRATA LOG DETAILS

RECORD NUMBER	STRATA TOP (m)	STRATA BOT (m)	STRATA DESCRIPTION
1	0.00	1.00	SOIL
2	1.00	6.00	BROWN CLAY AND BOULDERS
3	6.00	21.21	WHITE MUDSTONE AND BROKEN ROCK
4	21.21	30.30	BLUE BASALT WATER

STRATIGRAPHY DETAILS

DNR	1	0.00	WANDILLA FORMATION

REG NUMBER 91326

AQUIFER DETAILS

REC	TOP BED(M)	BOTTOM BED(M)	BED LITHOLOGY	DATE	SWL (m)	FLOW	QUALITY	YIELD (l/s)	CTR	CONDIT	FORMATION NAME
1	15.00	30.30	MDST	13/09/1993	-10.60	N	SALTY	0.52	Y	FR	WANDILLA FORMATION

PUMP TEST DETAILS PART 1

****** NO RECORDS FOUND ******

PUMP TEST DETAILS PART 2

****** NO RECORDS FOUND ******

BORE CONDITION

****** NO RECORDS FOUND ******

ELEVATION DETAILS

****** NO RECORDS FOUND ******

WATER ANALYSIS PART1

****** NO RECORDS FOUND ******

WATER ANALYSIS PART 2

****** NO RECORDS FOUND ******

WATER LEVEL DETAILS

****** NO RECORDS FOUND ******

WIRE LINE LOG DETAILS

****** NO RECORDS FOUND ******

FIELD MEASUREMENTS

****** NO RECORDS FOUND ******

SPECIAL WATER ANALYSIS

****** NO RECORDS FOUND ******

REG NUMBER 91326

VALIDATION LOG - PART 1

REGDET	CASING	STRLOG	AQUIFR	PUMTES	ELVDET	WLVDET	FIELDQ
Y 26/07/2000	Y 10/06/1994	Y 26/07/2000	Y 26/07/2000	Y 10/06/1994	Y 10/06/1994	Y 10/06/1994	Y 10/06/1994

VALIDATION LOG - PART 2

WATANL	SAMPLE	STRTIG	WIRLOG	MULCND	BRCOND	FPREAD	GNOTES
Y 10/06/1994		Y 10/06/1994		Y 10/06/1994			

GENERAL NOTES

****** NO RECORDS FOUND ******

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- You must include metadata with the product(s) and the metadata must incorporate as a minimum the metadata supplied with this data.

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**** End of Report ****

	1:44,707
	25/06/2009



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Legend


Legend
Watercourses
Include All Reg. Numbers
All Towns
DCDB Water
DCDB Road
DCDB
Coastline
(cont)
Queensland
Other Australian States

Appendix F Historical land titles and registered plan

CURRENT TITLE SEARCH

ENVIRONMENT AND RESOURCE MANAGEMENT, QUEENSLAND

Request No: 7682889
Search Date: 07/10/2009 13:18

Title Reference: 50780280
Date Created: 21/08/2009

Previous Title: 50778228

REGISTERED OWNER

Dealing No: 712676193 20/08/2009

THE MINISTER FOR INDUSTRIAL DEVELOPMENT OF QUEENSLAND

ESTATE AND LAND

Estate in Fee Simple

LOT 1 SURVEY PLAN 225924
County of DEAS THOMPSON Parish of CURTIS
Local Government: GLADSTONE

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 40057921 (Lot 10 on CP DS220)
(Lot 7 on CP DS220)

ADMINISTRATIVE ADVICES - NIL
UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

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Requested By: SMIS .

CURRENT TITLE SEARCH

ENVIRONMENT AND RESOURCE MANAGEMENT, QUEENSLAND

Request No: 7682894
Search Date: 07/10/2009 13:19 **Title Reference: 50780281**
Date Created: 21/08/2009

Previous Title: 50778228

REGISTERED OWNER

Dealing No: 712676193 20/08/2009

THE MINISTER FOR INDUSTRIAL DEVELOPMENT OF QUEENSLAND

ESTATE AND LAND

Estate in Fee Simple

LOT 2 SURVEY PLAN 225924
County of DEAS THOMPSON Parish of CURTIS
Local Government: GLADSTONE

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 40057921 (Lot 10 on CP DS220)
(Lot 27 on CP DS220)

ADMINISTRATIVE ADVICES - NIL
UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

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CURRENT TITLE SEARCH

ENVIRONMENT AND RESOURCE MANAGEMENT, QUEENSLAND

Request No: 7684122
Search Date: 07/10/2009 14:33 **Title Reference: 50780282**
Date Created: 21/08/2009

Previous Title: 50778228

REGISTERED OWNER

Dealing No: 712676193 20/08/2009

THE MINISTER FOR INDUSTRIAL DEVELOPMENT OF QUEENSLAND

ESTATE AND LAND

Estate in Fee Simple

LOT 3 SURVEY PLAN 225924
County of DEAS THOMPSON Parish of CURTIS
Local Government: GLADSTONE

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 40057921 (Lot 10 on CP DS220)
(Lot 11 on CP DS220)
(Lot 27 on CP DS220)
(Lot 28 on CP DS220)

ADMINISTRATIVE ADVICES - NIL
UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

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Requested By: SMIS .

CURRENT TITLE SEARCH

ENVIRONMENT AND RESOURCE MANAGEMENT, QUEENSLAND

Request No: 7684463
Search Date: 07/10/2009 14:52

Title Reference: 50780283
Date Created: 21/08/2009

Previous Title: 50778228

REGISTERED OWNER

Dealing No: 712676193 20/08/2009

THE MINISTER FOR INDUSTRIAL DEVELOPMENT OF QUEENSLAND

ESTATE AND LAND

Estate in Fee Simple

LOT 4 SURVEY PLAN 225924
County of DEAS THOMPSON Parish of CURTIS
Local Government: GLADSTONE

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 40057921 (Lot 10 on CP DS220)
(Lot 11 on CP DS220)
(Lot 12 on CP DS220)
(Lot 28 on CP DS220)
(Lot 7 on CP DS220)

ADMINISTRATIVE ADVICES - NIL
UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

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Requested By: SMIS .

[Form 1.1]

Title Reference:40057921

QUEENSLAND

DEED OF GRANT OF LAND

40057921

Land Act 1994

Elizabeth the Second, by the Grace of God, Queen of Australia, and Her other Realms and Territories, Head of the Commonwealth:-

TO ALL TO WHOM THESE PRESENTS SHALL COME, GREETING:

WE, with the advice of the Executive Council, under the Land Act 1994, grant in fee simple all that parcel of land described in Schedule 1 to the person described in Schedule 2,

SUBJECT TO the reservations and conditions specified, and such other reservations and conditions as may be contained in and declared by the laws of the State.

Specified Reservations -

(a) All minerals (as defined by the Mineral Resources Act 1989) on and below the surface of the land
(b) The right of access for the purpose of searching for and working any mines (as defined by the Mineral Resources Act 1989) in any part of the land
(c) All petroleum (as defined by the Petroleum Act 1923) on and below the surface of the land
(d) All rights of access for the purpose of searching for and for the operations of obtaining petroleum in any part of the land, and all rights of way for access and for pipelines and other purposes requisite for obtaining and conveying petroleum in the event of petroleum being obtained in any part of the said land
(e) All quarry material (as defined by the Forestry Act 1959) on and below the surface of the land

Specified Conditions - Nil

IN TESTIMONY WHEREOF, WE have caused this OUR grant to be sealed with the Seal of the State of Queensland.

Witness our Trusty and Well-beloved Her Excellency Penelope Anne Wensley, Governor in and over the State of Queensland and its Dependencies, in the Commonwealth of Australia, this 12th day of February in the 58th Year of Our Reign and in the year of Our Lord 2009

P. A. Wensley

SCHEDULE 1 - DESCRIPTION OF LAND

Lot /Plan	County	Parish
10/DS220	DEAS THOMPSON	CURTIS
11/DS220	DEAS THOMPSON	CURTIS
12/DS220	DEAS THOMPSON	CURTIS
13/DS220	DEAS THOMPSON	CURTIS
27/DS220	DEAS THOMPSON	CURTIS
28/DS220	DEAS THOMPSON	CURTIS
7/DS220	DEAS THOMPSON	CURTIS

Area Surveyed 2491.6500 Ha.

Note: For details of description, dimensions and marking of boundaries refer to plan mentioned above.

SCHEDULE 2 - GRANTEE

THE STATE OF QUEENSLAND (REPRESENTED BY DEPARTMENT OF INFRASTRUCTURE AND PLANNING)

epartment of Natural Resources and Water Reference: 2009/000478-1
revious Title References: 47030135, 47030137, 47030139, 47030138, 47030140, 47030136 and 47030134

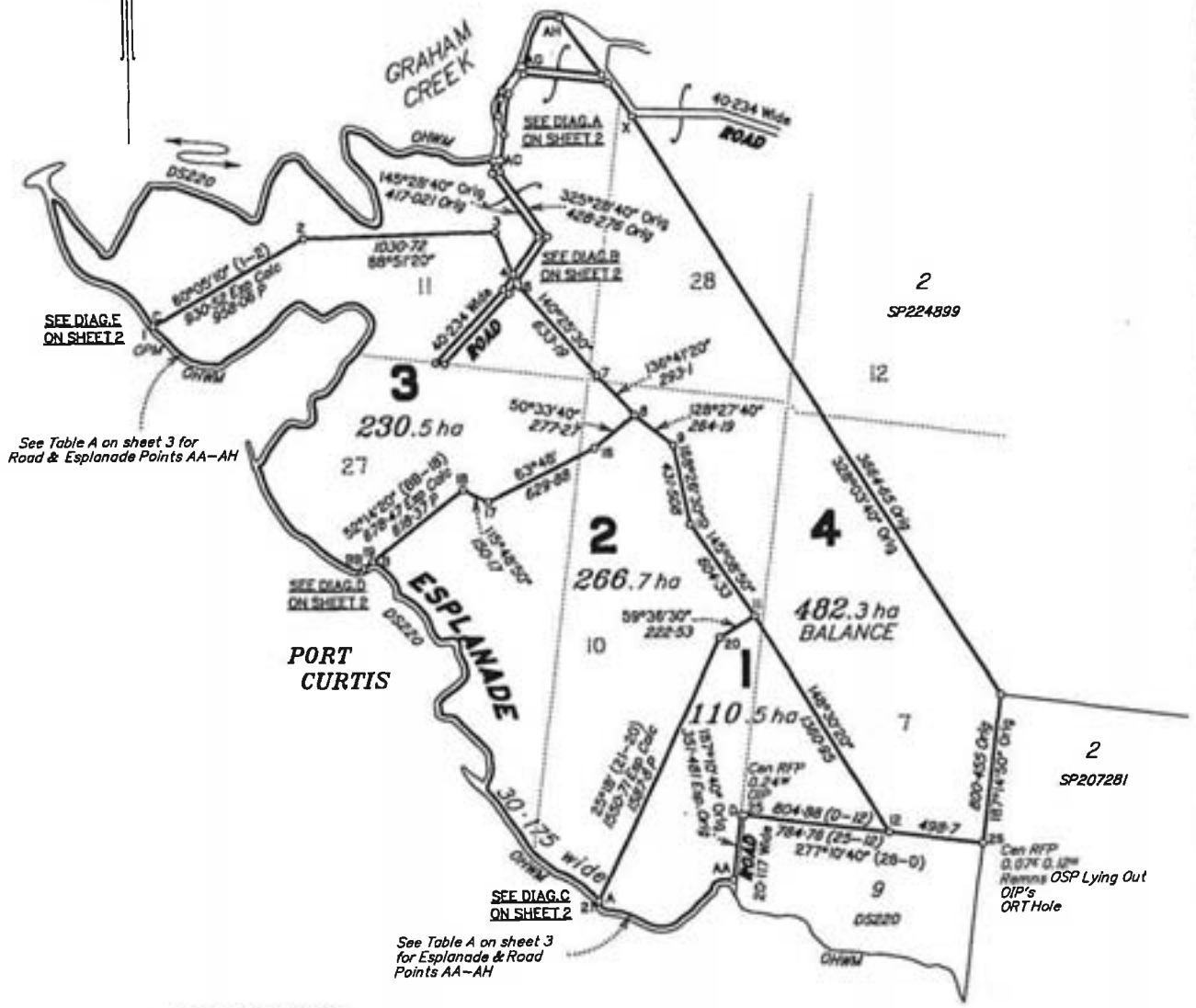
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Land Title Act 1994 ; Land Act 1994
Form 21 Version 2

SURVEY PLAN

Sheet 1 of 3

Original information compiled from plan SP224899 in the Department of Environment and Resource Management.



PERMANENT MARKS

PM	ORIGIN	BEARING	DIST	NO
1–OPM Fd		64°56'20"	312·814	722B1
1–PM		149°33'20	20·678	121860
11–OPM (New Conn.)	SP224899	105°39'	865·818	43555
19–PM		148°11'20"	213·879	168830
21–OPM	DP209057	80°51'50"	767·054	173111
21–PM		137°21'30"	40·439	168829

Branded peg placed at all new corners unless otherwise shown.

Scale 1: 25000 — Lengths are in Metres.

200 0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800

State copyright reserved.

I, Alan Scott Maclean hereby certify that Nelson Ian Leslie Harch (Surveying Graduate), for whose work I accept responsibility, and that the plan is accurate, that the said survey was performed in accordance with the Survey and Mapping Infrastructure Act 2003 and the Surveyors Act 2003 and associated Regulations and Standards and that the said survey was completed on the 08/05/2009.

Cadastral Surveyor

Date 9/6/09

Plan of Lots 1, 2, 3 & 4

Cancelling Lot 1 on SP224899

PARISH: CURTIS COUNTY: Deas Thompson

Meridian: MGA Zone 56 vide GPS

F/N's: Yes

Scale: 1:25000

Format: STANDARD

SP225924

Plan Status:

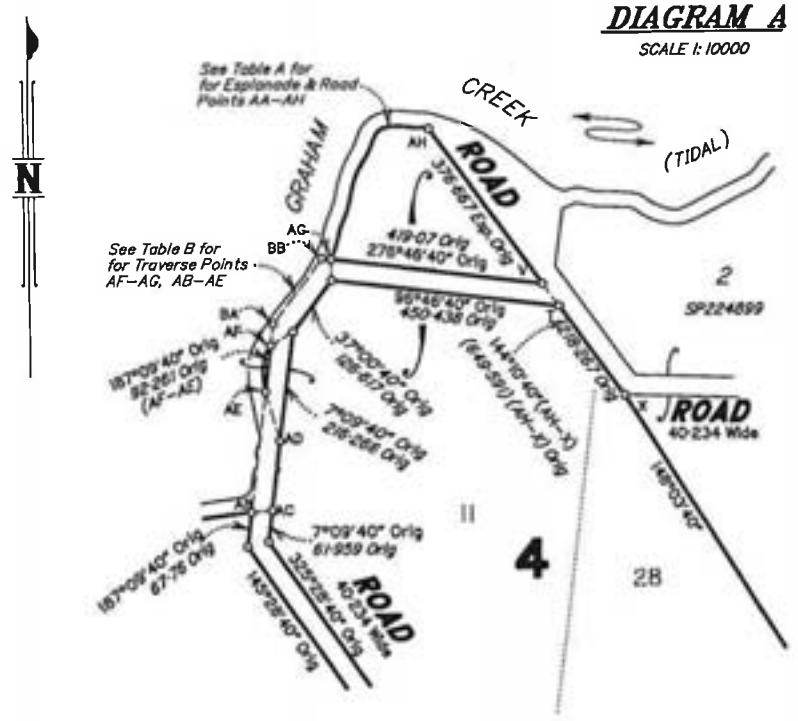
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Form 21A Version 1

ADDITIONAL SHEET

DIAGRAM A

SCALE 1: 10000



Scale 1: 10000 — Lengths are in Metres.

100 0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400

DIAGRAM C

SCALE 1: 1000

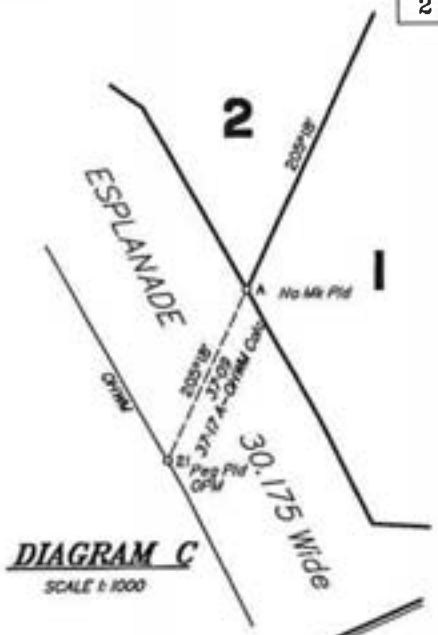


DIAGRAM D

Not to Scale

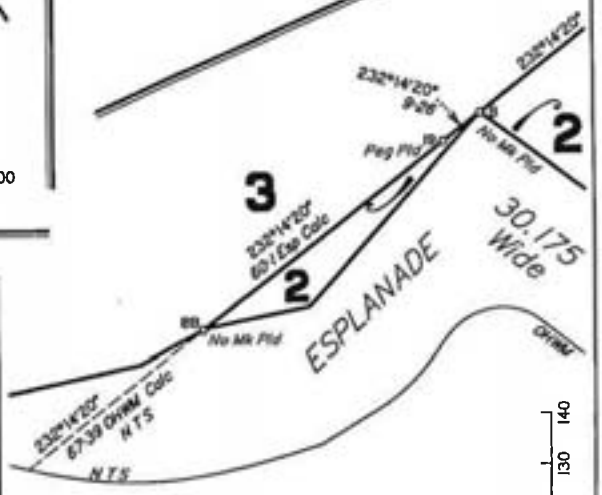
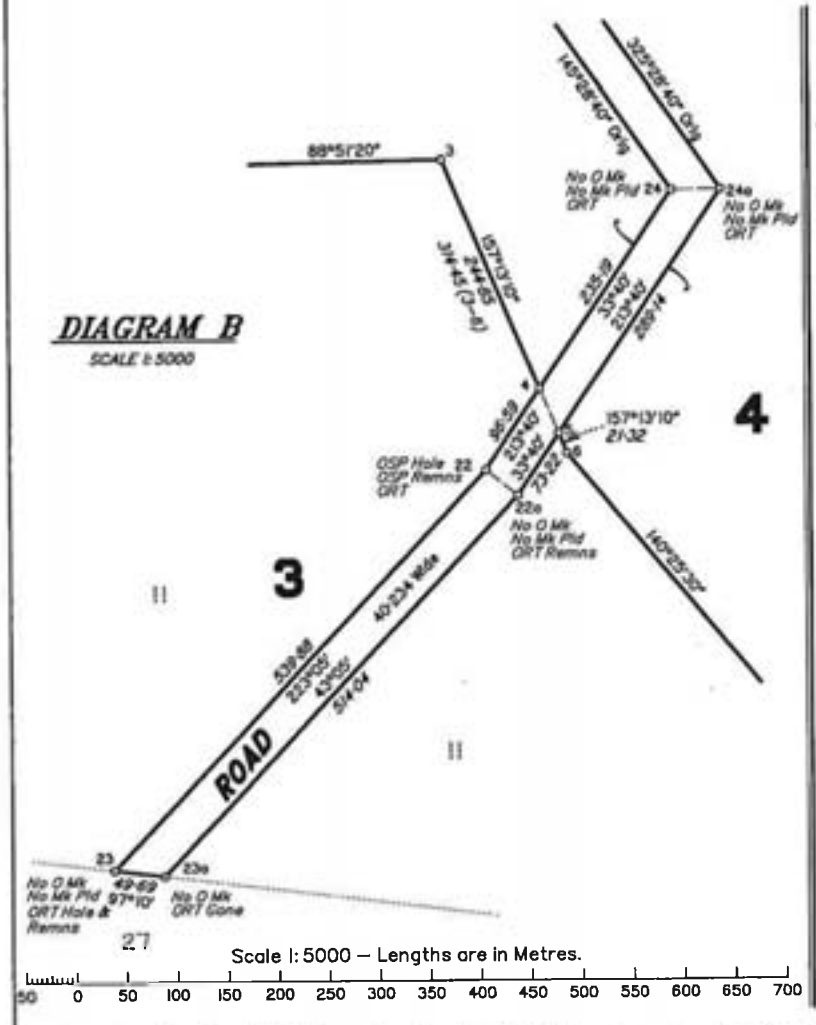


DIAGRAM B

SCALE 1: 5000

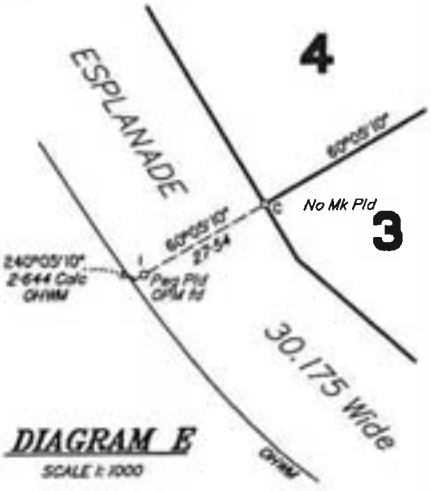


Scale 1: 5000 — Lengths are in Metres.

50 0 50 100 150 200 250 300 350 400 450 500 550 600 650 700

DIAGRAM E

SCALE 1: 1000



Scale 1: 1000 — Lengths are in Metres.

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140

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Insert Plan Number SP225924

712676193

$551.90
20/08/2009 14:52

BE 400 NT

**WARNING : Folded or Mutilated Plans will not be accepted.
Plans may be rolled.
Information may not be placed in the outer margins.**

Registered

5. Lodged by
PROPERTY SERVICES GROUP
PO BOX 15009
CITY EAST QLD 4002
PH: 32242065 REF: T6646
LODGER CODE: 2068
(Include address, phone number, reference, and Lodger Code)

1. Certificate of Registered Owners or Lessees.

I/We THE MINISTER FOR INDUSTRIAL DEVELOPMENT OF QUEENSLAND

(Names in full)

* as Registered Owners of this land agree to this plan and dedicate the Public Use Land as shown hereon in accordance with Section 50 of the Land Title Act 1994.
SUBJECT TO SECTION 3.7.8 OF THE INTEGRATED PLANNING ACT 1997
* as lessees ~~of the land~~ agree to this plan.

