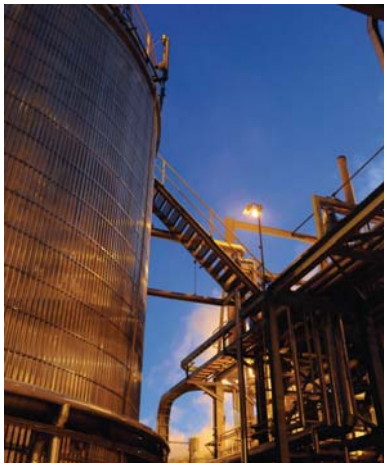

Proposed Ammonium Nitrate Facility
Heron Road, Kooragang Island

Environmental Impact Statement

Volume 2 Appendices G - M

August 2012

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URS DYNO Dyno Nobel Incitec Pivot SouthernCross International

Incitec Pivot Limited

Appendix G

Environmental Site Assessment

URS DYNO Dyno Nobel Incitec Pivot SouthernCross International

Incitec Pivot Limited

Environmental Assessment

Incitec Pivot Limited

Proposed IPL Ammonium Nitrate
Manufacturing Facility

January 2012
JBS 41699 -18711
JBS Environmental Pty Ltd

Environmental Assessment

Incitec Pivot Limited

Proposed IPL Ammonium Nitrate Manufacturing Facility

January 2012
JBS 41699 -18711
JBS Environmental Pty Ltd

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List of Abbreviations

A list of the common abbreviations used throughout this report is provided below.

AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ASS	acid sulfate soil
ASSMAC	Acid Sulfate Soils Management Advisory Committee
bgs	Below ground surface
COPC	Contaminant of potential concern
BTEX	Benzene, toluene, ethylbenzene and xylenes
B(a)P	Benzo(a)pyrene
CEMP	Construction Environmental Management Plan
DEC	NSW Department of Environment and Conservation
DECC	NSW Department of Environment and Climate Change
DO	Dissolved oxygen
DQOs	Data Quality Objectives
EPA	NSW Environment Protection Authority
ha	Hectare
HIL	Health based investigation level
IPL	Incitec Pivot Ltd
JBS	JBS Environmental Pty Ltd
LOR	Limit of Reporting
MW	Monitoring well
NEPC	National Environment Protection Council
NEPM	National Environment Protection (Assessment of Site Contamination) Measure
NHMRC	National Health and Medical Research Council
OCP	Organochlorine pesticides
OEH	NSW Office of Environment and Heritage (incorporates NSW EPA)
PAHs	Polycyclic aromatic hydrocarbons
PASS	Potential Acid Sulphate Soils
PCB	Polychlorinated biphenyls
PID	Photo ionisation detector
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percentage Difference
SPOCAS	Suspension Peroxide Oxidation Combined Activity & Sulfur
SVOC	Semi-Volatile Organic Compound
TAA	Titratable actual acidity (of soil)
TPA	Titratable potential acidity (of soil)
TPH	Total petroleum hydrocarbons
VOC	Volatile Organic Compound

Executive Summary

Introduction and Objectives

JBS Environmental Pty Ltd (JBS) was engaged by Incitec Pivot Limited (IPL) facility to undertake a detailed Environmental Site Assessment (ESA) on a portion of the IPL facility, identified as part Lot 3 in Deposited Plan 1110713, and located at Kooragang Island, NSW ('the site').

Development works may be undertaken at the site, requiring soil and groundwater investigation across an area of approximately 10 ha.

This investigation was required to provide draw conclusions regarding the suitability of the site for commercial/industrial redevelopment or make recommendations to enable such redevelopment.

Scope of Works

The scope of work comprised: review of historical documentation to identify potential areas of environmental concern and chemicals of potential concern (COPCs); development of a sampling and analysis program; soil sampling and analysis; well installation; groundwater sampling and analysis; a comparison of COPC concentrations in soils and groundwater to guidelines made or endorsed by the NSW Office of Environment and Heritage (OEH); and preparation of an environmental assessment report.

Site History Summary

A review of historical information for the site identified the following potentially contaminating activities:

- The presence of widespread fill across the site, several metres in depth, that is likely to comprise sediment dredged from the nearby Hunter River; and
- Use of the site as part of a fertiliser manufacturing operation for several decades, which has included outdoor stockpiling of manufactured goods and may have included chemical, fuel and/or liquid waste storage.

Summary of Results

Field observations and results of analytical testing of soil and groundwater samples can be summarised as follows:

- There were no visible fragments of asbestos containing materials (ACM) observed on the ground surface or in the subsurface fill material during site investigations.
- Observations of potential chemical contamination (e.g. staining, odours) were observed in four test pits (TP26, TP29, TP33 and TP36) across the site.
- Soils at the site comprised surficial silty/sandy topsoil underlain by clayey silt and sandy sediments, some of which are likely to represent dredged material used to reclaim parts of the island from the Hunter River.
- The concentration of TPH C_{10} – C_{36} was reported above the adopted commercial / industrial criteria (HIL-F) in one sample collected from the surface fill material at the site. The concentrations of TPH C_{10} – C_{36} in all other samples analysed were below the LOR. The 95% Upper Confidence Limit (UCL) was calculated for the 44 soil samples collected and analysed for TPH C_{10} – C_{36}. The 95% UCL of the average concentration of TPH C_{10} – C_{36} in the soil was 203 mg/kg.