Signature of *~~Registered Owners~~ *~~Lessees~~

Geoff Dickie; Deputy Coordinator-General as Delegate of THE MINISTER FOR INDUSTRIAL DEVELOPMENT OF QUEENSLAND

* Rule out whichever is inapplicable

2. Local Government Approval.

* _____

hereby approves this plan in accordance with the :

%

Dated this _____ day of _____

_____ #

_____ #

* Insert the name of the Local Government. % Insert Integrated Planning Act 1997 or Local Government (Planning & Environment) Act 1990
# Insert designation of signatory or delegation

3. Plans with Community Management Statement :

CMS Number :

Name :

4. References :

Dept File :

Local Govt :

Surveyor : 3628

4. Existing

Title Reference	Lot	Plan
50776228	1	SP224899

Created

Lots	Emts	Road
1, 2, 3 & 4		

Lots	Orig
1	Lot 7 on DS220 Lot 10 on DS220
2	Lot 27 on DS220 Lot 10 on DS220
3	Lot 27 on DS220 Lot 28 on DS220 Lot 11 on DS220 Lot 10 on DS220
4	Lot 10 on DS220 Lot 7 on DS220 Lot 11 on DS220 Lot 12 on DS220 Lot 28 on DS220

7. Portion Allocation :

8. Map Reference :
9150-311

9. Locality :
CURTIS ISLAND

10. Local Government :
GLADSTONE REGIONAL COUNCIL

11. Passed & Endorsed :

By : A.S.MACLEAN
Date : ~~9/6/09~~ 17/6/09 ~~12~~ 14/7/09
Signed :
Designation : CADASTRAL SURVEYOR

12. Building Format Plans only.

I certify that :

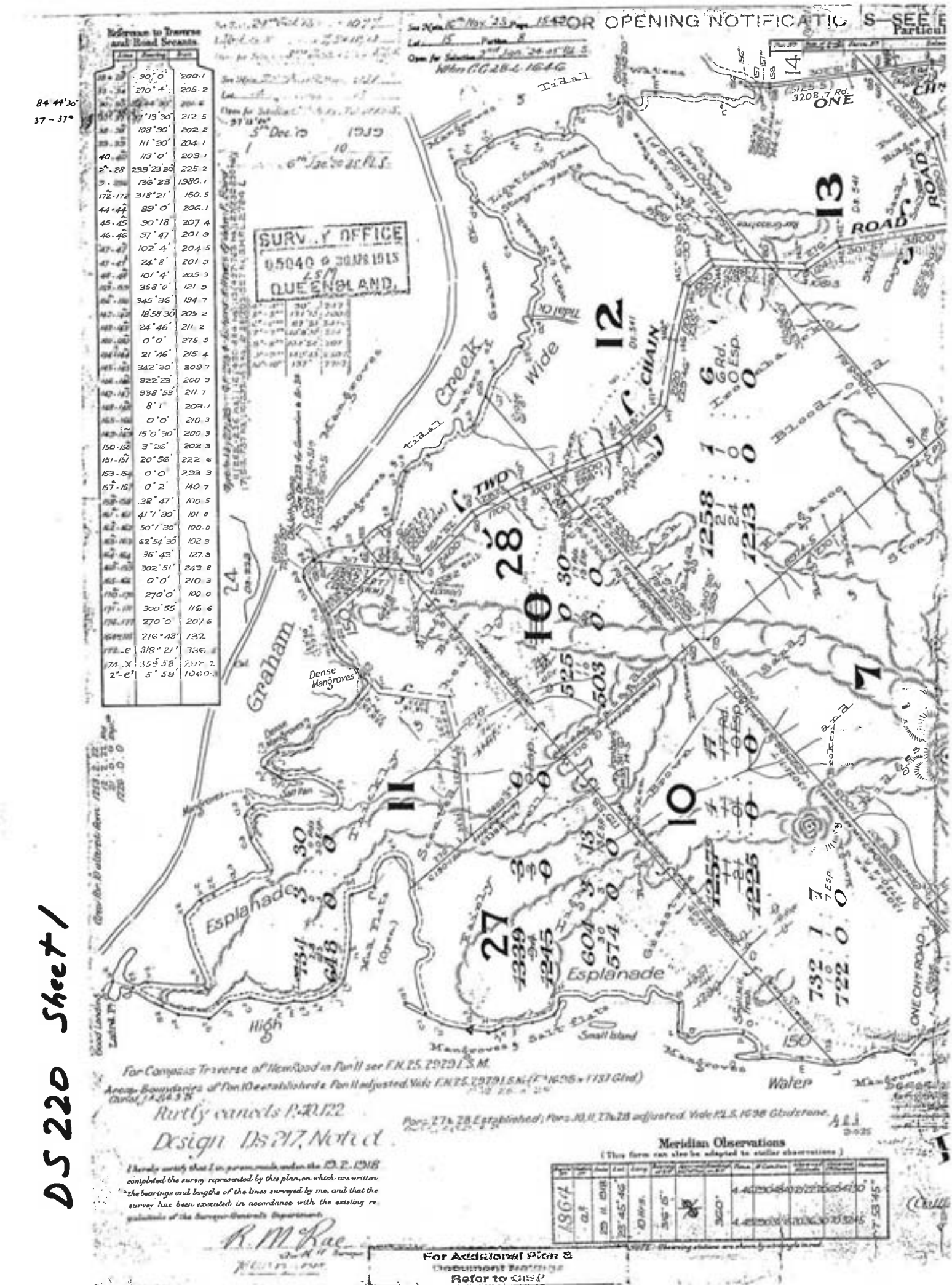
* As far as it is practical to determine, no part of the building shown on this plan encroaches onto adjoining lots or road.
* Part of the building shown on this plan encroaches onto adjoining * lots and road

_____ _____
Cadastral Surveyor/Director * Date
* Delete words not required

13. Lodgement Fees :

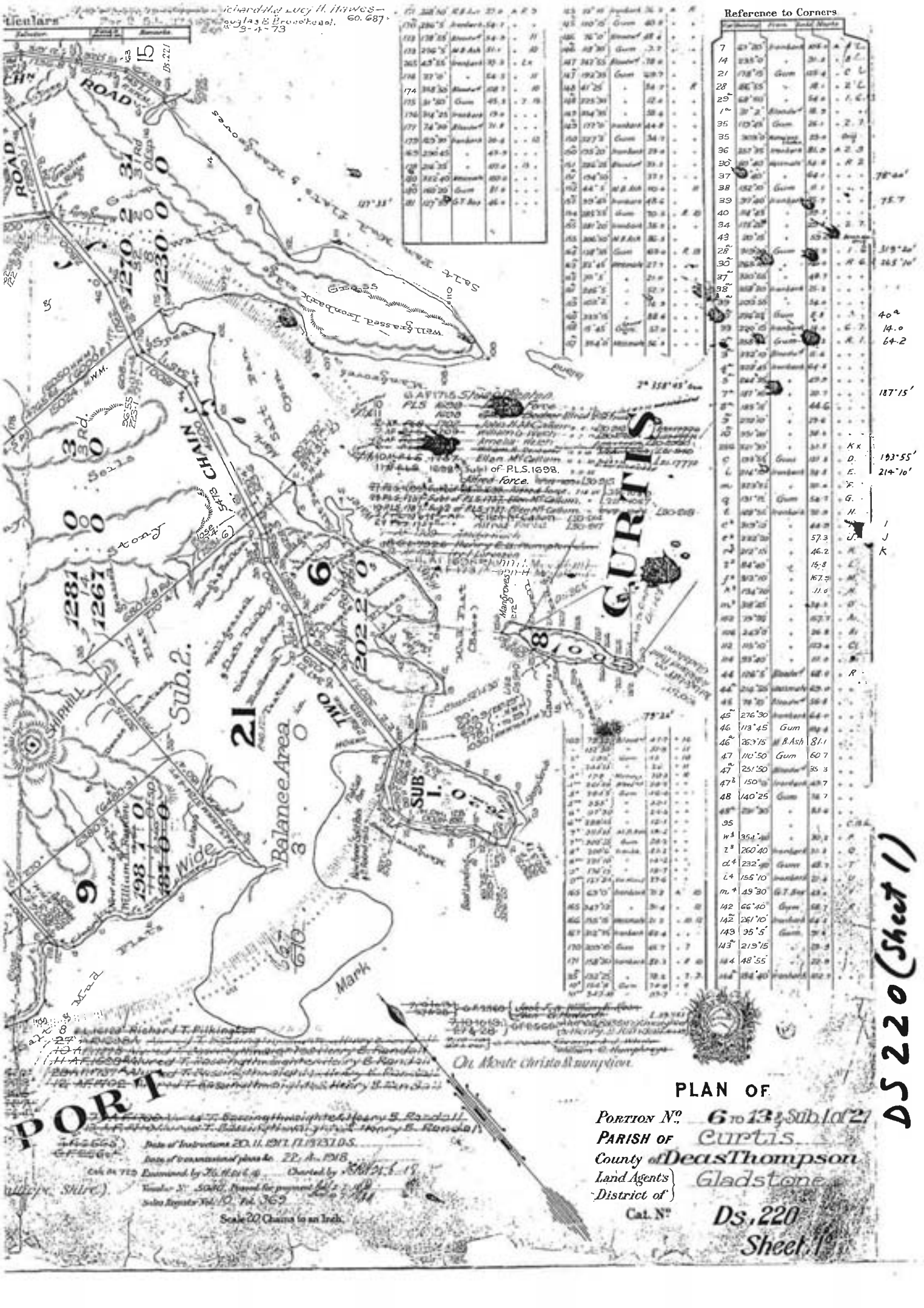
Survey Deposit	$
Lodgement	$
New Titles	$
Photocopy	$
Postage	$
TOTAL	$

14. Insert Plan Number SP225924



DS220 Sheet 1

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Reference to Corners
PLAN OF
PORTION No. 6 to 13 & Sub 1 of 21
PARISH OF Curtis
County of Deas Thompson
Land Agent's District of Gladstone
Cat. No Ds, 220
Sheet 1
Scale 20 Chains to an Inch.
DS 220 (Sheet 1)
CURTIS
Balance Area
Sub 2.
Sub 1.
Mangroves
Salt Flats
Creek
Road
Chain
Wide
Mark
Stony
Sandy
Gravelly
Richard T. Pilkington
Douglas E. Brotchie
Port

Reference to Traverse and Road Secants.

Particulars

Date of Instructions 20.11.17. 17.13737 D.S. Reference to Corners

Date of transmission of plans &c. 22-4-18

Scale Chains to an Inch.

SURVEY OFFICE
05040 30 APR 1918
QUEENSLAND.

For Additional Plan & Document Numbers Refer to Cap

Line	Bearing	Dist.
2 to 3	213° 12′	948.0
3 . 4	158° 29′	1603.0
4 . 5	35° 50′	1200.0
4 . 6	152° 25′	1275.3
6 . 7	161° 46′	919.1
7 . 8	185° 13′	1501.2
8 . 9	213° 53′	608.0
9 . 10	321° 9′	1237.8
10 . 41	269° 37′	678.8
41 . 11	269° 37′	124.2
11 . 42	162° 35′	415.0
42 . 12	162° 35′	1950 2
12 . 13	213° 53′	494.4
13 . 14	303° 21′	630.2
14 . 39	232° 14′	1049.0
39 . 15	232° 14′	480.0
15 . 16	157° 20′	1724.7
16 . 17	153° 35′	602.1
17 . 18	165° 28′	391.3
18 . 19	149° 35′	774.7
19-20	195° 40′	954.9
20 . 21	260° 31′	1113.7
21 . 22	326° 20′	360.7
22 . 22	326° 20′	746.0
22 . 23	347° 26′	615.6
23 . 24	307° 24′	636.6
24 . 25	322° 39′	1395.3
25 . 26	347° 32′	739.1
26 . 27	25° 55′	708.4
27 . 28	55° 55′	1191.1
30 . 31	348° 0′	930.0
31 . 32	24° 30′	500.0
1 . 41	180° 4′	5726.8
1 . 42	180° 4′	5726.8
1 . 43	180° 4′	6320.0
3 . 256	136° 23′	1980.1
256 . 257	157° 8′	1145.8
257 . 258	162° 19′	782.0
258 . 259	133° 18′	622.8
259 . 260	129° 4′	838.1
a . b	280° 46′	2401.2
b . c	268° 27′	1331.4
c . d	30° 51′	1405.3
d . e	289° 8′	1184.4
e . f	318° 21′	524.6
a . e	318° 21′	1011.6
e . f	216° 49′	1823.8
f . g	250° 57′	477.3

g to h	277° 58′	401.2
h . i	295° 51′	643.6
i . j	266° 20′	680.9
j . k	332° 23′	528.5
k . l	295° 56′	1879.3
l . m	321° 39′	1053.5
m . n	313° 25′	1226.1
m . o	318° 25′	2056.2
n . p	2° 23′	962.1
p . q	306° 45′	1345.2
q . r	340° 50′	378.6
r . s	2° 23′	907.7
s . t	311° 33′	3724.3
t . u	243° 8′	425.6
u . v	291° 54′	710.8
v . w	300° 35′	564.2
w . x	307° 58′	353.7
x . y	284° 23′	264.3
y . z	299° 15′	896.0
z . a^2	316° 15′	645.5
$a^2 . b^2$	323° 32′	900.8
$b^2 . c^2$	341° 5′	597.5
$b^2 . d^2$	341° 5′	1300.0
$c^2 . e^2$	29° 36′	4968.6
$e^2 . f^2$	253° 21′	1117.6
$f^2 . g^2$	291° 36′	721.1
$g^2 . h^2$	223° 29′	1673.2
$h^2 . i^2$	234° 21′	933.3
$i^2 . j^2$	256° 51′	424.8
$j^2 . k^2$	283° 47′	468.2
$k^2 . l^2$	295° 24′	506.3
$l^2 . m^2$	315° 35′	389.2
$m^2 . n^2$	299° 21′	431.7
$n^2 . o^2$	322° 39′	933.2
$o^2 . p^2$	300° 38′	668.1
$p^2 . q^2$	270° 30′	798.8
$q^2 . r^2$	318° 57′	990.5
$r^2 . s^2$	337° 38′	572.7
$s^2 . t^2$	343° 54′	1064.2
$t^2 . w^2$	319° 27′	666.1
$t^2 . v^2$	112° 32′	905.3
$v^2 . w^2$	136° 33′	1797.0
$w^2 . x^2$	24° 49′	2306.1
$x^2 . y^2$	86° 36′	697.4
$y^2 . z^2$	106° 46′	420.7
$z^2 . a^2$	101° 38′	773.3
$a^2 . b^2$	113° 29′	1148.0

b^3 to c^3	11° 27′	1187.0
$c^3 . d^3$	27° 15′	703.1
$d^3 . e^3$	86° 33′	310.6
$e^3 . f^3$	121° 36′	2504.6
$f^3 . g^3$	330° 33′	1729.1
$g^3 . h^3$	340° 45′	565.4
$h^3 . i^3$	203° 36′	1281.0
$i^3 . j^3$	84° 17′	414.6
$j^3 . k^3$	110° 9′	1149.0
$k^3 . l^3$	80° 6′	2572.3
$l^3 . m^3$	347° 20′	1196.0
$m^3 . n^3$	28° 26′	1246.0
$n^3 . o^3$	8° 2′	810.4
$o^3 . p^3$	15° 43′	429.6
$p^3 . 152$	73° 51′	547.7
$p^3 . q^3$	73° 51′	590.4
2 . 101	352° 26′	3300.0
101 . 102	38° 58′	2419.0
102 . 103	331° 58′	1646.7
103 . 104	111° 51′	1962.8
104 . 105	140° 1′	1923.7
105 . 106	187° 33′	1462.1
106 . 107	155° 43′	519.1
107 . 108	137° 53′	1702.0
108 . 109	120° 52′	1361.7
109 . 110	5° 34′	2118.4
110 . 111	340° 0′	1943.7
111 . 112	293° 52′	1631.6
112 . 113	10° 7′	2035.5
113 . 114	358° 54′	1984.0
114 . 115	356° 46′	2160.5
115 . 116	267° 10′	862.8
$q^3 . r^3$	107° 1′	624.4
$r^3 . s^3$	127° 38′	664.0
$s^3 . 155$	92° 29′	331.0
$s^3 . t^3$	92° 29′	1508.1
$t^3 . w^3$	53° 12′	1069.6
$w^3 . x^3$	97° 15′	865.5
$x^3 . 168$	61° 8′	973.0
$x^3 . y^3$	61° 8′	1656.0
$y^3 . z^3$	85° 35′	1023.4
$z^3 . a^3$	42° 36′	340.0

a^4 to b^4	52°	
$b^4 . c^4$	336° 53′	1201.7
$c^4 . d^4$	1° 47′	1609.8
$d^4 . e^4$	11° 27′	1374.6
$e^4 . f^4$	120° 24′	506.5
$f^4 . g^4$	92° 53′	640.5
$g^4 . h^4$	105° 23′	1016.6
$h^4 . i^4$	180° 21′	729.3
$i^4 . j^4$	129° 43′	698.2
$j^4 . k^4$	68° 39′	924.3
$k^4 . l^4$	122° 31′	1288.8
$l^4 . 182$	114° 50′	257.4
$l^4 . m^4$	114° 50′	1203.1
$m^4 . n^4$	135° 46′	2257.5
$n^4 . o^4$	128° 15′	1038.0
$o^4 . 156$	345° 36′	601.2
A1 . B1	90° 0′	2000.0
B1 . C1	360° 0′	300.0
C1 . D1	90° 0′	20000.0
114 . 115	216° 43′	132.0
260 . 261	152° 27′	666.0
261 . 262	150° 33′	426.4
262 . 263	81° 12′	315.8
263 . 264	343° 30′	471.3
264 . 265	321° 6′	437.5
265 . 266	344° 22′	423.8
266 . 267	358° 30′	255.5
267 . 268	335° 26′	783.2
268 . 269	322° 35′	440.5
269 . 270	316° 25′	330.5
270 . 271	314° 27′	522.0
271 . 272	326° 46′	276.1
272 . 256	265° 57′	453.2
103 . 172	325° 37′	209.8
9 . X	22° 45′	301.6
A1 . 51	167°	2000
155 . T	92° 29	1177.1
168 . Y3	61° 8′	677
162 . 114	114° 50′	945.7
C1 . 156	345° 36′	796.0

Compass Traverse

Traverse Tables

Meridian Observations

This form can also be adapted to stellar observations

Angle No.	Object	Mode	Face	Horizontal Circle	Mean Horizontal Circle	Reduction to Centre	Corrected Horizontal Circle	Vertical Circle	Mean Vertical Circle	Remarks

NOTE.—Observing stations are shown by a triangle in red.

I hereby certify that I, in person, made, and on the 19. 2. 1918 completed the survey represented by this plan, in which are written the bearings and lengths of the lines surveyed by me, and that the survey has been executed in accordance with the existing regulations of the Surveyor-General's Department.

A. M. Rae
Surveyor

PLAN OF

PORTION No. 6 to 13

PARISH OF Curtis

County of Deas Thomson

Land Agent's District of Gladstone

Cal. No. DS: 220

Sheet 2

DS220
Sheet 2

Land Title Act 1994 ; Land Act 1994
Form 21A Version 1

ADDITIONAL SHEET

Sheet 3 of 3

TABLE A

	BEARING	DISTANCE	
AA	271°13'	46·876	
	272°32'10"	38·616	
	223°59'40"	46·222	
	178°59'40"	23·864	
	238°01'50"	28·869	
	221°08'	41·756	
	232°31'30"	42·2	
	215°27'50"	39·933	
	235°18'20"	80·493	
	221°17'20"	38·477	
	256°58'20"	78·162	
	285°08'40"	68·389	
	303°01'40"	133·88	
	273°30'40"	127·383	
	333°51'	23·636	
	331°01'50"	28.831	A
A	331°01'50"	12.664	
	330°46'10"	28·618	
	305°11'50"	37·458	
	324°54'50"	33·068	
	303°06'40"	99·325	
	291°48'	45·439	
	286°24'40"	35·132	
	317°08'50"	36·13	
	305°58'30"	42·374	
	309°14'40"	53·902	
	317°34'20"	37·068	
	325°58'	36·561	
	331°41'30"	81·014	
	324°16'30"	53·225	
	320°33'	38·086	
	329°07'30"	39·164	
	326°18'20"	41·927	
	323°27'30"	41·788	
	320°35'40"	44·284	
	308°07'30"	38·601	
	33°11'30"	65·399	
	12°25'30"	52·41	
	347°45'40"	45·904	
	2°57'20"	39·02	
	319°13'40"	52·026	
	313°55'40"	82·241	
	312°29'40"	79·738	
	316°47'30"	39·906	
	313°55'40"	33·37	
	268°55'40"	36·052	
	287°21'50"	32·962	
	313°55'40"	3·069	
	18°22'10"	17·765	
	333°28'50"	36·252	
	32°36'	16·399	
	45°11'10"	34·344	
	59°41'30"	39·094	
	51°09'40"	87·861	
	31°48'50"	27·388	
	11°22'50"	17·31	
	353°03'10"	46·982	
	33°08'40"	46·761	
	33°45'50"	32·942	
	3°43'40"	90·407	
	253°17'30"	109·921	
	327°15'30"	21·024	
	318°43'40"	36·008	
	342°57'20"	38·282	
	340°31'50"	49·783	
	318°43'40"	89·993	
	304°41'30"	95·017	
	273°43'40"	19·283	
	8°55'20"	20·298	
	340°31'50"	56·778	
	318°43'40"	89·603	
	308°09'20"	73·721	B
B	228°43'40"	50·91	
	24°48'50"	18·808	BB
BB	24°48'50"	14·154	
	257°53'10"	30·174	
	289°04'40"	129·38	
	307°45'40"	109·261	
	315°08'40"	75·506	
	29°33'40"	55·531	
	306°25'40"	39·029	
	323°25'40"	103·307	
	330°42'40"	174·634	
	348°15'40"	58·68	
	336°57'	44·089	
	336°40'50"	6·819	
	64°10'10"	28·463	
	25°28'	50·152	
	31°00'	37·454	
	36°46'40"	39·483	
	33°55'	39·529	
	39°38'30"	38·025	
	42°29'20"	35·419	
	58°34'50"	12·93	
	75°26'20"	12·069	
	109°23'30"	71·056	
	63°20'30"	84·454	
	340°28'	91·157	
	10°12'50"	29·846	
	36°46'40"	20·611	
	81°46'40"	56·899	
	36°46'40"	51·228	
	42°29'20"	41·947	
	31°04'	45·648	
	22°44'30"	41·472	
	31°04'	31·548	
	56°04'	41·065	
	36°46'40"	173·187	
	10°12'50"	64·452	
	325°42'40"	58·85	
	310°43'20"	79·156	
	266°14'20"	57·29	
	249°13'	48·962	

TABLE A Cont.

	BEARING	DISTANCE	
	236°18'	46·235	
	241°14'20"	41·595	
	240°13'	7·056	
	299°08'20"	21·215	
	301°38'30"	77·064	
	312°22'40"	58·204	
	234°29'40"	77·01	
	230°39'40"	44·231	
	219°21'	43·286	
	222°07'50"	78·385	
	230°39'40"	36·478	
	236°22'20"	41·542	
	226°28'30"	52·191	
	247°14'20"	17·706	
	235°49'	21·73	
	241°31'40"	81·95	
	230°13'	44·854	
	227°02'40"	17·815	
	276°41'50"	31·831	
	271°37'50"	43·355	
	285°15'	36·08	
	288°06'	40·814	
	283°14'30"	9·291	
	308°07'10"	35·29	
	305°26'30"	40·328	
	307°57'10"	17·679	
	319°49'40"	78·224	
	306°28'10"	41·884	
	311°27'40"	40·59	
	329°49'40"	12·89	C
C	329°49'40"	175·832	
	307°48'40"	148·393	
	277°40'40"	155·239	
	326°07'40"	180·716	
	344°48'40"	110·841	
	343°32'50"	39·786	
	348°13'	39·54	
	345°22'	39·679	
	351°04'40"	41·065	
	342°13'20"	15·218	
	119°42'40"	42·81	
	131°06'	13·51	
	148°58'20"	37·217	
	149°26'20"	41·817	
	143°43'40"	42·493	
	140°52'	82·072	
	138°01'	83·094	
	132°25'	33·76	
	164°44'40"	33·228	
	104°55'40"	43·601	
	53°47'50"	43·489	
	26°17'	49·297	
	20°41'	19·003	
	31°59'40"	58·867	
	26°17'	41·189	
	29°08'	42·485	
	17°57'30"	40·709	
	31°59'40"	33·531	
	43°18'20"	41·03	
	31°59'40"	77·956	
	52°39'	5·991	
	93°46'40"	72·862	
	79°44'30"	39·908	
	99°35'10"	12·815	
	111°00'30"	38·593	
	111°20'	83·365	
	112°01'50"	40·962	
	108°48'40"	40·213	
	112°06'30"	32·431	
	120°37'	40·851	
	112°07'50"	40·672	
	120°39'40"	36·478	
	126°22'20"	37·454	
	131°58'20"	51·048	
	90°16'10"	51·614	
	22°54'50"	49·794	
	15°46'	160·679	
	24°38'30"	35·339	
	31°31'20"	38·612	
	37°17'30"	41·025	
	28°43'	30·651	
	72°14'10"	14·289	
	71°55'40"	37·171	
	95°18'30"	14·878	
	117°44'20"	30·431	
	152°44'30"	56·328	
	128°46'40"	69·801	
	140°05'20"	40·271	
	131°38'30"	39·561	
	142°48'50"	42·235	
	128°45'40"	38·82	
	148°04'	44·188	
	123°04'	43·355	
	137°18'30"	37·657	
	134°29'20"	47·39	
	111°13'10"	140·998	
	352°01'40"	157·032	
	337°43'40"	40·304	
	351°45'50"	43·009	
	332°01'	49·951	
	315°55'40"	45·55	
	323°41'30"	42·736	
	311°09'50"	44·254	
	326°25'	35·114	
	333°31'50"	19·007	
	356°13'20"	36·868	
	351°03'40"	64·667	
	28°47'10"	24·935	
	110°26'20"	36·134	
	101°44'	44·304	
	122°02'30"	35·412	
	134°01'40"	40·258	

TABLE A Cont.

	BEARING	DISTANCE	
	128°38'20"	43·926	
	123°02'20"	43·415	
	117°19'40"	49·508	
	88°27'	45·716	
	69°58'40"	44·376	
	75°58'	32·666	
	101°18'50"	33·302	
	106°34'	46·37	
	87°16'40"	37·004	
	118°14'30"	36·532	
	125°56'20"	58·418	
	92°59'20"	50·863	
	87°16'40"	43·244	
	81°34'	81·525	
	84°47'20"	39·618	AB
AC	7°09'40"	76·673	
	54°05'30"	4·322	
	337°00'20"	6·285	
	7°09'40"	48·76	
	39°30'40"	2·42	
	332°42'30"	2·508	AD
AD	343°36'20"	100·867	AE
AE	346°10'40"	9·032	
	354°30'40"	34·041	
	8°37'10"	32·008	
	35°05'30"	21·07	AF
AG	26°13'20"	26·419	
	9°00'10"	38·599	
	26°31'20"	40·897	
	9°30'	42·728	
	17°55'20"	36·42	
	34°02'	42·37	
	14°54'10"	41·726	
	64°31'10"	25·392	
	89°33'30"	31·505	
	98°57'	31·18	
	79°06'40"	11·181	
	105°40'20"	11·138	AH

TRAVERSES ETC

LINE	BEARING	DISTANCE
AF–BA	7°09'40"	42·199
BA–BB	37°00'40"	160·411
BB–AG	96°46'40"	17·525
AB–AE	7°09'40"	139·264
AB–AC	84°47'20"	41·4
AF–AX	59°07'30"	40·582
AY–AG	358°49'	24.24
22–22a	128°22'30"	40·37
4–5	157°13'10"	48·28
24–24a	89°33'	48·6

LINE PEGS

STN	BEARING	DISTANCE
1–LP	60°05'10"	310·15
1–LP	60°05'10"	481·20
2–LP	88°51'20"	120·57
2–LP	88°51'20"	315·41
2–LP	240°05'10"	258·17
3–LP	268°51'20"	378·63
6–LP	140°35'30"	221·21
7–LP	320°25'30"	213·59
8–LP	316°41'20"	89·76
10–LP	145°08'50"	194·66
11–LP	148°30'20"	329·72
11–LP	148°30'20"	519·12
11–LP	325°08'50"	94·42
12–LP	328°30'20"	122·92
12–LP	328°30'20"	378·93
12–LP	328°30'20"	625·03
16–LP	243°48'	144·88
17–LP	63°48'	295·2
19–LP	52°14'20"	116·05
20–LP	205°18'	143·48
20–LP	205°18'	431·33
20–LP	205°18'	555·43
21–LP	25°18'	317·16
21–LP	25°18'	477·04
21–LP	25°18'	753·03

Traverse Table and Table A calculated from original info on plan DS220 and original field notes.

REFERENCE MARKS

STN	TO	ORIGIN	BEARING	DIST
1	PIN		4°20'	1·076
2	PIN		20°16'	1·073
3	PIN		237°40'	1·23
6	PIN		235°36'	1·057
7	PIN		195°47'	0·862
8	PIN		33°48'	1·016
9	PIN		58°42'	0·622
10	PIN		9°02'	1·094
11	PIN		256°26'	0·959
12	PIN		157°38'	1·68
16	PIN		87°17'	1·265
17	PIN		278°31'	1·808
18	PIN		217°17'	1·018
19	PIN		17°35'	1·278
20	PIN		107°18'	1·254
21	PIN		340°20'	1·033
22	PIN		125°10'	1·687
22	ORT	DS220	31°14'	9·374
22a	ORT Remns	DS220	182°09'	7·866
23	PIN		348°45'	2·064
23	ORT Hole & Remns	DS220	25°10'	4·084
24	PIN		284°48'	2·692
24	ORT	DS220	284°39'	4·929
24a	ORT	DS220	115°54'	3·038
25	OIP	DP209057	127°12'	1·467
26	OIP	SP207281	239°42'	2·09
26	ORT Hole	DS220	319°35'	15·73
26	OIP (Orig)	SP207281	127°11'15"	107·317

State copyright reserved.

Insert Plan Number SP225924

HISTORICAL STATE TENURE SEARCH

ENVIRONMENT AND RESOURCE MANAGEMENT, QUEENSLAND

Request No: 7744862
Search Date: 15/10/2009 11:35

Title Reference: 17653063
Date Created: 21/10/1995

This State Tenure Has Been Fully Cancelled.

Refer to Image for Additional Information

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
711926804	NOTC INT RES ACQUISITION OF LAND ACT 1967	17/09/2008 10:16	CURRENT

UNREGISTERED DEALINGS - NIL

** End of Historical State Tenure Search **

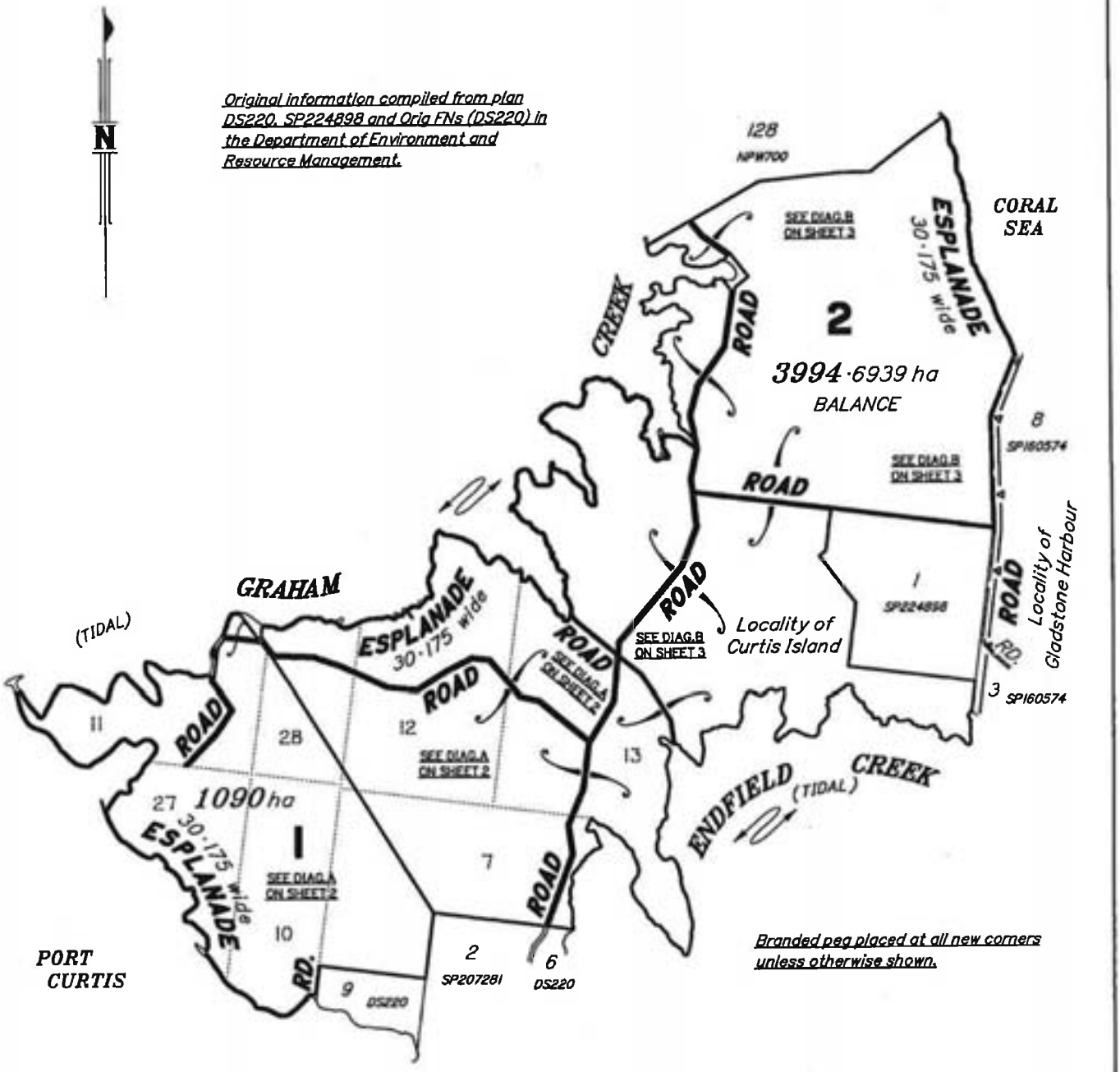
Information provided under section 34 Land Title Act(1994) or
section 281 Land Act(1994)

COPYRIGHT THE STATE OF QUEENSLAND (ENVIRONMENT AND RESOURCE MANAGEMENT) [2009]
Requested By: External Supervisor

Land Title Act 1994; Land Act 1994
Form 21 Version 2

SURVEY PLAN

Sheet 1 of 5



Scale 1: 50000 — Lengths are in Metres.

500 0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 6500 7000

State copyright reserved.

I, Alan Scott Maclean hereby certify that Nelson Ian Leslie Harch (Surveying Graduate), for whose work I accept responsibility, and that the plan is accurate, that the said survey was performed in accordance with the Survey and Mapping Infrastructure Act 2003 and the Surveyors Act 2003 and associated Regulations and Standards and that the said survey was completed on the 12/03/2009.

ASMacle Cadastral Surveyor

Date 24/6/09

Plan of Lots 1 & 2

Cancelling Lots 7, 10, 11, 12, 13, 27 and 28 on plan DS220 and Lot 2 on SP224898.

PARISH: CURTIS COUNTY: Deas Thompson

Meridian: MGA Zone 56 vide GPS F/N's: Yes

Scale: 1:50000

Format: STANDARD

SP224899

Plan Status:

Copyright protects the plan/s being ordered by you. Unauthorised reproduction or amendments are not permitted.

WARNING : Folded or Mutilated Plans will not be accepted.
Plans may be rolled.
Information may not be placed in the outer margins.

712640392

egistered

NO FEE
03/08/2009 14:04

BE 400 NT

5. Lodged by

(Include address, phone number, reference, and Lodger Code)

1. Certificate of Registered Owners or Lessees.

I/We THE MINISTER FOR INDUSTRIAL DEVELOPMENT OF QUEENSLAND

(Names in full)

*as Registered Owners of this land agree to this plan and dedicate the Public Use Land as shown hereon in accordance with Section 50 of the Land Title Act 1994.

*as Lessees of this land agree to this plan.

Signature of *Registered Owners *Lessees

* Rule out whichever is inapplicable

6. Existing / Created

Title Reference	Lot	Plan	Lots	Emts	Road
50757688	7	DS220	1, 2		
50757688	10	DS220	1		
50757688	11	DS220	1		
50757688	12	DS220	1, 2		
50757688	13	DS220	2		
50757688	27	DS220	1		
50757688	28	DS220	1, 2		
TO ISSUE	2	SP224898	2		

Lots	Orig
2	LOT 2 SP224898 TO ISSUE Lot 28 on DS220 Lot 13 on DS220 Lot 12 on DS220 Lot 7 on DS220
1	Lot 28 on DS220 Lot 27 on DS220 Lot 12 on DS220 Lot 11 on DS220 Lot 10 on DS220 Lot 7 on DS220

2. Local Government Approval.

* _____

hereby approves this plan in accordance with the :

% Section 3.7.8 (1)(c) of the Integrated Planning Act 1997 applies to this plan and is exempt from local government approval.

Dated this 31st day of July 2009

_____ #

_____ #

* Insert the name of the Local Government.
# Insert designation of signatory or delegation
% Insert Integrated Planning Act 1997 or Local Government (Planning & Environment) Act 1990

7. Portion Allocation :

8. Map Reference :
9150–311

9. Locality :
CURTIS ISLAND

10. Local Government :
GLADSTONE REGIONAL COUNCIL

11. Passed & Endorsed :

By: A.S.MACLEAN
Date: 26/5/09
Signed:
Designation: CADASTRAL SURVEYOR

12. Building Format Plans only.

I certify that :

* As far as it is practical to determine, no part of the building shown on this plan encroaches onto adjoining lots or road

* Part of the building shown on this plan encroaches onto adjoining * lots and road

_____ / _____
Cadastral Surveyor / Director* Date

*Delete words not required

13. Lodgement Fees :

Survey Deposit	$
Lodgement	$
New Titles	$
Photocopy	$
Postage	$
TOTAL	$

14. Insert Plan Number SP224899

3. Plans with Community Management Statement :

CMS Number :

Name :

4. References :

Dept File :

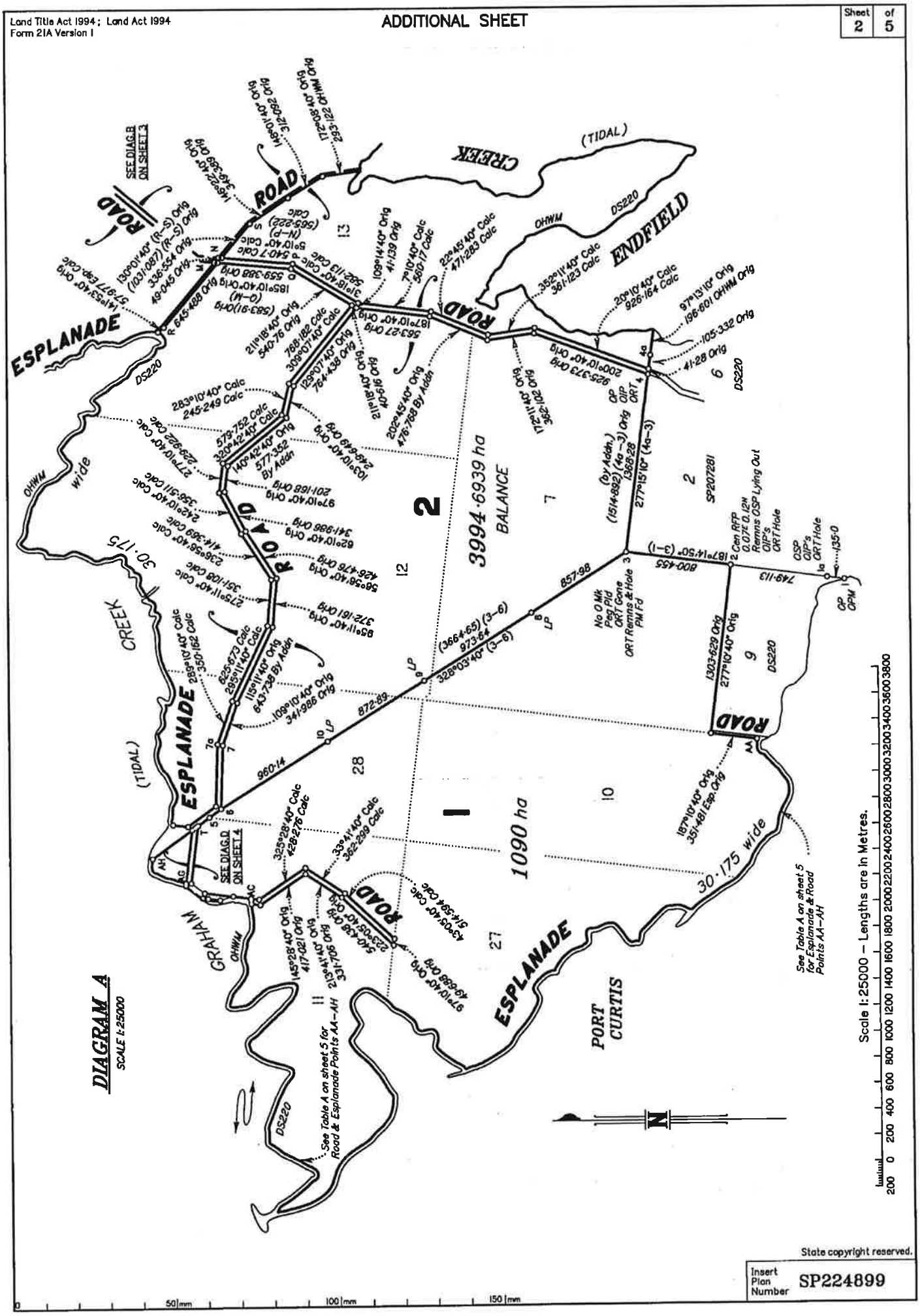
Local Govt :

Surveyor : 3628

Land Title Act 1994; Land Act 1994
Form 21A Version 1

ADDITIONAL SHEET

Sheet 2 of 5

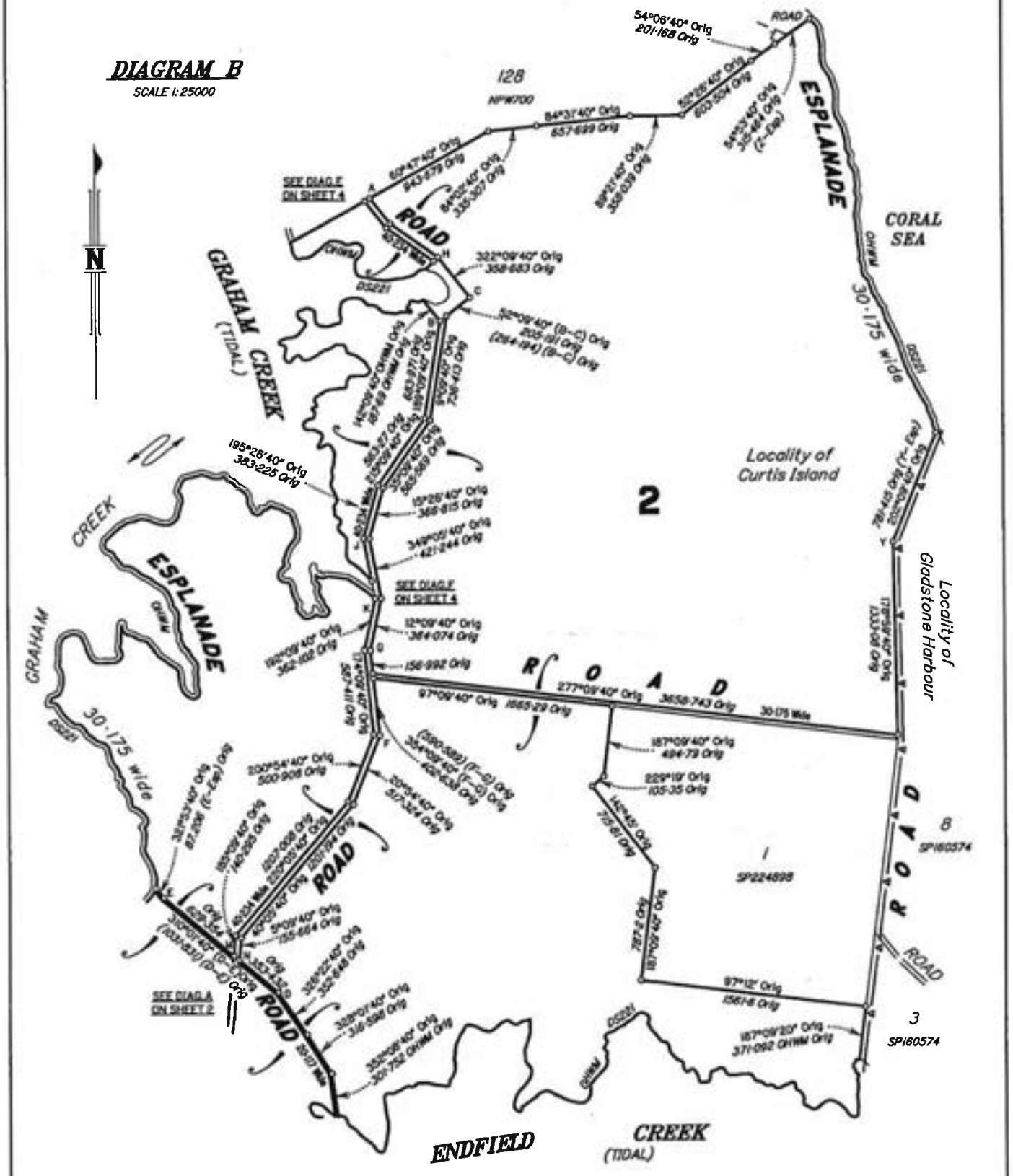


Insert Plan Number SP224899

Land Title Act 1994; Land Act 1994
Form 21A Version 1

ADDITIONAL SHEET

Sheet 3 of 5



Scale 1: 25000 — Lengths are in Metres.

200 0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800

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Insert Plan Number SP224899

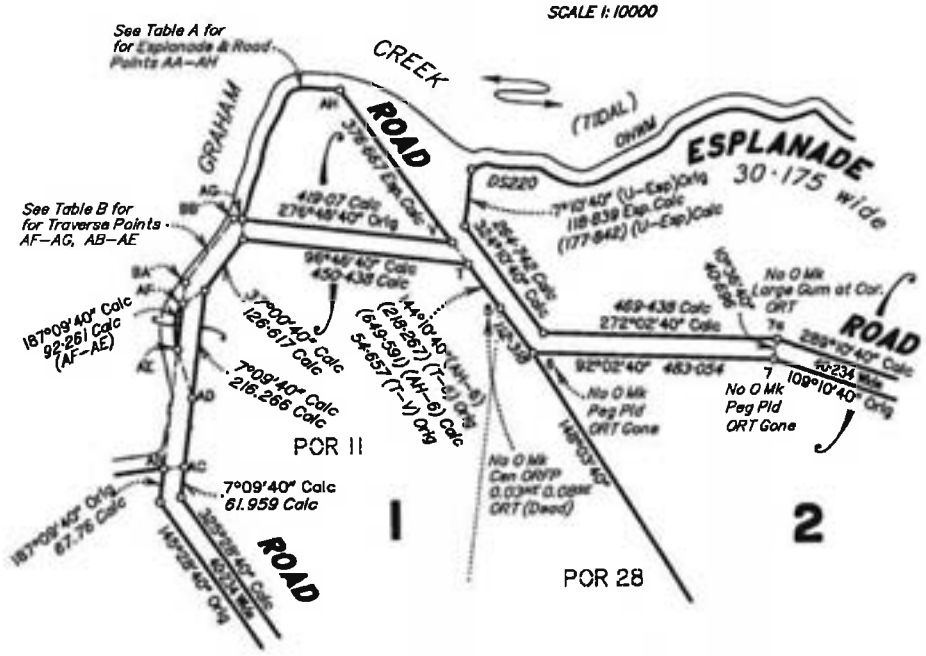
Land Title Act 1994 ; Land Act 1994
Form 21A Version 1

ADDITIONAL SHEET

Sheet 4 of 5

DIAGRAM D

SCALE 1: 10000





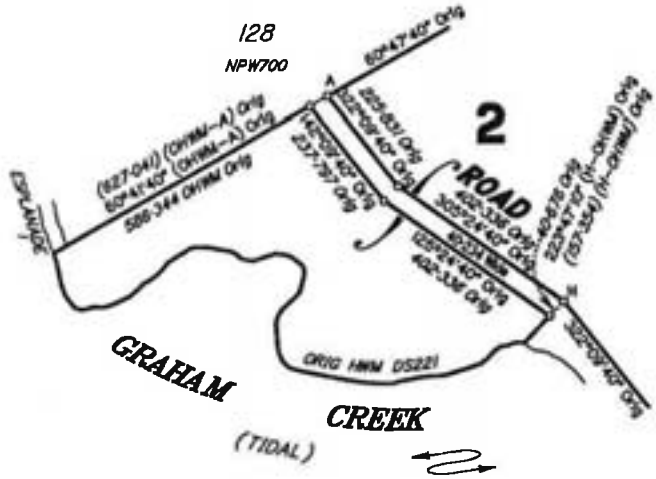


DIAGRAM E

SCALE 1: 10000

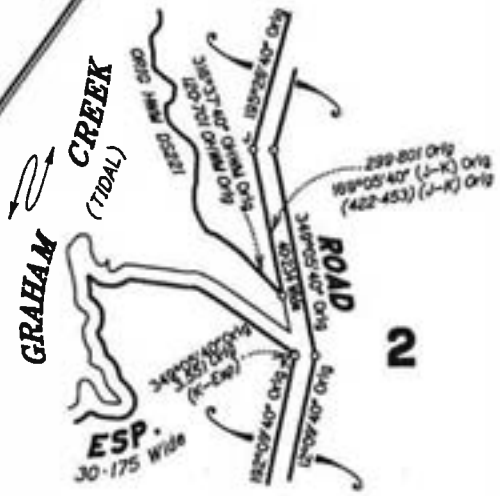


DIAGRAM F

SCALE 1: 10000

Scale 1: 10000 — Lengths are in Metres.

100 0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400

State copyright reserved.

Insert Plan Number SP224899

Land Title Act 1994 ; Land Act 1994
Form 21A Version 1

ADDITIONAL SHEET

Sheet 5 of 5

TABLE A

	BEARING	DISTANCE
AA	271°13'	46·876
	272°32'10"	38·616
	223°59'40"	46·222
	178°59'40"	23·864
	238°01'50"	28·869
	221°08'	41·756
	232°31'30"	42·2
	215°27'50"	39·933
	235°18'20"	80·493
	221°17'20"	38·477
	256°58'20"	78·162
	285°08'40"	68·389
	303°01'40"	133·88
	273°30'40"	127·383
	333°51'	23·636
	331°01'50"	41·495
	330°46'10"	28·618
	305°11'50"	37·458
	324°54'50"	33·068
	303°06'40"	99·325
	291°48'	45·439
	286°24'40"	35·132
	317°08'50"	36·13
	305°58'30"	42·374
	309°14'40"	53·902
	317°34'20"	37·068
	325°58'	36·561
	331°41'30"	81·014
	324°16'30"	53·225
	320°33'	38·086
	328°07'30"	39·164
	326°18'20"	41·927
	323°27'30"	41·788
	320°35'40"	44·284
	308°07'30"	38·601
	33°11'30"	65·399
	12°25'30"	52·41
	347°45'40"	45·904
	2°57'20"	39·02
	319°13'40"	52·026
	313°55'40"	82·241
	312°29'40"	79·738
	316°47'30"	39·906
	313°55'40"	33·37
	268°55'40"	36·052
	287°21'50"	32·962
	313°55'40"	3·069
	18°22'10"	17·765
	339°28'30"	36·252
	32°36'	16·399
	45°11'10"	34·344
	59°41'30"	39·094
	51°09'40"	87·861
	31°48'50"	27·388
	11°22'50"	17·31
	353°03'10"	46·982
	332°06'40"	46·761
	333°45'50"	32·942
	3°43'40"	90·407
	235°17'30"	109·921
	327°15'30"	21·024
	318°43'40"	36·008
	342°57'20"	38·282
	340°31'50"	49·783
	318°43'40"	89·993
	304°41'30"	95·017
	273°43'40"	19·283
	8°55'20"	20·298
	340°31'50"	56·778
	318°43'40"	89·603
	306°09'20"	73·721
	228°43'40"	50·91
	241°46'50"	32·962
	257°53'10"	30·174
	299°04'40"	129·38
	307°45'40"	109·261
	315°08'40"	75·506
	291°33'40"	55·531
	306°25'40"	39·029
	323°25'40"	103·307
	330°42'40"	174·634
	348°05'40"	58·68
	336°57'00"	44·089
	336°40'50"	6·819
	64°10'10"	28·463
	25°28'	50·152
	31°	37·454
	36°46'40"	39·483
	33°55'	39·529
	39°38'30"	38·025
	42°29'20"	35·419
	58°34'50"	12·93
	75°26'20"	12·069
	109°25'30"	71·056
	63°20'30"	84·454
	340°28'	91·157
	10°12'50"	29·846
	36°46'40"	20·611
	81°46'40"	56·839
	35°46'40"	51·228
	42°29'20"	41·947
	31°04'	45·648
	22°44'30"	41·472
	31°04'	31·548
	58°04'	41·065
	36°46'40"	173·187
	10°12'50"	64·452
	325°42'40"	58·85
	310°43'20"	79·056
	266°14'20"	57·29
	249°13'	48·962

TABLE A Cont.

BEARING	DISTANCE
236°18'	46·235
241°14'20"	41·595
240°13'	7·056
299°06'20"	21·215
301°38'30"	77·064
312°22'40"	58·204
234°29'40"	77·01
230°39'40"	44·231
219°21'	43·286
222°07'50"	78·385
230°39'40"	36·478
236°22'20"	41·542
226°28'30"	52·191
247°14'20"	17·706
235°49'	21·73
241°31'40"	81·95
230°13'	44·854
227°02'40"	17·815
276°41'50"	31·831
271°37'50"	43·355
285°15'	36·08
288°06'	40·814
283°14'30"	9·291
308°07'10"	35·29
305°28'30"	40·328
307°57'10"	17·679
319°49'40"	78·224
306°28'10"	41·884
311°27'40"	40·59
329°49'40"	188·722
307°48'40"	148·393
277°40'40"	155·239
326°07'40"	180·716
344°48'40"	110·841
342°32'50"	39·786
348°13'	39·54
345°22'	39·679
351°04'40"	41·065
342°13'20"	15·218
119°42'40"	42·81
131°06'	13·51
148°58'20"	37·217
149°26'20"	41·817
143°43'40"	42·493
140°52'	82·072
138°01'	83·094
132°25'	33·76
164°44'40"	33·228
104°55'40"	43·601
53°47'50"	43·489
26°17'	49·297
20°41'	19·003
31°59'40"	58·867
26°17'	41·189
29°08'	42·485
17°57'30"	40·709
31°59'40"	33·531
43°18'20"	41·03
31°59'40"	77·956
52°39'	5·991
93°46'40"	72·862
79°44'30"	39·908
99°35'10"	12·815
111°00'30"	38·593
111°20'	83·365
112°01'50"	40·962
108°48'40"	40·213
112°06'30"	32·431
120°37'	40·851
112°07'50"	40·672
120°39'40"	36·478
128°22'20"	37·454
131°58'20"	51·048
90°18'10"	51·614
22°54'50"	49·794
15°46'	160·679
24°38'30"	35·339
31°31'20"	38·612
37°17'30"	41·025
28°43'	30·651
72°14'10"	14·289
71°55'40"	37·171
95°18'30"	14·878
117°44'20"	30·431
152°44'30"	56·328
128°46'40"	69·801
140°05'20"	40·271
131°38'30"	39·561
142°48'50"	42·235
128°46'40"	38·82
148°04'	44·188
123°04'	43·355
137°18'30"	37·657
134°29'20"	47·39
111°13'10"	140·998
352°01'40"	157·032
337°43'40"	40·304
351°45'50"	43·009
332°01'	49·951
315°55'40"	45·55
323°41'30"	42·736
311°09'50"	44·254
326°25'	35·114
333°31'50"	19·007
356°13'20"	36·868
351°03'40"	64·667
28°47'10"	24·935
110°28'20"	36·134
101°44'	44·304
122°02'30"	35·412
134°01'40"	40·258

TABLE A Cont.

	BEARING	DISTANCE	
	128°38'20"	43·926	
	123°02'20"	43·415	
	117°19'40"	49·508	
	88°27'	45·716	
	69°58'40"	44·376	
	75°58'	32·666	
	101°18'50"	33·302	
	106°34'	46·37	
	87°16'40"	37·004	
	118°14'30"	36·532	
	125°56'20"	58·418	
	92°59'20"	50·863	
	87°16'40"	43·244	
	81°34'	81·525	
	84°47'20"	39·618	AB
AC	7°09'40"	76·673	
	54°05'30"	4·322	
	337°00'20"	6·285	
	7°09'40"	48·76	
	39°30'40"	2·42	
	333°43'30"	2·508	AD
AD	343°36'20"	100·867	AE
AE	346°10'40"	9·032	
	354°30'40"	34·041	
	8°37'10"	32·008	
	35°05'30"	21·07	AF
AG	26°13'20"	26·419	
	9°00'10"	38·599	
	26°31'20"	40·897	
	9°30'	42·728	
	17°55'20"	36·42	
	34°02'	42·37	
	14°54'10"	41·726	
	64°31'10"	25·392	
	89°33'30"	31·505	
	98°57'	31·18	
	79°06'40"	11·181	
	105°40'20"	11·138	AH

TRAVERSES ETC

LINE	BEARING	DISTANCE
AF–BA	7°09'40"	42·199
BA–BB	37°00'40"	160·411
BB–AG	95°46'40"	17·525
AB–AE	7°09'40"	139·264
AB–AC	84°47'20"	41·4
AF–AX	59°07'30"	40·582
AY–AG	358°49'	24.24

Branded peg placed at all new corners, unless otherwise stated.

Traverse Table and Table A calculated from original info on plan DS220 and original field notes.

REFERENCE MARKS

STN	TO	ORIGIN	BEARING	DIST
1a	OIP	SP207281	214°20'	4·238
1a	ORT Hole	DS220	86°46'	16.476
1a	OIP Orig	SP207281	0°58'10"	79.02
2	OIP	SP207281	239°42'	2·09
2	ORT Hole	DS220	319°35'	15·73
2	OIP Orig	SP207281	127°11'15"	107·317
3	PIN		208°24'	4·478
3	ORT Remns & Hole	DS220	6°56'	5·049
4	OIP	SP207281	181°19'	3·695
4	ORT	DS220	2°29'	5·995
5	PIN		57°32'	1·521
5	ORT (Dead)	DS220	224°10'40"	10·964
6	PIN		197°58'	1·798
7	PIN		78°30'	1·057
7a	ORT	DS220	22°30'40"	4·627
7a	PIN		342°24'	1.231
9	PIN		138°09'	1·055
10	PIN		110°48'	1·072

PERMANENT MARKS

PM	ORIGIN	BEARING	DIST	NO	TYPE
1–OPM	SP207281	8°17'30"	12·616	173102	S. PM
3–PM Fd		282°23'10"	511·709	43555	B. Plaque

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Insert Plan Number SP224899

1653-63

SCHEDULE

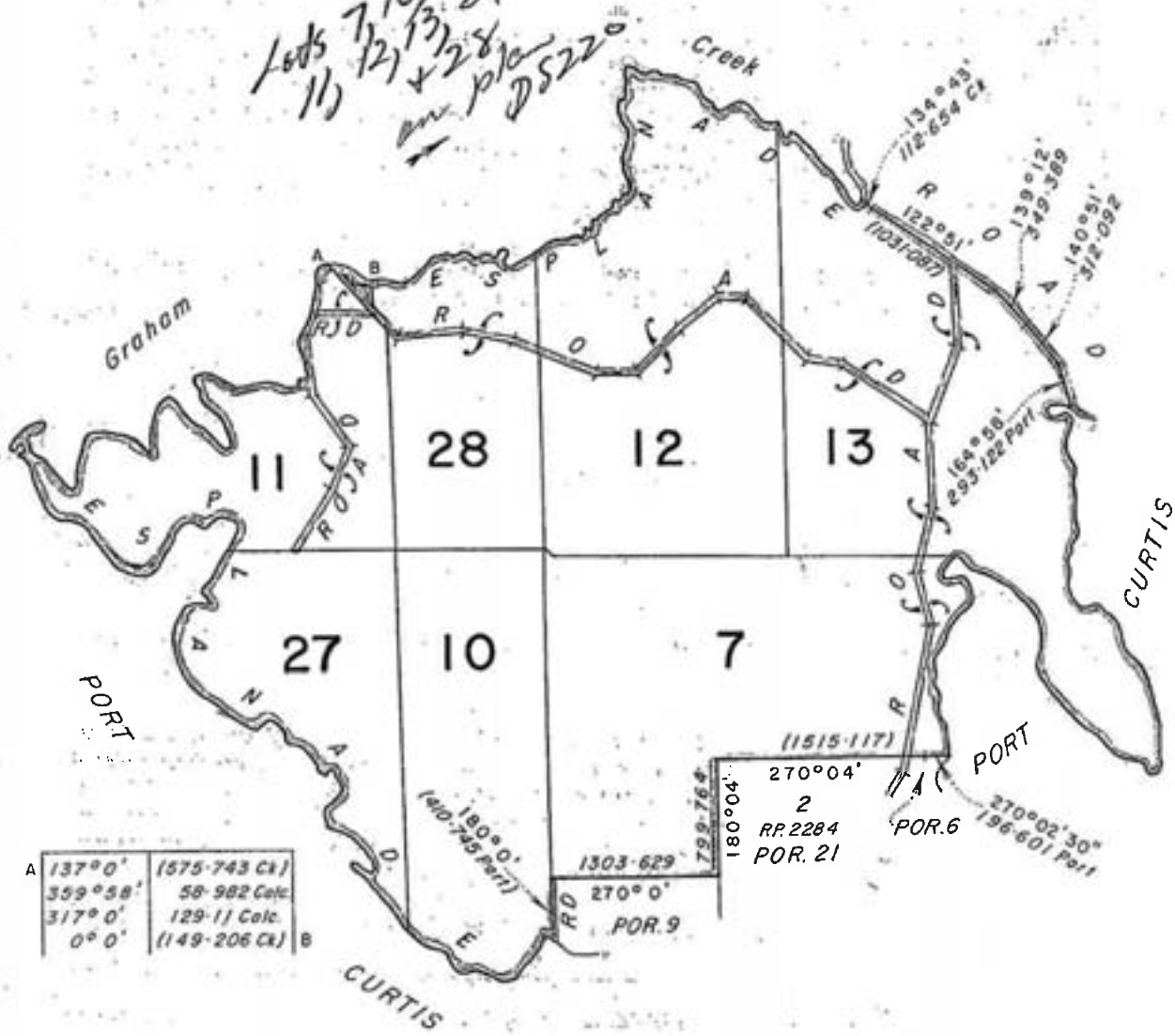
Register No. of Lease 10/2784 Gladstone District

County [redacted] Thompson Parish Curtis

Portion Seven, Ten, Eleven, Twelve, Thirteen, Twenty-seven and Twenty-eight

Area 2491.65 hectares. Plan of Survey Cat. No. Ds.220

Lots 7, 10, 27, 11, 12, 13, 28 on plan D522



TOTAL LEASE AREA

2491·65 ha
ex Rds & Esp.

Scale 1 [redacted]

Plan No. Ds.220

7653-63

Transfers, Mortgages, Etc., Registered.

IN terms or Regulation 41A (1) of the Land Regulations, the description of the Land comprised in the within lease is amended to lot 7, 9, 11, 12, on plan 13 + 27 + 28

D522 of

Registrar of Dealings.

TRANSFER of the Lessee's Interest in the within-described holding to

GIUSEPPE EMANUELE

Registered: 17 OCT 1989 *Registrar of Dealings*

Mortgage No. 219719 to ARROW PROPERTIES PTY LTD

PARTIAL RELEASE ... REGISTRAR OF TITLES

Registered 17 OCT ... 3 SEP ... Registrar of Dealings

Ross William Graving, Colin Grant Graving and Mark Jon Graving as tenants in common in equal interests

are now the registered lessees of the withindescribed holding.

TRANSFER No. L383061P

PRODUCED 5 MAR 1993

REGISTERED 3 SEP 1993 REGISTRAR OF TITLES

Memorandum of Mortgage to National Australia Bank Limited

No. L383062R

PRODUCED 22 FEB 1993

REGISTERED 3 SEP 1993 REGISTRAR OF TITLES

Memorandum of Mortgage to Emanuele Giuseppe

RELEASED ... REGISTRAR OF TITLES

PRODUCED ... FEB 1993

REGISTERED 3 SEP 1993 REGISTRAR OF TITLES

Elfic Limited

Is mortgagee under mortgage No. L383066P

TRANSFER NO. L399099X

PRODUCED 5 MAR 1993

REGISTERED 3 SEP 1993 REGISTRAR OF TITLES

DUPLICATE

Division IV, Part VI
(Ownership of the timber remains with the Crown)

Grazing Homestead
Perpetual Lease No. 2784

GLADSTONE District.

83·985

VOL: S 7653 FOL: 63

17653063

QUEENSLAND

VOL. 7653 FOL. 63

Lease of Grazing Homestead Perpetual Lease under the Land Act 1962–1983

Elizabeth the Second, by the Grace of God, Queen of Australia, and Her other Realms and Territories, Head of the Commonwealth:—

To All to whom these Presents shall come, Greeting:

Whereas, JACK RICHEY

made application on or about the Seventeenth day of February in the year one thousand nine hundred and eighty-three under and in accordance with the provisions of Division IV of Part VI of the *Land Act* 1962–1983 (hereinafter referred to as "the said Act") with respect to the land held (or lately held) by him as Grazing Farm No. 2784 situated in the abovenamed District: AND WHEREAS the said JACK RICHEY thereupon became entitled to a Lease in Perpetuity of the whole or part of the land as a Grazing Homestead Perpetual Lease at the yearly rent hereinafter mentioned, and with, under, and subject to the rights, powers, privileges, terms, conditions, provisions, exceptions, restrictions, reservations and provisoes in the said Act, and hereinafter contained: NOW KNOW YE, that in consideration of the premises and of the rent hereby reserved and of the payment of the rent payable under the said Act for the said land, and subject to the condition of Occupation as defined by the said Act

WE, in pursuance of the said Act, DO HEREBY, for Us, Our Heirs and Successors, Demise and Lease unto the said JACK RICHEY (hereinafter with his Successors in title designated "the Lessee "), and his lawful Assigns, All that parcel of Land described in the Schedule endorsed on these presents, TO HOLD the same unto the Lessee , and his lawful Assigns, IN PERPETUITY from the First day of April in the year One thousand nine hundred and eighty-three with, under, and subject to the reservations hereinafter particularly mentioned, and with, under, and subject to the rights, powers, privileges, terms, conditions, provisions, exceptions, restrictions, reservations and provisoes contained or prescribed in and by the said Act, the *Mining Act* 1968–1983 and the *Petroleum Act* 1923–1983, or any Regulations made or which may hereafter be made under the aforesaid Acts or any of them: YIELDING AND PAYING unto Us, Our Heirs and

DUTY STAMP

[Form 9A]

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7653-63

Successors, on or before the thirty-first day of March in each and every year, such yearly rent or sum as determined or prescribed subject to the provisions of the said Act such payments to be made at the Office in Brisbane, of the Department of Lands, or at any District Land Office, in Our said State, or at such other place as may from time to time be appointed by the Governor of Our said State in Council: PROVIDED ALWAYS AND WE DO HEREBY RESERVE unto Us, Our Heirs and Successors, all Gold and Minerals (the term "Mineral" to have the same meaning as in the *Mining Act* 1968–1983), on ~~/~~ below the surface of the said Land, and all Mines of Gold and Minerals, on and below the surface of the said Land: AND WE DO HEREBY ALSO RESERVE unto Us, Our Heirs and Successors, and to such persons as shall from time to time be duly authorised by Us in that behalf during the term of the said Lease, the free right and privilege of access, including ingress, egress, and regress, into, upon, over and out of the said Land, for the purpose of searching for or working Gold and Minerals, or any of them, or mines of Gold and Minerals, or any of them, in any part of the said Land: AND WE DO HEREBY ALSO RESERVE unto Us, Our Heirs and Successors, all Petroleum (the term "Petroleum" to have the same meaning as in the *Petroleum Act* 1923–1983), on or below the surface of the said Land: AND ALSO all rights of access for the purpose of searching for and for the operations of obtaining Petroleum in any part of the said Land: AND ALSO all rights of way for access and for pipe lines and other purposes requisite for obtaining and conveying Petroleum in the event of Petroleum being obtained in any part of the said Land: AND WE DO FURTHER RESERVE the right of any person duly authorised in that behalf by the Governor of Our said State in Council at all times to go upon the said Land, or any part thereof, for any purpose whatsoever, or to make any survey, inspection, or examination of the same.

PROVIDED NEVERTHELESS and these presents are upon the express conditions that the lessee shall carry out and perform all the conditions to which the former selection was subject.

IN TESTIMONY WHEREOF, We have caused this Our Lease to be sealed with the Seal of Our said State.

WITNESS Our Trusty and Well-beloved His Excellency Commodore Sir JAMES MAXWELL RAMSAY, *Knight Commander of the Most Distinguished Order of Saint Michael and Saint George, Knight Commander of the Royal Victorian Order, Commander of the Most Excellent Order of the British Empire, upon whom has been conferred the Decoration of the Distinguished Service Cross, and Commodore in the Royal Australian Navy (Retired), Governor in and over the State of Queensland and its Dependencies in the Commonwealth of Australia, at Government House, Brisbane, in Queensland aforesaid, this* twenty-fifth *day of* July, *in the thirty-*second *year of Our Reign and in the year of Our Lord One thousand nine hundred and* eighty-three.

James Ramsay

Appendix G EMR/CLR listing

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1144758 EMR Site Id: 25 June 2009
This response relates to a search request received for the site:
Lot: 1 Plan: RP602284

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3227 7370.

Lindi Bowen
Registrar, Contaminated Land Unit

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1144771 EMR Site Id: 25 June 2009
This response relates to a search request received for the site:
Lot: 10 Plan: DS220

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3227 7370.

Lindi Bowen
Registrar, Contaminated Land Unit

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1144772 EMR Site Id: 25 June 2009
This response relates to a search request received for the site:
Lot: 11 Plan: DS220

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3227 7370.

Lindi Bowen
Registrar, Contaminated Land Unit

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1144761 EMR Site Id: 25 June 2009
This response relates to a search request received for the site:
Lot: 2 Plan: RP602284

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3227 7370.

Lindi Bowen
Registrar, Contaminated Land Unit

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1144762 EMR Site Id: 25 June 2009
This response relates to a search request received for the site:
Lot: 27 Plan: DS220

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3227 7370.

Lindi Bowen
Registrar, Contaminated Land Unit

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1144763 EMR Site Id: 25 June 2009
This response relates to a search request received for the site:
Lot: 28 Plan: DS220

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3227 7370.

Lindi Bowen
Registrar, Contaminated Land Unit

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1185917 EMR Site Id: 30 November 2009
This response relates to a search request received for the site:
Lot: 3 Plan: SP225924

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3330 5687.

Lindi Bowen
Registrar, Contaminated Land Unit

Search Receipt

Date/Time (AEST)	30-Nov-2009 02:04:07 PM
Account	2007-1673
User Name	
Your Reference	301001-00752
CONFIRM Reference	33308571
Transaction	QLD Contaminated Sites Extract
Search Criteria	3 / SP225924
Value	$43.95
GST	$0.63
Price	$44.58

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1185922 EMR Site Id: 30 November 2009
This response relates to a search request received for the site:
Lot: 4 Plan: SP225924

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3330 5687.

Lindi Bowen
Registrar, Contaminated Land Unit

Search Receipt

Date/Time (AEST)	30-Nov-2009 02:06:49 PM
Account	2007-1673
User Name	
Your Reference	301001-00752
CONFIRM Reference	33308594
Transaction	QLD Contaminated Sites Extract
Search Criteria	4 / SP225924
Value	$43.95
GST	$0.63
Price	$44.58

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1144767 EMR Site Id: 25 June 2009
This response relates to a search request received for the site:
Lot: 6 Plan: DS220

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3227 7370.

Lindi Bowen
Registrar, Contaminated Land Unit

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1144769 EMR Site Id: 25 June 2009
This response relates to a search request received for the site:
Lot: 7 Plan: DS220

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3227 7370.

Lindi Bowen
Registrar, Contaminated Land Unit

QLD ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 1144766 EMR Site Id: 25 June 2009
This response relates to a search request received for the site:
Lot: 9 Plan: DS220

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

EMR/CLR Searches may be conducted online through the State Government Website www.smartservice.qld.gov.au or Citec Confirm www.confirm.com.au.

If you have any queries in relation to this search please phone (07) 3227 7370.

Lindi Bowen
Registrar, Contaminated Land Unit

Appendix H URS and ERM site plans





A

CI-01

Pit

House Stumps

Water Tank

CI-06

CI-02

Water Trough

Stumps

Concrete Slab

Drainage Line

CI-03

CI-04

CI-05

Access Track

Legend

Soil Bore Sample Locations

Figure 3

Cattle Dip Site Features and Soil Sample Locations.

Client:	BG/QGC		
Project:	Queensland Curtis Island LNG Project		
Drawing No:	0086165_01_Cattle Dip		
Date:	23/12/2008	Drawing size:	A4
Drawn by:	AB	Reviewed by:	AB
Scale:	Refer to Scale Bar		

N

0 10 20m

Environmental Resources Management Australia Pty Ltd
Level 1, 60 Leichhardt Street, Spring Hill, QLD 4000
Telephone +61 7 3839 8393

ERM



N
W E
S

0 12.5 25m

Scale 1 : 600 (A4)
Datum : GDA94

◇ Hand Auger Sample Location

Source: Client Supplied Satellite Imagery (12-04-2007). This map may also contain other data which is sourced and Copyright. Refer to Section 18.2 of the EIS for Ownership and Copyright.

Client: LNG / URS	Project: GLADSTONE LNG PROJECT PRELIMINARY SITE INVESTIGATION	Title: **HAND AUGER SAMPLES CATTLE DIP - FISHERMANS HUT CURTIS ISLAND**
	Drawn: CA | Approved: JB | Date: 04-02-2009 Job No: **4262 6220** | File No: 42626220-g-549.wor	Figure: **3** | Rev:A | **A4**

This drawing is subject to COPYRIGHT. It remains the property of URS Australia Pty Ltd

Appendix I Laboratory reports

Australian Laboratory Services

SAMPLE RECEIPT NOTIFICATION (SRN)

Comprehensive Report

Work Order	: **EB0911579**		
Client	: **WORLEY PARSONS - INFRASTRUCTURE MWE**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALEX KOCHNIEFF	Contact	: Tim Kilmister
Address	: 106 WICKHAM STREET FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: alex.kochnieff@worleyparsons.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32449600	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 301001-00752	Page	: 1 of 4
Order number	: ----		
C-O-C number	: ----	Quote number	: ES2009WORPAR0223 (EN/034/09)
Site	: Laind Pt		
Sampler	: Alex Kochnieff	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Dates

Date Samples Received	: 22-JUL-2009	Issue Date	: 24-JUL-2009 16:06
Client Requested Due Date	: 29-JUL-2009	Scheduled Reporting Date	: **29-JUL-2009**

Delivery Details

Mode of Delivery	: Carrier	Temperature	: 20.0,20.4,18.8 C
No. of coolers/boxes	: 3 MEDIUM	No. of samples received	: 39
Sercurity Seal	: Intact.	No. of samples analysed	: 35

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Requested Deliverables
- **Sample containers do not comply to pretreatment / preservation standards (AS, APHA, USEPA). Please refer to the Sample Container(s)/Preservation Non-Compliance Log at the end of this report for details.**
- **Sample(s) have been received within recommended holding times.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- **Please be advised that both Maroon vials for sample TBO1 were broken in transit.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Maggie Kahi.
- Analytical work for this work order will be conducted at ALS Brisbane.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

Method Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
EP068 : Pesticides by GCMS		
BH01/0.0-0.05	- Snap Lock Bag	- Soil Glass Jar - Unpreserved
BH07/0.0-0.05	- Snap Lock Bag	- Soil Glass Jar - Unpreserved

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process neccessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	(On Hold) SOIL No analysis requested	SOIL - EA002 pH (1:5)	SOIL - EA010 (solids): Electrical Conductivity (1:5) Electrical Conductivity (1:5)	SOIL - EA055-103 Moisture Content	SOIL - ED007 CEC / Exchangeable Cations (ED007)	SOIL - EK061G (Solids) Total Kjeldahl Nitrogen as N (TKN) By Discrete Analyser	SOIL - EK071G (solids) Reactive Phosphorus as P By Discrete Analyser	SOIL - S-02 8 Metals (incl. Digestion)
EB0911579-001	19-JUL-2009 15:00	BH01/0.0-0.05		✓	✓		✓	✓	✓	✓
EB0911579-002	19-JUL-2009 15:00	BH01/0.3-0.4					✓			
EB0911579-003	19-JUL-2009 15:00	BH01/0.9-1.0					✓			
EB0911579-004	17-JUL-2009 15:00	BHO2/0.0-0.1		✓	✓	✓	✓	✓	✓	
EB0911579-005	19-JUL-2009 15:00	BH03/0.0-0.1		✓	✓		✓	✓	✓	✓
EB0911579-006	19-JUL-2009 15:00	BH03/0.4-0.5	✓							
EB0911579-007	19-JUL-2009 15:00	BH04/0.0-0.1		✓	✓	✓	✓	✓	✓	
EB0911579-008	19-JUL-2009 15:00	BH04/0.2-0.3					✓			
EB0911579-009	19-JUL-2009 15:00	BH05/0.0-0.1		✓	✓	✓	✓	✓	✓	
EB0911579-010	19-JUL-2009 15:00	BH06/0.2-0.3		✓	✓	✓	✓	✓	✓	
EB0911579-011	19-JUL-2009 15:00	BH06/0.9-1.0					✓			
EB0911579-012	19-JUL-2009 15:00	BH07/0.0-0.05		✓	✓		✓	✓	✓	✓
EB0911579-013	19-JUL-2009 15:00	BH07/0.2-0.3	✓							
EB0911579-014	19-JUL-2009 15:00	BH08/0.0-0.1		✓	✓	✓	✓	✓	✓	
EB0911579-015	19-JUL-2009 15:00	BH08/0.6-0.8					✓			
EB0911579-016	19-JUL-2009 15:00	BH09/0.0-0.1		✓	✓	✓	✓	✓	✓	
EB0911579-017	19-JUL-2009 15:00	BH09B/0.0-0.1		✓	✓	✓	✓	✓	✓	
EB0911579-018	19-JUL-2009 15:00	BH09B/0.2-0.3	✓							
EB0911579-019	19-JUL-2009 15:00	BH10/0.0-0.1		✓	✓		✓	✓	✓	✓
EB0911579-020	19-JUL-2009 15:00	BH11/0.0-0.02		✓	✓	✓	✓	✓	✓	
EB0911579-021	19-JUL-2009 15:00	BH11/0.1-0.2		✓	✓	✓	✓	✓	✓	
EB0911579-022	19-JUL-2009 15:00	BH12/0.0-0.1		✓	✓		✓	✓	✓	✓
EB0911579-023	19-JUL-2009 15:00	BH12/0.9-1.0					✓			
EB0911579-024	14-JUL-2009 15:00	BH13/0.0-0.1		✓	✓	✓	✓	✓	✓	
EB0911579-025	19-JUL-2009 15:00	BH14/0.0-0.1		✓	✓	✓	✓	✓	✓	
EB0911579-026	19-JUL-2009 15:00	BH14/0.5-0.6	✓							
EB0911579-027	18-JUL-2009 15:00	BH15/0.0-0.1		✓	✓	✓	✓	✓	✓	
EB0911579-028	18-JUL-2009 15:00	BH15/0.9-1.0					✓			
EB0911579-029	14-JUL-2009 15:00	BH16/0.0-0.1		✓	✓		✓	✓	✓	✓
EB0911579-030	14-JUL-2009 15:00	BH16/0.4-0.5					✓			
EB0911579-031	18-JUL-2009 15:00	BH17/0.0-0.05		✓	✓	✓	✓	✓	✓	
EB0911579-032	18-JUL-2009 15:00	BH17/0.9-1.0					✓			
EB0911579-033	18-JUL-2009 15:00	BH17/0.0-0.05		✓	✓	✓	✓	✓	✓	

			(On Hold) SOIL No analysis requested	SOIL - EA002 pH (1:5)	SOIL - EA010 (solids): Electrical Conductivity (1:5) Electrical Conductivity (1:5)	SOIL - EA055-103 Moisture Content	SOIL - ED007 CEC / Exchangeable Cations (ED007)	SOIL - EK061G (Solids) Total Kjeldahl Nitrogen as N (TKN) By Discrete Analyser	SOIL - EK071G (solids) Reactive Phosphorus as P By Discrete Analyser	SOIL - S-02 8 Metals (incl. Digestion)
EB0911579-034	18-JUL-2009 15:00	BH18/0.4-0.5					✓			
EB0911579-035	18-JUL-2009 15:00	BH18/0.9-1.0					✓			
EB0911579-040	19-JUL-2009 15:00	DUP02		✓	✓		✓	✓	✓	✓

Matrix: **SOIL**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	SOIL - S-12 OC/OP Pesticides
EB0911579-001	19-JUL-2009 15:00	BH01/0.0-0.05	✓
EB0911579-012	19-JUL-2009 15:00	BH07/0.0-0.05	✓

Matrix: **WATER**

Laboratory sample ID	*Client sampling date / time*	*Client sample ID*	WATER - W-02T 8 metals (Total)	WATER - W-05T TPH/BTEX/8 Metals (Total)
EB0911579-036	18-JUL-2009 15:00	LP GW		✓
EB0911579-037	18-JUL-2009 15:00	RB02	✓	
EB0911579-038	19-JUL-2009 15:00	RB03	✓	

Requested Deliverables

MR ALEX KOCHNIEFF

- *AU Certificate of Analysis - NATA (COA)	Email	alex.kochnieff@worleyparsons.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	alex.kochnieff@worleyparsons.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	alex.kochnieff@worleyparsons.com
- A4 - AU Sample Receipt Notification - Environmental (SRN)	Email	alex.kochnieff@worleyparsons.com
- A4 - AU Tax Invoice (INV)	Email	alex.kochnieff@worleyparsons.com
- Default - Chain of Custody (COC)	Email	alex.kochnieff@worleyparsons.com
- EDI Format - ENMRG (ENMRG)	Email	alex.kochnieff@worleyparsons.com
- EDI Format - XTab (XTAB)	Email	alex.kochnieff@worleyparsons.com

CHAIN OF CUSTODY DOCUMENTATION

ALS Australian Laboratory Services Pty Ltd

CLIENT: Worley Parsons	SAMPLER: Alex Kochnieff.
ADDRESS / OFFICE: 161 10, Ann St, Brisbane City	MOBILE: 0419645639.
PROJECT MANAGER (PM): Alex Kochnieff.	PHONE 3319 3940.
PROJECT ID: 301001-00752.	EMAIL REPORT TO: alex.kochnieff@worleyparsons.com
SITE: Laird Pt P.O. NO.:	EMAIL INVOICE TO: (if different to report) above.
RESULTS REQUIRED (Date): Standard. QUOTE NO.:	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples, Extra volume for QC or trace LORs etc.
* As, Cd, Cr, Cu, Ni, Pb, Zn, Hg

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		PH_EC	TKN	Reactive Phosphorous	CEC (Ca, Mg, K, Na)	TPH / BTEX	Heavy Metals *	OC OP						HOLD
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
1	BH01/0.0-0.05	S	19/7				✓	✓	✓	✓		✓	✓						
2	BH01/0.3-0.4		19/7							✓									
3	BH01/0.9-1.0		19/7							✓									
4	BH02/0.0-0.1		17/7				✓	✓	✓	✓									
5	BH03/0.0-0.1		19/7				✓	✓	✓	✓		✓							
6	BH03/0.4-0.5		↓																✓
7	BH04/0.0-0.1		18/7				✓	✓	✓	✓									
8	BH04/0.2-0.3		↓							✓									
9	BH05/0.0-0.1		↓				✓	✓	✓	✓									
10	BH06/0.2-0.3		↓				✓	✓	✓	✓									
11	BH06/0.9-1.0		↓							✓									
12	BH07/0.0-0.05		↓				✓	✓	✓	✓		✓	✓						

Environmental Division
Brisbane
Work Order
EB0911579

Telephone : +61-7-3243 7222

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Alex Kochnieff.	Date: 16/7/09.	Name: L. Angeles.	Date: 22/7/09	Con' Note No:
Of: Worley Parsons.	Time: am!	Of: ALS.	Time: 1420	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

23 feb

CHAIN OF CUSTODY DOCUMENTATION

Australian Laboratory Services Pty Ltd

CLIENT:	Worley Parsons	SAMPLER:	Alex Kabnicff.
ADDRESS / OFFICE:	169 10, Ann St, Brisbane City	MOBILE:	0419645639.
PROJECT MANAGER (PM):	Alex Kabnicff.	PHONE	3319 3940.
PROJECT ID:	301001-00752.	EMAIL REPORT TO:	alex.kabnicff@worleyparsons.com
SITE:	Laird Pt	P.O. NO.:	EMAIL INVOICE TO: (if different to report) above.
RESULTS REQUIRED (Date):	Standard.	QUOTE NO.:	

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples, Extra volume for QC or trace LORs etc.
* As, Cd, Cr, Cu, Ni, Pb, Zn, Hg

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	pH, EC	TKN	Reactive Phosphorus	CEC (Ca, Mg, K, Na)	TPH / BTEX	Heavy Metals *	OC OP	HOLD
13	BH07/0.2-0.3	S	18/7											✓
14	BH08/0.0-0.1						✓	✓	✓	✓				
15	BH08/0.6-0.8									✓				
16	BH09/0.0-0.1						✓	✓	✓	✓				
17	BH09B/0.0-0.1						✓	✓	✓	✓				
18	BH09B/0.2-0.3													✓
19	BH10/0.0-0.1		↓				✓	✓	✓	✓		✓		
20	BH10/0.0-0.02		19/7				✓	✓	✓	✓				
21	BH11/0.1-0.2						✓	✓	✓	✓				
22	BH12/0.0-0.1						✓	✓	✓	✓		✓		
23	BH12/0.9-1.0		↓							✓				
24	BH13/0.0-0.1		14/7.				✓	✓	✓	✓				

RELINQUISHED BY:			RECEIVED BY			METHOD OF SHIPMENT
Name:	Alex Kabnicff.	Date: 16/7/09.	Name:	L. Angeles	Date: 22/7/09	Con' Note No:
Of:	Worley Parsons.	Time: am.	Of:	ALS.	Time: 1420	
Name:		Date:	Name:		Date:	Transport Co:
Of:		Time:	Of:		Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Environmental

CHAIN OF CUSTODY DOCUMENTATION

ALS Australian Laboratory Services Pty Ltd

CLIENT: WorleyParsons	SAMPLER: Alex Kochnieff.
ADDRESS / OFFICE: 10/10, Ann St, Brisbane City	MOBILE: 0419645639.
PROJECT MANAGER (PM): Alex Kochnieff.	PHONE 3319 3940.
PROJECT ID: 301001-00752.	EMAIL REPORT TO: alex.kochnieff@worleyparsons.com
SITE: Laird Pt P.O. NO.:	EMAIL INVOICE TO: (if different to report) above.
RESULTS REQUIRED (Date): Standard. QUOTE NO.:	

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples, Extra volume for QC or trace LORs etc.
* As, Cd, Cr, Cu, Ni, Pb Zn, Hg

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	Pb Ec Chromium suite	TKN	Reactive Phosphorus	CEC (Ca, Mg, Na, K)	TPH/BTEX	Heavy Metals *	OC OP						HOLD
25	BH14/0.0-0.1	S	19/7				✓	✓	✓	✓									
26	BH14/0.5-0.6		↓																✓
27	BH15/0.0-0.1		18/7				✓	✓	✓	✓									
28	BH15/0.9-1.0		↓							✓									
29	BH16/0.0-0.1		14/7				✓	✓	✓	✓		✓							
30	BH16/0.4-0.5		↓							✓									
31	BH17/0.0-0.05		18/7				✓	✓	✓	✓									
32	BH17/0.9-1.0									✓									
33	BH18/0.0-0.05						✓	✓	✓	✓									
34	BH18/0.4-0.5									✓									
35	BH18/0.9-1.0	↓								✓									
36	LP GW	W	↓								✓	✓							

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Alex Kochnieff.	Date: 16/7/09.	Name: L. ANGELES.	Date: 22/7/09	Con' Note No:
Of: WorleyParsons.	Time: am.	Of: ALS.	Time: 1420	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

ALS Australian Laboratory Services Pty Ltd

CLIENT: Worley Parsons	SAMPLER: Alex Kochnieff
ADDRESS / OFFICE: Lvl 10, 333 Ann St, Bris City	MOBILE: 0419645629
PROJECT MANAGER (PM): Alex Kochnieff	PHONE 3719 3940
PROJECT ID: 301001-00752.	EMAIL REPORT TO: above
SITE: Laird Pt. P.O. NO.:	EMAIL INVOICE TO: (if different to report) above.
RESULTS REQUIRED (Date): Standard QUOTE NO.:	

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
COOLER SEAL (circle appropriate)
Intact: Yes No N/A
SAMPLE TEMPERATURE
CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples, Extra volume for QC or trace LORs etc.
*As, Cd, Cr, Cu, Ni Pb, Zn, Hg

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		pH EC	TKN	Reactive Phosphorous	CEC (Ca, Mg, K, Na)	TPH/BTEX	Heavy Metals *	OCOP						HOLD
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
37	RB02	W	18/7									✓							
38	RB03	W	18/7									✓							
~~39~~	TB01	W	19/7								✓								
40	Dup02	S.	19/7				✓	✓	✓	✓		✓							

SAME sheet as TRANS

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Alex Kochnieff	Date: 22/7	Name: L. Angeles	Date: 22/7/09	Con' Note No:
Of: Worley Parsons	Time: am	Of: ALS.	Time: 1420.	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EB0911579**	Page	: 1 of 14
Client	: **WORLEY PARSONS - INFRASTRUCTURE MWE**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALEX KOCHNIEFF	Contact	: Tim Kilmister
Address	: 106 WICKHAM STREET FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: alex.kochnieff@worleyparsons.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32449600	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 301001-00752	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 22-JUL-2009
Sampler	: Alex Kochnieff	Issue Date	: 30-JUL-2009
Site	: Laind Pt		
		No. of samples received	: 39
Quote number	: EN/034/09	No. of samples analysed	: 35

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Carsten Emrich	Senior Organic Chemist	Organics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Sarah Ashworth	Organic Chemist	Inorganics
Sarah Ashworth	Organic Chemist	Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG005T (Total Metals): Sample EB0911566-003 shows poor matrix spike recovery due to matrix interference. Confirmed by visual inspection.**
- **EK061G (TKN), EA010 (Conductivity) and EA002 (pH): Insufficient sample to perform analysis on sample 12 (BH07/0.0-0.05)**
- **LCS recovery for EG020T (Total Metals) fall outside Dynamic Control Limits for Lead. It is, however within ALS Static Control Limits and hence deemed acceptable. No further action is required.**
- **Pesticides: Poor matrix spike recovery due to matrix interference. Confirmed by re-extraction and re-analysis.**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: BH01/0.0-0.05	BH01/0.3-0.4	BH01/0.9-1.0	BHO2/0.0-0.1	BH03/0.0-0.1
				Client sampling date / time: 19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	17-JUL-2009 15:00	19-JUL-2009 15:00
				EB0911579-001	EB0911579-002	EB0911579-003	EB0911579-004	EB0911579-005
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**5.6**	----	----	**6.4**	**5.6**
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**40**	----	----	**28**	**51**
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**2.2**	----	----	**7.6**	**8.8**
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	**2.3**	<0.1	<0.1	**0.3**	**0.3**
^ Exchangeable Magnesium	----	0.1	meq/100g	**1.6**	**10.3**	**9.8**	**1.6**	**1.3**
^ Exchangeable Potassium	----	0.1	meq/100g	**0.5**	**0.4**	**0.5**	**0.4**	**0.2**
^ Exchangeable Sodium	----	0.1	meq/100g	**0.3**	**3.0**	**7.0**	**0.3**	**0.4**
^ Cation Exchange Capacity	----	0.1	meq/100g	**4.7**	**13.7**	**17.4**	**2.6**	**2.1**
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**11**	----	----	----	<5
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	**2**	----	----	----	**8**
Copper	7440-50-8	5	mg/kg	<5	----	----	----	**13**
Lead	7439-92-1	5	mg/kg	<5	----	----	----	**9**
Nickel	7440-02-0	2	mg/kg	<2	----	----	----	**4**
Zinc	7440-66-6	5	mg/kg	**7**	----	----	----	<5
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	<0.1
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**1520**	----	----	**520**	**450**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.100	mg/kg	**0.436**	----	----	**0.138**	**0.134**
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: BH01/0.0-0.05	BH01/0.3-0.4	BH01/0.9-1.0	BHO2/0.0-0.1	BH03/0.0-0.1
				Client sampling date / time: 19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	17-JUL-2009 15:00	19-JUL-2009 15:00
				EB0911579-001	EB0911579-002	EB0911579-003	EB0911579-004	EB0911579-005
EP068A: Organochlorine Pesticides (OC) - Continued								
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	**80.9**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	**76.8**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL			Client sample ID	BH04/0.0-0.1	BH04/0.2-0.3	BH05/0.0-0.1	BH06/0.2-0.3	BH06/0.9-1.0
			Client sampling date / time	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00
Compound	CAS Number	LOR	Unit	EB0911579-007	EB0911579-008	EB0911579-009	EB0911579-010	EB0911579-011
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	6.3	----	6.1	6.3	----
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	41	----	25	13	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	5.9	----	8.5	6.5	----
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	4.7	2.5	0.3	2.2	2.9
^ Exchangeable Magnesium	----	0.1	meq/100g	2.8	2.6	0.7	2.4	2.9
^ Exchangeable Potassium	----	0.1	meq/100g	0.4	0.2	<0.1	0.5	0.4
^ Exchangeable Sodium	----	0.1	meq/100g	0.1	0.1	0.2	0.3	0.4
^ Cation Exchange Capacity	----	0.1	meq/100g	8.0	5.5	1.2	5.4	6.6
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	2640	----	430	500	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.100	mg/kg	0.326	----	0.131	0.138	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: BH07/0.0-0.05	BH08/0.0-0.1	BH08/0.6-0.8	BH09/0.0-0.1	BH09B/0.0-0.1
				Client sampling date / time: 19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00
				EB0911579-012	EB0911579-014	EB0911579-015	EB0911579-016	EB0911579-017
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	5.9	----	5.9	5.8
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	----	36	----	26	25
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	5.8	6.4	----	2.6	4.2
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	13.7	7.0	0.1	0.3	0.8
^ Exchangeable Magnesium	----	0.1	meq/100g	9.5	2.9	1.5	1.6	1.0
^ Exchangeable Potassium	----	0.1	meq/100g	0.9	0.3	<0.1	0.4	0.4
^ Exchangeable Sodium	----	0.1	meq/100g	0.8	0.1	0.2	0.1	<0.1
^ Cation Exchange Capacity	----	0.1	meq/100g	24.9	10.3	1.9	2.4	2.3
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	23	----	----	----	----
Copper	7440-50-8	5	mg/kg	13	----	----	----	----
Lead	7439-92-1	5	mg/kg	7	----	----	----	----
Nickel	7440-02-0	2	mg/kg	6	----	----	----	----
Zinc	7440-66-6	5	mg/kg	39	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	3970	----	990	1810
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.100	mg/kg	301	0.362	----	<0.100	0.318
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: BH07/0.0-0.05	BH08/0.0-0.1	BH08/0.6-0.8	BH09/0.0-0.1	BH09B/0.0-0.1
				Client sampling date / time: 19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00
				EB0911579-012	EB0911579-014	EB0911579-015	EB0911579-016	EB0911579-017
EP068A: Organochlorine Pesticides (OC) - Continued								
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.1	%	**88.5**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.1	%	**84.6**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL			Client sample ID	BH10/0.0-0.1	BH11/0.0-0.02	BH11/0.1-0.2	BH12/0.0-0.1	BH12/0.9-1.0
			Client sampling date / time	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00	19-JUL-2009 15:00
Compound	CAS Number	LOR	Unit	EB0911579-019	EB0911579-020	EB0911579-021	EB0911579-022	EB0911579-023
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	6.0	6.0	6.3	6.5	----
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	20	260	53	28	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	1.7	7.6	5.8	12.2	----
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	0.3	6.2	7.0	10.6	0.2
^ Exchangeable Magnesium	----	0.1	meq/100g	1.2	1.5	2.4	6.8	2.6
^ Exchangeable Potassium	----	0.1	meq/100g	0.1	0.2	0.4	0.5	0.1
^ Exchangeable Sodium	----	0.1	meq/100g	0.3	<0.1	0.1	0.2	0.3
^ Cation Exchange Capacity	----	0.1	meq/100g	1.8	8.0	9.8	18.1	3.3
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	36	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	<1	----
Chromium	7440-47-3	2	mg/kg	4	----	----	68	----
Copper	7440-50-8	5	mg/kg	7	----	----	50	----
Lead	7439-92-1	5	mg/kg	<5	----	----	<5	----
Nickel	7440-02-0	2	mg/kg	<2	----	----	25	----
Zinc	7440-66-6	5	mg/kg	<5	----	----	34	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	<0.1	----
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	540	5270	2160	1850	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.100	mg/kg	0.140	24.1	5.73	1.08	----

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID: BH13/0.0-0.1 Client sampling date / time: 14-JUL-2009 15:00 EB0911579-024	Client sample ID: BH14/0.0-0.1 Client sampling date / time: 19-JUL-2009 15:00 EB0911579-025	Client sample ID: BH15/0.0-0.1 Client sampling date / time: 18-JUL-2009 15:00 EB0911579-027	Client sample ID: BH15/0.9-1.0 Client sampling date / time: 18-JUL-2009 15:00 EB0911579-028	Client sample ID: BH16/0.0-0.1 Client sampling date / time: 14-JUL-2009 15:00 EB0911579-029
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**6.3**	**5.3**	**6.4**	----	**5.3**
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**97**	**47**	**18**	----	**146**
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	**7.0**	**17.0**	**9.2**	----	**10.6**
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	**3.3**	**0.2**	**6.5**	**3.6**	**1.4**
^ Exchangeable Magnesium	----	0.1	meq/100g	**2.0**	**4.4**	**2.0**	**6.2**	**5.4**
^ Exchangeable Potassium	----	0.1	meq/100g	**0.2**	**0.3**	**0.5**	**0.6**	**0.8**
^ Exchangeable Sodium	----	0.1	meq/100g	**0.5**	**0.5**	**0.2**	**0.5**	**1.0**
^ Cation Exchange Capacity	----	0.1	meq/100g	**6.1**	**5.4**	**9.1**	**11.0**	**8.6**
^ Exchangeable Aluminium	----	0.1	meq/100g	----	----	----	<0.1	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	----	----	----	**11**
Cadmium	7440-43-9	1	mg/kg	----	----	----	----	<1
Chromium	7440-47-3	2	mg/kg	----	----	----	----	**15**
Copper	7440-50-8	5	mg/kg	----	----	----	----	**15**
Lead	7439-92-1	5	mg/kg	----	----	----	----	**7**
Nickel	7440-02-0	2	mg/kg	----	----	----	----	**5**
Zinc	7440-66-6	5	mg/kg	----	----	----	----	**18**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	----	<0.1
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	**880**	**480**	**380**	----	**1440**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.100	mg/kg	**0.504**	<0.100	<0.100	----	**0.119**

Analytical Results

Sub-Matrix: **SOIL**

Compound	CAS Number	LOR	Unit	Client sample ID	BH16/0.4-0.5	BH17/0.0-0.05	BH17/0.9-1.0	BH17/0.0-0.05	BH18/0.4-0.5
				Client sampling date / time	14-JUL-2009 15:00	18-JUL-2009 15:00	18-JUL-2009 15:00	18-JUL-2009 15:00	18-JUL-2009 15:00
					EB0911579-030	EB0911579-031	EB0911579-032	EB0911579-033	EB0911579-034
EA002 : pH (Soils)									
pH Value	----	0.1	pH Unit		----	**5.9**	----	**5.9**	----
EA010: Conductivity									
Electrical Conductivity @ 25°C	----	1	µS/cm		----	**13**	----	**36**	----
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)	----	1.0	%		----	**2.7**	----	**6.0**	----
ED007: Exchangeable Cations									
^ Exchangeable Calcium	----	0.1	meq/100g		<0.1	**1.9**	**0.2**	**0.2**	**0.3**
^ Exchangeable Magnesium	----	0.1	meq/100g		**12.0**	**1.2**	**4.1**	**4.1**	**21.2**
^ Exchangeable Potassium	----	0.1	meq/100g		**0.7**	**0.4**	**0.5**	**0.5**	**0.4**
^ Exchangeable Sodium	----	0.1	meq/100g		**3.8**	**0.2**	**0.9**	**0.9**	**5.7**
^ Cation Exchange Capacity	----	0.1	meq/100g		**16.6**	**3.7**	**5.6**	**5.7**	**27.6**
^ Exchangeable Aluminium	----	0.1	meq/100g		<0.1	----	<0.1	----	**2.1**
EK061G: Total Kjeldahl Nitrogen as N									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		----	**960**	----	**2090**	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	----	0.100	mg/kg		----	**0.151**	----	**0.170**	----

Analytical Results

Sub-Matrix: SOIL			Client sample ID	BH18/0.9-1.0	DUP02	----	----	----
			Client sampling date / time	18-JUL-2009 15:00	19-JUL-2009 15:00	----	----	----
Compound	CAS Number	LOR	Unit	EB0911579-035	EB0911579-040	----	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	----	5.3	----	----	----
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	----	119	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	----	10.2	----	----	----
ED007: Exchangeable Cations								
^ Exchangeable Calcium	----	0.1	meq/100g	0.3	0.9	----	----	----
^ Exchangeable Magnesium	----	0.1	meq/100g	21.4	6.2	----	----	----
^ Exchangeable Potassium	----	0.1	meq/100g	0.3	1.0	----	----	----
^ Exchangeable Sodium	----	0.1	meq/100g	8.1	1.4	----	----	----
^ Cation Exchange Capacity	----	0.1	meq/100g	30.1	9.5	----	----	----
^ Exchangeable Aluminium	----	0.1	meq/100g	0.6	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	----	10	----	----	----
Cadmium	7440-43-9	1	mg/kg	----	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	----	14	----	----	----
Copper	7440-50-8	5	mg/kg	----	14	----	----	----
Lead	7439-92-1	5	mg/kg	----	7	----	----	----
Nickel	7440-02-0	2	mg/kg	----	5	----	----	----
Zinc	7440-66-6	5	mg/kg	----	17	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	<0.1	----	----	----
EK061G: Total Kjeldahl Nitrogen as N								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	----	1550	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	----	0.100	mg/kg	----	0.111	----	----	----

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID: LP GW Client sampling date / time: 18-JUL-2009 15:00 EB0911579-036	Client sample ID: RB02 Client sampling date / time: 18-JUL-2009 15:00 EB0911579-037	Client sample ID: RB03 Client sampling date / time: 19-JUL-2009 15:00 EB0911579-038	---- ---- ----	---- ---- ----
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	**0.002**	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	**0.004**	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L	**0.003**	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	**0.005**	<0.005	<0.005	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	**60**	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	**300**	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080: BTEX								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.1	%	**111**	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	**100**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	**94.7**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	136
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	10	110

Sub-Matrix: **WATER**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	80	120
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

Environmental Division

QUALITY CONTROL REPORT

Work Order	: **EB0911579**	Page	: 1 of 14
Client	: **WORLEY PARSONS - INFRASTRUCTURE MWE**	Laboratory	: Environmental Division Brisbane
Contact	: MR ALEX KOCHNIEFF	Contact	: Tim Kilmister
Address	: 106 WICKHAM STREET FORTITUDE VALLEY QLD, AUSTRALIA 4006	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: alex.kochnieff@worleyparsons.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32449600	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 301001-00752	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Laind Pt		
C-O-C number	: ----	Date Samples Received	: 22-JUL-2009
Sampler	: Alex Kochnieff	Issue Date	: 30-JUL-2009
Order number	: ----		
		No. of samples received	: 39
Quote number	: EN/034/09	No. of samples analysed	: 35

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Carsten Emrich	Senior Organic Chemist	Organics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Sarah Ashworth	Organic Chemist	Inorganics
Sarah Ashworth	Organic Chemist	Organics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insuffient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA010: Conductivity (QC Lot: 1051282)									
EB0911578-149	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	395	390	1.3	0% - 20%
EB0911578-159	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	551	514	6.9	0% - 20%
EA010: Conductivity (QC Lot: 1051288)									
EB0911579-004	BHO2/0.0-0.1	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	28	29	3.5	0% - 20%
EB0911579-020	BH11/0.0-0.02	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	260	261	0.4	0% - 20%
EA055: Moisture Content (QC Lot: 1050653)									
EB0911579-001	BH01/0.0-0.05	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	2.2	2.4	7.7	No Limit
EB0911579-012	BH07/0.0-0.05	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	5.8	7.1	20.5	No Limit
EA055: Moisture Content (QC Lot: 1050654)									
EB0911579-033	BH17/0.0-0.05	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	6.0	5.2	13.8	No Limit
ED007: Exchangeable Cations (QC Lot: 1051816)									
EB0911579-011	BH06/0.9-1.0	ED007: Exchangeable Calcium	----	0.1	meq/100g	2.9	3.0	0.0	0% - 20%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	2.9	3.0	0.0	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.4	0.4	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.4	0.4	0.0	No Limit
		ED007: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	<0.1	0.0	No Limit
EB0911579-021	BH11/0.1-0.2	ED007: Exchangeable Calcium	----	0.1	meq/100g	7.0	6.8	1.5	0% - 20%
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	2.4	2.4	0.0	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.4	0.4	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	0.1	0.1	0.0	No Limit
		ED007: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	<0.1	0.0	No Limit
ED007: Exchangeable Cations (QC Lot: 1051819)									
EB0911579-034	BH18/0.4-0.5	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.3	0.3	0.0	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	21.2	20.9	1.4	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	0.4	0.4	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	5.7	5.7	0.0	0% - 20%
		ED007: Exchangeable Aluminium	----	0.1	meq/100g	2.1	2.0	4.9	0% - 20%
EB0911579-040	DUP02	ED007: Exchangeable Calcium	----	0.1	meq/100g	0.9	0.9	0.0	No Limit
		ED007: Exchangeable Magnesium	----	0.1	meq/100g	6.2	5.8	7.0	0% - 20%
		ED007: Exchangeable Potassium	----	0.1	meq/100g	1.0	0.9	0.0	No Limit
		ED007: Exchangeable Sodium	----	0.1	meq/100g	1.4	1.3	9.6	0% - 50%
		ED007: Exchangeable Aluminium	----	0.1	meq/100g	0.3	0.2	0.0	No Limit
ED007: Exchangeable Cations (QC Lot: 1053513)									
EB0911579-001	BH01/0.0-0.05	ED007: Exchangeable Calcium	----	0.1	meq/100g	2.3	2.1	8.5	0% - 20%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED007: Exchangeable Cations (QC Lot: 1053513) - continued									
EB0911579-001	BH01/0.0-0.05	ED007: Exchangeable Magnesium	---	0.1	meq/100g	1.6	1.5	8.1	0% - 50%
		ED007: Exchangeable Potassium	---	0.1	meq/100g	0.5	0.4	0.0	No Limit
		ED007: Exchangeable Sodium	---	0.1	meq/100g	0.3	0.2	0.0	No Limit
EB0911579-010	BH06/0.2-0.3	ED007: Exchangeable Calcium	---	0.1	meq/100g	2.2	2.2	0.0	0% - 20%
		ED007: Exchangeable Magnesium	---	0.1	meq/100g	2.4	2.4	0.0	0% - 20%
		ED007: Exchangeable Potassium	---	0.1	meq/100g	0.5	0.5	0.0	No Limit
		ED007: Exchangeable Sodium	---	0.1	meq/100g	0.3	0.3	0.0	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1052020)									
EB0911566-002	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	4	4	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	4	9	81.3	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	26	30	12.6	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	55	45	18.8	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	140	142	1.2	0% - 20%
EB0911579-022	BH12/0.0-0.1	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	68	80	15.8	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	25	22	14.6	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	36	37	5.3	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	50	53	7.4	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	34	31	11.2	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1053509)									
EB0911579-012	BH07/0.0-0.05	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	23	26	15.1	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	6	6	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	13	15	9.1	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	8	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	39	43	9.4	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1052021)									
EB0911566-002	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EB0911583-003	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1053510)									
EB0911579-012	BH07/0.0-0.05	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EK061G: Total Kjeldahl Nitrogen as N (QC Lot: 1052045)									
EB0911579-004	BHO2/0.0-0.1	EK061G: Total Kjeldahl Nitrogen as N	---	20	mg/kg	520	430	18.3	0% - 20%
EB0911579-020	BH11/0.0-0.02	EK061G: Total Kjeldahl Nitrogen as N	---	20	mg/kg	5270	4500	15.7	0% - 20%
EK061G: Total Kjeldahl Nitrogen as N (QC Lot: 1052529)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK061G: Total Kjeldahl Nitrogen as N (QC Lot: 1052529) - continued									
EB0911579-001	BH01/0.0-0.05	EK061G: Total Kjeldahl Nitrogen as N	---	20	mg/kg	1520	1680	10.0	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1051286)									
EB0911579-001	BH01/0.0-0.05	EK071G: Reactive Phosphorus as P	---	0.100	mg/kg	0.436	0.432	0.8	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1051289)									
EB0911579-004	BHO2/0.0-0.1	EK071G: Reactive Phosphorus as P	---	0.100	mg/kg	0.138	0.147	6.4	No Limit
EB0911579-020	BH11/0.0-0.02	EK071G: Reactive Phosphorus as P	---	0.100	mg/kg	24.1	27.0	11.2	0% - 20%
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1051103)									
EB0911579-001	BH01/0.0-0.05	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EB0911717-007	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1051103) - continued									
EB0911717-007	Anonymous	EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	0.60	0.58	3.5	0% - 50%
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1051103)									
EB0911579-001	BH01/0.0-0.05	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EB0911717-007	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1051103) - continued									
EB0911717-007	Anonymous	EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG020T: Total Metals by ICP-MS (QC Lot: 1050450)									
EB0911579-036	LP GW	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.004	0.004	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.005	<0.005	0.0	No Limit
EB0911649-007	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.149	0.150	0.9	0% - 20%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.005	0.005	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.066	0.066	0.0	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.025	0.023	11.4	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1050852)									
EB0911571-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EB0911571-011	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1050853)									
EB0911579-038	RB03	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EB0911685-003	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1050710)									
EB0911579-036	LP GW	EP080: C6 - C9 Fraction	---	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEX (QC Lot: 1050710)									
EB0911579-036	LP GW	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEX (QC Lot: 1050710) - continued									
EB0911579-036	LP GW	EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA002 : pH (Soils) (QCLot: 1051283)								
EA002: pH Value	----	0.1	pH Unit	----	5.2 pH Unit	99.2	96	104
EA002 : pH (Soils) (QCLot: 1051287)								
EA002: pH Value	----	0.1	pH Unit	----	5.2 pH Unit	98.1	96	104
EA010: Conductivity (QCLot: 1051282)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	196 µS/cm	103	91	111
EA010: Conductivity (QCLot: 1051288)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	196 µS/cm	102	91	111
ED007: Exchangeable Cations (QCLot: 1051816)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	90.1	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	0.77 meq/100g	92.3	76.4	110
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	81.2	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	80.3	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	88.4	70.1	104
ED007: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Cations (QCLot: 1051819)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	90.2	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	0.77 meq/100g	93.5	76.4	110
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	84.2	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	80.2	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	89.0	70.1	104
ED007: Exchangeable Aluminium	----	0.1	meq/100g	<0.1	----	----	----	----
ED007: Exchangeable Cations (QCLot: 1053513)								
ED007: Exchangeable Calcium	----	0.1	meq/100g	<0.1	1.47 meq/100g	93.4	70.2	105
ED007: Exchangeable Magnesium	----	0.1	meq/100g	<0.1	0.77 meq/100g	91.7	76.4	110
ED007: Exchangeable Potassium	----	0.1	meq/100g	<0.1	0.20 meq/100g	83.7	70	95.3
ED007: Exchangeable Sodium	----	0.1	meq/100g	<0.1	0.51 meq/100g	82.9	70	104
ED007: Cation Exchange Capacity	----	0.1	meq/100g	----	2.95 meq/100g	90.5	70.1	104
EG005T: Total Metals by ICP-AES (QCLot: 1052020)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.8 mg/kg	124	78	124
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.82 mg/kg	89.4	77	117
EG005T: Chromium	7440-47-3	2	mg/kg	<2	61.6 mg/kg	93.0	83	119
EG005T: Copper	7440-50-8	5	mg/kg	<5	54.7 mg/kg	96.2	82	122
EG005T: Lead	7439-92-1	5	mg/kg	<5	55.5 mg/kg	85.5	83	117

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1052020) - continued								
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.1 mg/kg	86.8	83	121
EG005T: Zinc	7440-66-6	5	mg/kg	<5	105 mg/kg	90.9	82	120
EG005T: Total Metals by ICP-AES (QCLot: 1053509)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	13.8 mg/kg	100	78	124
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	2.82 mg/kg	95.2	77	117
EG005T: Chromium	7440-47-3	2	mg/kg	<2	61.6 mg/kg	100	83	119
EG005T: Copper	7440-50-8	5	mg/kg	<5	54.7 mg/kg	104	82	122
EG005T: Lead	7439-92-1	5	mg/kg	<5	55.5 mg/kg	93.5	83	117
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55.1 mg/kg	95.2	83	121
EG005T: Zinc	7440-66-6	5	mg/kg	<5	105 mg/kg	95.4	82	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1052021)								
EG035T: Mercury	7439-97-6	0.10	mg/kg	<0.1	1.34 mg/kg	105	73	119
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1053510)								
EG035T: Mercury	7439-97-6	0.10	mg/kg	<0.1	1.34 mg/kg	98.5	73	119
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1052045)								
EK061G: Total Kjeldahl Nitrogen as N	---	20	mg/kg	<20	373 mg/kg	118	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1052529)								
EK061G: Total Kjeldahl Nitrogen as N	---	20	mg/kg	<20	373 mg/kg	129	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1051286)								
EK071G: Reactive Phosphorus as P	---	0.1	mg/kg	<0.100	2.5 mg/kg	98.8	75	119
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1051289)								
EK071G: Reactive Phosphorus as P	---	0.1	mg/kg	<0.100	2.5 mg/kg	97.6	75	119
EP068A: Organochlorine Pesticides (OC) (QCLot: 1051103)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.25 mg/kg	66.4	58.4	116
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.25 mg/kg	68.9	57.7	107
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.25 mg/kg	71.1	59.3	116
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.25 mg/kg	70.2	59.1	118
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	72.6	56	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.25 mg/kg	70.6	57.3	119
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.25 mg/kg	72.5	58.2	113
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.25 mg/kg	64.4	60.4	113
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.25 mg/kg	64.0	60.3	114
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.25 mg/kg	78.7	56	120
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.25 mg/kg	64.9	60.8	113
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.25 mg/kg	76.3	58.8	115
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.25 mg/kg	71.8	61.2	116
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.25 mg/kg	82.1	47	133
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.25 mg/kg	80.6	58.5	117

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP068A: Organochlorine Pesticides (OC) (QCLot: 1051103) - continued								
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.25 mg/kg	77.1	58.4	118
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.25 mg/kg	90.5	46.3	115
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.25 mg/kg	75.0	53.6	120
EP068: 4.4`-DDT	50-29-3	0.05	mg/kg	----	0.25 mg/kg	80.6	52.6	129
		0.2	mg/kg	<0.2	----	----	----	----
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.25 mg/kg	72.4	51.6	124
EP068: Methoxychlor	72-43-5	0.05	mg/kg	----	0.25 mg/kg	76.4	52.4	129
		0.2	mg/kg	<0.2	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1051103)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.25 mg/kg	82.3	43.9	113
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.25 mg/kg	77.0	31.8	112
EP068: Monocrotophos	6923-22-4	0.05	mg/kg	----	0.25 mg/kg	74.0	33	130
		0.2	mg/kg	<0.2	----	----	----	----
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.25 mg/kg	# 137	46.4	129
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.25 mg/kg	91.9	57.1	114
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.25 mg/kg	75.6	58.9	113
EP068: Parathion-methyl	298-00-0	0.05	mg/kg	----	0.25 mg/kg	80.0	54.8	112
		0.2	mg/kg	<0.2	----	----	----	----
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.25 mg/kg	83.5	57.8	119
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.25 mg/kg	75.4	68	109
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.25 mg/kg	80.6	62.2	115
EP068: Parathion	56-38-2	0.05	mg/kg	----	0.25 mg/kg	73.7	54.7	113
		0.2	mg/kg	<0.2	----	----	----	----
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.25 mg/kg	74.4	51.9	121
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.25 mg/kg	99.4	58	118
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.25 mg/kg	86.2	59.8	115
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.25 mg/kg	77.1	32.5	101
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.25 mg/kg	72.5	59.6	116
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.25 mg/kg	83.5	58.4	118
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.25 mg/kg	78.3	56.9	117
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.25 mg/kg	90.4	42	130

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EG020T: Total Metals by ICP-MS (QCLot: 1050450)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.100 mg/L	106	76	120
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.100 mg/L	109	84	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.100 mg/L	119	82	124
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.200 mg/L	112	82	116

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1050450) - continued								
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.100 mg/L	# 114	85	113
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.100 mg/L	113	81	117
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.200 mg/L	102	81	123
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1050852)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.0100 mg/L	113	80	116
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1050853)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.0100 mg/L	108	80	116
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1049913)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	600 µg/L	77.9	49	110
EP071: C15 - C28 Fraction	----	100	µg/L	<100	1020 µg/L	77.6	58	130
EP071: C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1050710)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	160 µg/L	104	73	135
EP080: BTEX (QCLot: 1050710)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	104	77.6	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	102	74	122
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	99.5	73	126
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	20 µg/L	100	70.4	129
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	96.6	74.3	126

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1052020)							
EB0911566-003	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	102	70	130
		EG005T: Cadmium	7440-43-9	25 mg/kg	87.6	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	91.8	70	130
		EG005T: Copper	7440-50-8	50 mg/kg	95.6	70	130
		EG005T: Lead	7439-92-1	50 mg/kg	# 300	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	85.5	70	130
		EG005T: Zinc	7440-66-6	50 mg/kg	109	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1052021)							
EB0911566-003	Anonymous	EG035T: Mercury	7439-97-6	5.0 mg/kg	110	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1052045)							
EB0911579-005	BH03/0.0-0.1	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	87.8	70	130
EK061G: Total Kjeldahl Nitrogen as N (QCLot: 1052529)							
EB0911579-022	BH12/0.0-0.1	EK061G: Total Kjeldahl Nitrogen as N	----	500 mg/kg	114	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1051289)							
EB0911579-005	BH03/0.0-0.1	EK071G: Reactive Phosphorus as P	----	2.0 mg/kg	90.6	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1051103)							
EB0911763-007	Anonymous	EP068: gamma-BHC	58-89-9	0.25 mg/kg	102	70	130
		EP068: Heptachlor	76-44-8	0.25 mg/kg	76.5	70	130
		EP068: Aldrin	309-00-2	0.25 mg/kg	85.4	70	130
		EP068: Dieldrin	60-57-1	0.25 mg/kg	94.7	70	130
		EP068: Endrin	72-20-8	1.0 mg/kg	82.1	70	130
		EP068: 4.4`-DDT	50-29-3	1.0 mg/kg	# 48.9	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1051103)							
EB0911763-007	Anonymous	EP068: Diazinon	333-41-5	0.25 mg/kg	96.6	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.25 mg/kg	87.2	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.25 mg/kg	78.1	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.25 mg/kg	77.6	70	130
		EP068: Prothiofos	34643-46-4	0.25 mg/kg	75.5	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1050450)							
EB0911579-037	RB02	EG020A-T: Arsenic	7440-38-2	1.000 mg/L	111	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	Spike Recovery (%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG020T: Total Metals by ICP-MS (QCLot: 1050450) - continued							
EB0911579-037	RB02	EG020A-T: Cadmium	7440-43-9	0.500 mg/L	112	70	130
		EG020A-T: Chromium	7440-47-3	1.000 mg/L	112	70	130
		EG020A-T: Copper	7440-50-8	1.000 mg/L	111	70	130
		EG020A-T: Lead	7439-92-1	1.000 mg/L	111	70	130
		EG020A-T: Nickel	7440-02-0	1.000 mg/L	111	70	130
		EG020A-T: Zinc	7440-66-6	1.000 mg/L	108	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1050852)							
EB0911571-002	Anonymous	EG035T: Mercury	7439-97-6	0.010 mg/L	104	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1050853)							
EB0911608-001	Anonymous	EG035T: Mercury	7439-97-6	0.010 mg/L	102	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1050710)							
EB0911621-001	Anonymous	EP080: C6 - C9 Fraction	----	140 µg/L	84.0	70	130
EP080: BTEX (QCLot: 1050710)							
EB0911621-001	Anonymous	EP080: Benzene	71-43-2	10 µg/L	95.0	70	130
		EP080: Toluene	108-88-3	10 µg/L	81.9	70	130

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: **EB0911579**	Page	: 1 of 13
Client	: WORLEY PARSONS - INFRASTRUCTURE MWE	Laboratory	: Environmental Division Brisbane
Contact	: MR ALEX KOCHNIEFF	Contact	: Tim Kilmister
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Project	: 301001-00752	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Laind Pt		
C-O-C number	: ----	Date Samples Received	: 22-JUL-2009
Sampler	: Alex Kochnieff	Issue Date	: 30-JUL-2009
Order number	: ----		
		No. of samples received	: 39
Quote number	: EN/034/09	No. of samples analysed	: 35

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Snap Lock Bag								
BH13/0.0-0.1,	BH16/0.0-0.1	**14-JUL-2009**	**29-JUL-2009**	21-JUL-2009	×	**29-JUL-2009**	29-JUL-2009	✓
Snap Lock Bag								
BHO2/0.0-0.1		**17-JUL-2009**	**29-JUL-2009**	24-JUL-2009	×	**29-JUL-2009**	29-JUL-2009	✓
Snap Lock Bag								
BH15/0.0-0.1,	BH17/0.0-0.05,	**18-JUL-2009**	**29-JUL-2009**	25-JUL-2009	×	**29-JUL-2009**	29-JUL-2009	✓
BH17/0.0-0.05								
Snap Lock Bag								
BH01/0.0-0.05,	BH03/0.0-0.1,	**19-JUL-2009**	**29-JUL-2009**	26-JUL-2009	×	**29-JUL-2009**	29-JUL-2009	✓
BH04/0.0-0.1,	BH05/0.0-0.1,							
BH06/0.2-0.3,	BH08/0.0-0.1,							
BH09/0.0-0.1,	BH09B/0.0-0.1,							
BH10/0.0-0.1,	BH11/0.0-0.02,							
BH11/0.1-0.2,	BH12/0.0-0.1,							
BH14/0.0-0.1,	DUP02							

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA010: Conductivity							
Snap Lock Bag BH13/0.0-0.1, BH16/0.0-0.1	**14-JUL-2009**	**29-JUL-2009**	21-JUL-2009	×	**29-JUL-2009**	26-AUG-2009	✓
Snap Lock Bag BHO2/0.0-0.1	**17-JUL-2009**	**29-JUL-2009**	24-JUL-2009	×	**29-JUL-2009**	26-AUG-2009	✓
Snap Lock Bag BH15/0.0-0.1, BH17/0.0-0.05, BH17/0.0-0.05	**18-JUL-2009**	**29-JUL-2009**	25-JUL-2009	×	**29-JUL-2009**	26-AUG-2009	✓
Snap Lock Bag BH01/0.0-0.05, BH03/0.0-0.1, BH04/0.0-0.1, BH05/0.0-0.1, BH06/0.2-0.3, BH08/0.0-0.1, BH09/0.0-0.1, BH09B/0.0-0.1, BH10/0.0-0.1, BH11/0.0-0.02, BH11/0.1-0.2, BH12/0.0-0.1, BH14/0.0-0.1, DUP02	**19-JUL-2009**	**29-JUL-2009**	26-JUL-2009	×	**29-JUL-2009**	26-AUG-2009	✓
EA055: Moisture Content							
Snap Lock Bag BH13/0.0-0.1, BH16/0.0-0.1	**14-JUL-2009**	**----**	----	----	**27-JUL-2009**	21-JUL-2009	×
Snap Lock Bag BHO2/0.0-0.1	**17-JUL-2009**	**----**	----	----	**27-JUL-2009**	24-JUL-2009	×
Snap Lock Bag BH15/0.0-0.1, BH17/0.0-0.05, BH17/0.0-0.05	**18-JUL-2009**	**----**	----	----	**27-JUL-2009**	25-JUL-2009	×
Snap Lock Bag BH01/0.0-0.05, BH03/0.0-0.1, BH04/0.0-0.1, BH05/0.0-0.1, BH06/0.2-0.3, BH07/0.0-0.05, BH08/0.0-0.1, BH09/0.0-0.1, BH09B/0.0-0.1, BH10/0.0-0.1, BH11/0.0-0.02, BH11/0.1-0.2, BH12/0.0-0.1, BH14/0.0-0.1, DUP02	**19-JUL-2009**	**----**	----	----	**27-JUL-2009**	26-JUL-2009	×

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED007: Exchangeable Cations							
Pulp Bag BH13/0.0-0.1, BH16/0.0-0.1, BH16/0.4-0.5	**14-JUL-2009**	**29-JUL-2009**	10-JAN-2010	✓	**30-JUL-2009**	10-JAN-2010	✓
Pulp Bag BHO2/0.0-0.1	**17-JUL-2009**	**29-JUL-2009**	13-JAN-2010	✓	**30-JUL-2009**	13-JAN-2010	✓
Pulp Bag BH15/0.0-0.1, BH15/0.9-1.0, BH17/0.0-0.05, BH17/0.9-1.0, BH17/0.0-0.05, BH18/0.4-0.5, BH18/0.9-1.0	**18-JUL-2009**	**29-JUL-2009**	14-JAN-2010	✓	**30-JUL-2009**	14-JAN-2010	✓
Pulp Bag BH01/0.0-0.05, BH01/0.3-0.4, BH01/0.9-1.0, BH03/0.0-0.1, BH04/0.0-0.1, BH04/0.2-0.3, BH05/0.0-0.1, BH06/0.2-0.3, BH06/0.9-1.0, BH07/0.0-0.05, BH08/0.0-0.1, BH08/0.6-0.8, BH09/0.0-0.1, BH09B/0.0-0.1, BH10/0.0-0.1, BH11/0.0-0.02, BH11/0.1-0.2, DUP02, BH12/0.0-0.1, BH12/0.9-1.0, BH14/0.0-0.1	**19-JUL-2009**	**29-JUL-2009**	15-JAN-2010	✓	**30-JUL-2009**	15-JAN-2010	✓
EG005T: Total Metals by ICP-AES							
Pulp Bag BH01/0.0-0.05	**19-JUL-2009**	**29-JUL-2009**	16-AUG-2009	✓	**29-JUL-2009**	15-JAN-2010	✓
Snap Lock Bag BH16/0.0-0.1	**14-JUL-2009**	**29-JUL-2009**	11-AUG-2009	✓	**29-JUL-2009**	10-JAN-2010	✓
Snap Lock Bag BH03/0.0-0.1, BH07/0.0-0.05, BH10/0.0-0.1, BH12/0.0-0.1, DUP02	**19-JUL-2009**	**29-JUL-2009**	16-AUG-2009	✓	**29-JUL-2009**	15-JAN-2010	✓
EG035T: Total Recoverable Mercury by FIMS							
Snap Lock Bag BH16/0.0-0.1	**14-JUL-2009**	**29-JUL-2009**	11-AUG-2009	✓	**29-JUL-2009**	11-AUG-2009	✓
Snap Lock Bag BH01/0.0-0.05, BH03/0.0-0.1, BH10/0.0-0.1, BH12/0.0-0.1, DUP02	**19-JUL-2009**	**29-JUL-2009**	16-AUG-2009	✓	**29-JUL-2009**	16-AUG-2009	✓
Snap Lock Bag BH07/0.0-0.05	**19-JUL-2009**	**29-JUL-2009**	16-AUG-2009	✓	**30-JUL-2009**	16-AUG-2009	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen as N								
Pulp Bag								
BH01/0.0-0.05,	BH12/0.0-0.1	**19-JUL-2009**	**29-JUL-2009**	---	----	**29-JUL-2009**	15-JAN-2010	✓
Snap Lock Bag								
BH13/0.0-0.1,	BH16/0.0-0.1	**14-JUL-2009**	**29-JUL-2009**	10-JAN-2010	✓	**29-JUL-2009**	10-JAN-2010	✓
Snap Lock Bag								
BHO2/0.0-0.1		**17-JUL-2009**	**29-JUL-2009**	13-JAN-2010	✓	**29-JUL-2009**	13-JAN-2010	✓
Snap Lock Bag								
BH15/0.0-0.1,	BH17/0.0-0.05,	**18-JUL-2009**	**29-JUL-2009**	14-JAN-2010	✓	**29-JUL-2009**	14-JAN-2010	✓
BH17/0.0-0.05								
Snap Lock Bag								
BH03/0.0-0.1,	BH04/0.0-0.1,	**19-JUL-2009**	**29-JUL-2009**	15-JAN-2010	✓	**29-JUL-2009**	15-JAN-2010	✓
BH05/0.0-0.1,	BH06/0.2-0.3,							
BH08/0.0-0.1,	BH09/0.0-0.1,							
BH09B/0.0-0.1,	BH10/0.0-0.1,							
BH11/0.0-0.02,	BH11/0.1-0.2,							
BH14/0.0-0.1,	DUP02							
EK071G: Reactive Phosphorus as P by discrete analyser								
Snap Lock Bag								
BH13/0.0-0.1,	BH16/0.0-0.1	**14-JUL-2009**	**29-JUL-2009**	21-JUL-2009	×	**29-JUL-2009**	10-JAN-2010	✓
Snap Lock Bag								
BHO2/0.0-0.1		**17-JUL-2009**	**29-JUL-2009**	24-JUL-2009	×	**29-JUL-2009**	13-JAN-2010	✓
Snap Lock Bag								
BH15/0.0-0.1,	BH17/0.0-0.05,	**18-JUL-2009**	**29-JUL-2009**	25-JUL-2009	×	**29-JUL-2009**	14-JAN-2010	✓
BH17/0.0-0.05								
Snap Lock Bag								
BH01/0.0-0.05,	BH03/0.0-0.1,	**19-JUL-2009**	**29-JUL-2009**	26-JUL-2009	×	**29-JUL-2009**	15-JAN-2010	✓
BH04/0.0-0.1,	BH05/0.0-0.1,							
BH06/0.2-0.3,	BH07/0.0-0.05,							
BH08/0.0-0.1,	BH09/0.0-0.1,							
BH09B/0.0-0.1,	BH10/0.0-0.1,							
BH11/0.0-0.02,	BH11/0.1-0.2,							
BH12/0.0-0.1,	BH14/0.0-0.1,							
DUP02								
EP068A: Organochlorine Pesticides (OC)								
Snap Lock Bag								
BH01/0.0-0.05,	BH07/0.0-0.05	**19-JUL-2009**	**28-JUL-2009**	02-AUG-2009	✓	**28-JUL-2009**	06-SEP-2009	✓
EP068B: Organophosphorus Pesticides (OP)								
Snap Lock Bag								
BH01/0.0-0.05,	BH07/0.0-0.05	**19-JUL-2009**	**28-JUL-2009**	02-AUG-2009	✓	**28-JUL-2009**	06-SEP-2009	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered							
LP GW, RB02	**18-JUL-2009**	**27-JUL-2009**	14-JAN-2010	✓	**27-JUL-2009**	14-JAN-2010	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered							
RB03	**19-JUL-2009**	**27-JUL-2009**	15-JAN-2010	✓	**27-JUL-2009**	15-JAN-2010	✓
EG035T: Total Recoverable Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Unfiltered							
LP GW, RB02	**18-JUL-2009**	**----**	----	----	**27-JUL-2009**	15-AUG-2009	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered							
RB03	**19-JUL-2009**	**----**	----	----	**27-JUL-2009**	16-AUG-2009	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved							
LP GW	**18-JUL-2009**	**24-JUL-2009**	25-JUL-2009	✓	**28-JUL-2009**	05-SEP-2009	✓
Amber VOC Vial - HCl or NaHSO4							
LP GW	**18-JUL-2009**	**---**	---	----	**27-JUL-2009**	01-AUG-2009	✓
EP080: BTEX							
Amber VOC Vial - HCl or NaHSO4							
LP GW	**18-JUL-2009**	**---**	---	----	**27-JUL-2009**	01-AUG-2009	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Electrical Conductivity (1:5)	EA010	4	39	**10.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	6	32	**18.8**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Moisture Content	EA055-103	3	24	**12.5**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	2	20	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	3	21	**14.3**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	3	22	**13.6**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	3	20	**15.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	3	20	**15.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Electrical Conductivity (1:5)	EA010	2	39	**5.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	3	32	**9.4**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	20	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
pH (1:5)	EA002	2	29	**6.9**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	2	21	**9.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	20	**10.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	20	**10.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Electrical Conductivity (1:5)	EA010	2	39	**5.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Exchangeable Cations	ED007	3	32	**9.4**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Pesticides by GCMS	EP068	1	20	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	2	21	**9.5**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	22	**9.1**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	20	**10.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	20	**10.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Pesticides by GCMS	EP068	1	20	**5.0**	**5.0**	✓	ALS QCS3 requirement
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	1	20	**5.0**	**5.0**	✓	ALS QCS3 requirement
TKN as N By Discrete Analyser	EK061G	2	22	**9.1**	**5.0**	✓	ALS QCS3 requirement
Total Mercury by FIMS	EG035T	1	19	**5.3**	**5.0**	✓	ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	19	**5.3**	**5.0**	✓	ALS QCS3 requirement

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP) - Continued							
Total Mercury by FIMS	EG035T	4	40	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	4	**25.0**	**10.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	2	40	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	15	**6.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	4	**25.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	2	40	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH - Semivolatile Fraction	EP071	1	15	**6.7**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	4	**25.0**	**5.0**	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	2	40	**5.0**	**5.0**	✓	ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.0**	**5.0**	✓	ALS QCS3 requirement
TPH Volatiles/BTEX	EP080	1	4	**25.0**	**5.0**	✓	ALS QCS3 requirement

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103)
Electrical Conductivity (1:5)	EA010	SOIL	(APHA 21st ed., 2510) Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 104)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Exchangeable Cations	ED007	SOIL	Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301)
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
TKN as N By Discrete Analyser	EK061G	SOIL	APHA 21st ed., 4500-Norg-D Soil samples are digested using Kjeldahl digestion followed by determination by Discrete Analyser.
Reactive Phosphorus as P-Soluble By Discrete Analyser	EK071G	SOIL	APHA 21st ed., 4500 P-F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2
Pesticides by GCMS	EP068	SOIL	(USEPA SW 846 - 8270B) Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (1999) Schedule B(3) (Method 504,505)
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Mercury by FIMS	EG035T	WATER	AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Analytical Methods	Method	Matrix	Method Descriptions
TPH - Semivolatile Fraction	EP071	WATER	USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TPH Volatiles/BTEX	EP080	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH4Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
TKN/TP Digestion	EK061/EK067	SOIL	APHA 21st ed., 4500 Norg- D; APHA 21st ed., 4500 P - H. Macro Kjeldahl digestion.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
Tumbler Extraction of Solids (Option A - Concentrating)	ORG17A	SOIL	In-house, Mechanical agitation (tumbler). 20g of sample, Na2SO4 and surrogate are extracted with 150mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Digestion for Total Recoverable Metals	EN25	WATER	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Separatory Funnel Extraction of Liquids	ORG14	WATER	USEPA SW 846 - 3510B 500 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2). ALS default excludes sediment which may be resident in the container.

Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EP068B: Organophosphorus Pesticides (OP)	1208206-002	----	**Dimethoate**	60-51-5	137 %	46.4-129%	**Recovery greater than upper control limit**
Matrix Spike (MS) Recoveries							
EG005T: Total Metals by ICP-AES	EB0911566-003	Anonymous	**Lead**	7439-92-1	300 %	70-130%	**Recovery greater than upper data quality objective**
EP068A: Organochlorine Pesticides (OC)	EB0911763-007	Anonymous	**4.4`-DDT**	50-29-3	48.9 %	70-130%	**Recovery less than lower data quality objective**

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Laboratory Control Spike (LCS) Recoveries							
EG020T: Total Metals by ICP-MS	1207561-002	----	**Lead**	7439-92-1	114 %	85-113%	**Recovery greater than upper control limit**

- **For all matrices, no Method Blank value outliers occur.**
- **For all matrices, no Duplicate outliers occur.**

Regular Sample Surrogates

- **For all regular sample matrices, no surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)						
Snap Lock Bag BH13/0.0-0.1, BH16/0.0-0.1	29-JUL-2009	21-JUL-2009	**8**	----	----	----
Snap Lock Bag BHO2/0.0-0.1	29-JUL-2009	24-JUL-2009	**5**	----	----	----
Snap Lock Bag BH15/0.0-0.1, BH17/0.0-0.05, BH17/0.0-0.05	29-JUL-2009	25-JUL-2009	**4**	----	----	----

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils) - Analysis Holding Time Compliance						
Snap Lock Bag BH03/0.0-0.1, BH04/0.0-0.1, BH05/0.0-0.1, BH06/0.2-0.3, BH08/0.0-0.1, BH09/0.0-0.1, BH09B/0.0-0.1, BH10/0.0-0.1, BH11/0.0-0.02, BH11/0.1-0.2, BH12/0.0-0.1, BH14/0.0-0.1, DUP02	29-JUL-2009	26-JUL-2009	**3**	----	----	----
EA010: Conductivity						
Snap Lock Bag BH13/0.0-0.1, BH16/0.0-0.1	29-JUL-2009	21-JUL-2009	**8**	----	----	----
Snap Lock Bag BHO2/0.0-0.1	29-JUL-2009	24-JUL-2009	**5**	----	----	----
Snap Lock Bag BH15/0.0-0.1, BH17/0.0-0.05, BH17/0.0-0.05	29-JUL-2009	25-JUL-2009	**4**	----	----	----
Snap Lock Bag BH03/0.0-0.1, BH04/0.0-0.1, BH05/0.0-0.1, BH06/0.2-0.3, BH08/0.0-0.1, BH09/0.0-0.1, BH09B/0.0-0.1, BH10/0.0-0.1, BH11/0.0-0.02, BH11/0.1-0.2, BH12/0.0-0.1, BH14/0.0-0.1, DUP02	29-JUL-2009	26-JUL-2009	**3**	----	----	----
EA055: Moisture Content						
Snap Lock Bag BH13/0.0-0.1, BH16/0.0-0.1	----	----	----	27-JUL-2009	21-JUL-2009	**6**
Snap Lock Bag BHO2/0.0-0.1	----	----	----	27-JUL-2009	24-JUL-2009	**3**
Snap Lock Bag BH15/0.0-0.1, BH17/0.0-0.05, BH17/0.0-0.05	----	----	----	27-JUL-2009	25-JUL-2009	**2**

Matrix: **SOIL**

Method / Container / Client Sample ID(s)		Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content - Analysis Holding Time Compliance							
Snap Lock Bag							
BH01/0.0-0.05,	BH03/0.0-0.1,	----	----	----	27-JUL-2009	26-JUL-2009	**1**
BH04/0.0-0.1,	BH05/0.0-0.1,						
BH06/0.2-0.3,	BH07/0.0-0.05,						
BH08/0.0-0.1,	BH09/0.0-0.1,						
BH09B/0.0-0.1,	BH10/0.0-0.1,						
BH11/0.0-0.02,	BH11/0.1-0.2,						
BH12/0.0-0.1,	BH14/0.0-0.1,						
DUP02							
EK071G: Reactive Phosphorus as P by discrete analyser							
Snap Lock Bag							
BH13/0.0-0.1,	BH16/0.0-0.1	29-JUL-2009	21-JUL-2009	**8**	----	----	----
Snap Lock Bag							
BHO2/0.0-0.1		29-JUL-2009	24-JUL-2009	**5**	----	----	----
Snap Lock Bag							
BH15/0.0-0.1,	BH17/0.0-0.05,	29-JUL-2009	25-JUL-2009	**4**	----	----	----
BH17/0.0-0.05							
Snap Lock Bag							
BH03/0.0-0.1,	BH04/0.0-0.1,	29-JUL-2009	26-JUL-2009	**3**	----	----	----
BH05/0.0-0.1,	BH06/0.2-0.3,						
BH07/0.0-0.05,	BH08/0.0-0.1,						
BH09/0.0-0.1,	BH09B/0.0-0.1,						
BH10/0.0-0.1,	BH11/0.0-0.02,						
BH11/0.1-0.2,	BH12/0.0-0.1,						
BH14/0.0-0.1,	DUP02						

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- **No Quality Control Sample Frequency Outliers exist.**

Advanced Analytical Australia

SAMPLE RECEIPT NOTIFICATION

Attention : Alex Kochnieff

Client : WorleyParsons Services Pty Ltd
Level 10, 333 Ann Street
Brisbane QLD 4000
Telephone : 07 3036 3433
Facsimile : 07 3221 7791

Project : Soil Analysis **Order Number :**

Laboratory Reference : A09/2300

Completed Chain of Custody accompanied samples.	**YES**
Samples were received in good condition and correctly preserved for all tests.	**YES**
Samples were received in sufficient time to allow laboratory to meet holding times.	**YES**
Samples were received chilled/chilling (if required).	**YES**

Date samples received : **28/7/09**
Matrix : **Soil**
No. of samples : **1**
Scheduled reporting date : **6/08/09**

Customer Services Officer : Lilian Wong

Telephone : 07 3268 1228
Email : brisbane@advancedanalytical.com.au

Contact your Customer Services Officer for all queries and issues regarding this sample batch.

Note: Turnaround time begins at time of receipt at laboratory, surcharges may apply for fast turnaround.

Water samples will be discarded after 1 month from receipt at laboratory unless notified.
Soil samples will be stored in chilled condition for one month from receipt at laboratory and discarded after 3 months unless notified.

COMMENTS:

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www.advancedanalytical.com.au

A09/230

Pg 1 of 1 6/8/09

CHAIN OF CUSTODY DOCUMENTATION

AAA

CLIENT: WorleyParsons

ADDRESS / OFFICE: Level 10, 333 Ann St, Brisbane City

PROJECT MANAGER (PM): Alex Kochnieff

PROJECT ID: 301001-00752

SITE: Hamilton Pt P.O. NO.:

RESULTS REQUIRED (**Date**): Standard QUOTE NO.:

SAMPLER: Alex Kochnieff

MOBILE: 0419645639

PHONE

EMAIL REPORT TO: Above

EMAIL INVOICE TO: Above

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DIPOSAL:

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		Heavy Metals (As, Cd, Cr, Cu, Ni, Pb, Zn)												Notes: e.g. Highly contaminated samples, Extra volume for QC or trace LORs etc.
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
1	BH22/0.9-1.0	S	16/7/09				x												

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: Alex Kochnieff	Date: 28/07/09	Name: Julian Wong	Date:	Con' Note No:
Of: WorleyParsons	Time: Am	Of: Julian Wong	Time: 11:30am 28 JUL 2009	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserveed Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

REPORT OF ANALYSIS

Laboratory Reference: A09/2300

Client: WorleyParsons Services Pty Ltd
Level 10, 333 Ann Street
Brisbane QLD 4000

Contact: Alex Kochnieff

Order No:
Project: 301001-00752 Laird Pt - Soil Analysis
Sample Type: Soil
No. of Samples: 1
Date Received: 28/7/09
Date Completed: 4/08/2009

Laboratory Contact Details:

Client Services Manager: Lilian Wong
Technical Enquiries: Andrew Bradbury
Telephone: +61 7 3268 1228
Fax: +61 7 3268 1238
Email: brisbane@advancedanalytical.com.au
andrew.bradbury@advancedanalytical.com.au

Attached Results Approved By:

Ian Eckhard
Technical Director

Comments:
All samples tested as submitted by client. All attached results have been checked and approved for release.
This is the Final Report and supersedes any reports previously issued with this batch number.
This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.

NATA
WORLD RECOGNISED ACCREDITATION
NATA Accredited Laboratory Accreditation No: 15108

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Batch Number: A09/2300
Project Reference: 301001-00752 Laird Pt - Soil Analysis

Laboratory Reference:	**-**	**-**	**/1**
Client Reference:	**-**	**-**	**BH16/0.0-0.1**
Date Sampled:	**-**	**-**	**14/7/09**
Analysis Description	**Method**	**Units**	
Total Solids			
Total Solids	04-004	%	91.8
Trace Elements			
Arsenic	04-001	mg/kg	8.0
Cadmium	04-001	mg/kg	<1.0
Chromium	04-001	mg/kg	19
Copper	04-001	mg/kg	17
Nickel	04-001	mg/kg	6.4
Lead	04-001	mg/kg	8.1
Zinc	04-001	mg/kg	22

Method	Method Description
04-004	Total Solids by gravimetric, %
04-001	Metals by ICP-OES, mg/kg

Result Comments
[<] Less than
[INS] Insufficient sample for this test
[NA] Test not required
Solid sample results are reported on a dry weight basis.

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Batch Number: A09/2300
Project Reference: 301001-00752 Laird Pt - Soil Analysis

QUALITY ASSURANCE REPORT

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results
Total Solids	%	N/T	A09/2300-1	91.8 || 91.6 || RPD: 0

TEST	UNITS	Blank	Duplicate Sm#	Duplicate Results	Spike Sm#	Spike Results
Arsenic	mg/kg	<1.0	[NT]	[NT]	A09/2316-A/01	111%
Cadmium	mg/kg	<1.0	[NT]	[NT]	A09/2316-A/01	102%
Chromium	mg/kg	<1.0	[NT]	[NT]	A09/2316-A/01	107%
Copper	mg/kg	<1.0	[NT]	[NT]	A09/2316-A/01	107%
Nickel	mg/kg	<1.0	[NT]	[NT]	A09/2316-A/01	103%
Lead	mg/kg	<1.0	[NT]	[NT]	A09/2316-A/01	102%
Zinc	mg/kg	<1.0	[NT]	[NT]	A09/2316-A/01	103%

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Batch Number: A09/2300

Project Reference: 301001-00752 Laird Pt - Soil Analysis

Comments:

RPD = Relative Percent Deviation
[NT] = Not Tested
[N/A] = Not Applicable
'#' = Spike recovery data could not be calculated due to high levels of contaminants

Acceptable replicate reproducibility limit or RPD:	Results < 10 times LOR: no limits.
	Results >10 times LOR: 0% - 50%.
Acceptable matrix spike & LCS recovery limits:	Trace elements 70-130%
	Organic analyses 50-150%
	SVOC & speciated phenols 10-140%
	Surrogates 10-140%

When levels outside these limits are obtained, an investigation into the cause of the deviation is performed before the batch is accepted or rejected, and results are released.

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Appendix J QA/QC tables

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Table 1 - Summary of Rinsates Blanks

Project No. 301001-00752		Heavy Metals							
Sample Number	Date (d-m-y)	Arsenic:T (mg/L)	Cadmium:T (mg/L)	Chromium:T (mg/L)	Copper:T (mg/L)	Mercury:T (mg/L)	Nickel:T (mg/L)	Lead:T (mg/L)	Zinc:T (mg/L)
RB01	18-Jul-09	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.005
RB02	18-Jul-09	<0.001	<0.0001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.005

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Table 2: Summary of Soil Duplicate and Triplicate RPD Results

Sample ID	BH16	DUP02	BH16		
Sample Depth	0.0-0.1m	0.0-0.1m	0.0-0.01m		
Date	14-Jul-09	14-Jul-09	14-Jul-09		
Analyte	**Primary Result (ALS)**	**Duplicate Result (ALS)**	**Triplicate Result (AAA)**	**Duplicate RPD**	**Triplicate RPD**
Arsenic	11	10	8	9.52	31.58
Cadmium	< 1	< 1	< 1	NA	NA
Chromium	15	14	19	6.90	23.53
Copper	15	14	17	6.90	12.50
Lead	7	7	8.1	0.00	14.57
Nickel	5	5	6.4	0.00	24.56
Zinc	18	17	22	5.71	20.00
Mercury	< 0.1	< 0.1	NT	NA	NA

Notes

Shading indicates results above acceptance criteria 40% (refer AS4482.1).
RPD = Relative Percent Difference.
N/A = Not Applicable as a result of sample concentrations not being at least 10 times greater than the Limits of Reporting. Concentrations that do not meet this criteria are excluded from the RPD analysis.

Appendix K Laboratory tables

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Table 1 - Heavy Metals
Summary of Soil Analytical Results

Australian Laboratory Services			Sample No.		BH01	BH03	BH07	BH10	BH12	BH16
			Depth (m)		0.0-0.05	0.0-0.1	0.0-0.05	0.0-0.1	0.0-0.1	0.0-0.1
			Date Sampled		19/07/2009	19/07/2009	19/07/2009	19/07/2009	19/07/2009	14/07/2009
Analyte	Units	LOR	Soil Type		Gravely Silt	Silt	Loam	Clayey Silt	Silt	Silt
			PID Reading (ppmv)		0	0	0	0	0	0
			Soil Guideline							
Moisture Content (dried @ 103°C)	%	1	NEPM HIL A (1999)	NEPM HIL F (1999)	2.2	8.8	5.8	1.7	12.2	10.6
Arsenic	mg/kg	5	100	500	11	<5	<5	<5	36	11
Cadmium	mg/kg	1	20	100	<1	<1	<1	<1	<1	<1
Chromium	mg/kg	2	300#	1,500	2	8	23	4	68	15
Copper	mg/kg	5	200*	5000	<5	13	13	7	50	15
Lead	mg/kg	5	300	1500	<5	9	7	<5	<5	7
Nickel	mg/kg	2	600	3000	<2	4	6	<2	25	5
Zinc	mg/kg	5	400*	35000	7	<5	39	<5	34	18
Mercury	mg/kg	0.1	15	75	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Notes:

NEPM - National Environment Protection Measure (1999).
HIL A - Health-based Guideline for Residentail A Settings.
HIL F - Health-based Guideline for Commercial/Industrial Settings.
- Guideline value shown represents Cr (VI).
* - Queensland Department of Environmental and Resource Management Phyto-toxicity guideline.
LOR - Limit of Reporting.
ppmv - parts per million by volume.

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Table 2 - Organochlorine Pesticides
Summary of Soil Analytical Results

Australian Laboratory Services			Analyte		Moisture Content	alpha-BHC	Hexachlorobenzene (HCB)	beta-BHC	gamma-BHC	delta-BHC	Heptachlor	Aldrin	Dieldrin	Heptachlor epoxide	trans-Chlordane	cis-Chlordane	alpha-Endosulfan	4.4`-DDE	4.4`-DDD	4.4`-DDT	Endrin	beta-Endosulfan	Endrin aldehyde	Endosulfan sulfate	Endrin ketone	Methoxychlor
			Units		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
			LOR		1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.2
Sample No.	Depth (m)	Date Sampled	Soil Type	PID Reading (ppmv)																						
BH 01	0.0-0.05	19/07/2009	Gravely Silt	0	2.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
BH 07	0.0-0.05	19/07/2009	Loam	0	5.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
Soil Guideline		NEPM (1999) HIL A				NE	NE	NE	NE	NE	50	50		NE	250		NE	1000			NE	NE	NE	NE	NE	NE
		NEPM (1999) HIL F				NE	NE	NE	NE	NE	250	250		NE	1,250		NE	5,000			NE	NE	NE	NE	NE	NE

Notes:
NEPM - National Environment Protection Measure (1999).
HIL A - Health-based Investigation Level for Residential A Settings.
HIL F - Health-based Investigation Level for Commercial/Industrial Settings.
LOR - Limit of Reporting.
ppmv - parts per million by volume.
NE - Not Established.

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Table 3 - Organophosphorous Pesticides
Summary of Soil Analytical Results

Australian Laboratory Services			Analyte		Moisture Content	Dichlorvos	Demeton-S-methyl	Monocrotophos	Dimethoate	Diazinon	Chlorpyrifos-methyl	Parathion-methyl	Malathion	Fenthion	Chlorpyrifos	Parathion	Pirimphos-ethyl	Chlorfenvinphos	Bromophos-ethyl	Fenamiphos	Prothiofos	Ethion	Carbophenothion	Azinphos Methyl
			Units		%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
			LOR		1	0.05	0.05	0.2	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Sample No.	Depth (m)	Date Sampled	Soil Type	PID Reading (ppmv)																				
BH 01	0.0-0.05	19/07/2009	Gravely Silt	0	2.2	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH 07	0.0-0.05	19/07/2009	Loam	0	5.8	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Soil Guideline NEPM HIL A and HIL F (1999)						NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

NEPM - National Environment Protection Measure (1999).
HIL A - Health-based Investigation Level for Residential A Settings.
HIL F - Health-based Investigation Level for Commercial/Industrial Settings.
LOR - Limit of Reporting.
ppmv - parts per million by volume.