- Concentrations of remaining contaminants of potential concern (COPCs) in soil were below adopted commercial / industrial criteria (HIL-F) and as such potential contaminants in soil at the site do not appear to represent potential human health risk during future commercial / industrial development at the site.
- Acid Sulfate Soil (ASS) conditions were reported at two locations assessed (TP14 and TP17), while remaining soils assessed did not exhibit ASS conditions including TP07, TP15 and TP16 which exhibited acidic soil (not ASS) conditions.
- Field tests indicated groundwater at the site was fresh to brackish, and was mildly acidic to mildly alkaline.
- Based on the elevation of groundwater within each of the thirteen wells gauged, the direction of groundwater flow was inferred to occur in two directions, to the south west and north east, with mounding occurring at the centre of the site.
- Ammonia (and associated nitrogen) concentrations in half of all groundwater samples analysed exceeded adopted guideline for protection of aquatic ecosystems. The reported ammonia concentrations indicate that, while elevated values are present in the centre of the site, the concentrations downgradient of the centre are low, generally below or close to the adopted assessment criteria. As such it is considered that the ammonia concentrations reported within the defined site boundaries do not pose an unacceptable risk to down gradient receptors.

Conclusions

Based on the findings of this investigation and subject to the limitations in **Section 13**, the site is suitable for commercial/industrial use without further assessment, remediation or management.

Recommendations

Should the site be redeveloped for continued commercial / industrial land use then it is recommended that a construction environmental management plan (CEMP) be prepared and implemented. The CEMP should consider safety and construction requirements appropriate for the soil and groundwater conditions at the site, including ASS/ Potential Acid Sulfate Soils (PASS).

1 Introduction

1.1 Background

JBS Environmental Pty Ltd (JBS) was engaged by Incitec Pivot Limited (IPL) facility to undertake a detailed Environmental Site Assessment (ESA) on a portion of the IPL facility, located at Kooragang Island, NSW, as shown on **Figure 1**. It is understood that development works may be undertaken in the southern and eastern portion of the facility, requiring soil and groundwater investigation across an area of approximately 10 ha as shown on **Figure 2.**

1.2 Objective

This investigation was required to provide an assessment of potential contamination of soil and groundwater in relation to on-going commercial/industrial land use.

1.3 Scope of Work

The scope of works included:

- An intrusive soil sampling program consisting of the collection of soil samples from fifty four test pit locations and three boreholes (**Figure 3**);
- Installation of groundwater wells within each of the three borehole locations;
- Collection of groundwater samples at the three new and five existing monitoring wells within or in proximity of the site (**Figure 2**);
- Field and laboratory analysis of a selection of soil and groundwater samples for geochemical parameters and potential contaminants of concern, including:
    - pH, nutrients, water soluble sulphate, electrical conductivity (EC);
    - total petroleum hydrocarbons (TPH);
    - benzene, toluene, ethylbenzene and xylenes (BTEX);
    - volatile organic compounds (VOCs);
    - polycyclic aromatic hydrocarbons (PAHs);
    - a suite of heavy metals (arsenic, cadmium, chromium, copper, lead, nickel, mercury and zinc;
    - asbestos;
    - suspension peroxide oxidation combined acidity & sulphur (SPOCAS);
- Completion of a site survey by a registered surveyor to determine the position and relative level of all new and existing monitoring wells utilised as part of the investigation; and
- Data analysis and the provision of an ESA report detailing the assessment findings.

2 Site Condition & Surrounding Environment

2.1 Site Identification

The site details are summarised in **Table 2.1** and shown in **Figures 1** and **2** and described in detail in the following sections.

Table 2.1 Summary Site Details

Lot/DP	Part Lot 3 in Deposited Plan 1117013
Site Address	Heron Road, Kooragang Island, Newcastle, NSW
Site Area	Approximately 10 HA
Geographical Coordinates (MGA 56):	N: 635 9998.89 E: 6 385 707.44 (approximate)
Local Government Authority:	Newcastle City Council
Current Zoning:	Sp1 Special Activities
Previous use:	Commercial/Industrial
Current use:	Commercial/Industrial

2.2 Site Location

The site is located between Heron and Greenleaf Roads in the southeast portion of Kooragang Island in the local government area of Newcastle, NSW, as shown in **Figure 1**. The extent of the portion of the IPL Kooragang Island facility that is the subject site is shown in **Figure 2**. A photographic log of the site and investigation is provided in **Appendix A**.

2.3 Site Description

The site comprises two areas of the IPL facility: a larger irregularly-shaped area in the centre and east; and a smaller rectangular-shaped area to the west adjacent Heron Road. Both areas are predominantly grass-covered and unsealed. The site is essentially flat with no notable gradient across the site, consisting of low-lying reclaimed land with an elevation less than 5 m AHD.

2.4 Surrounding Landuse

The site is within the IPL facility which is within an industrial area on the eastern end of Kooragang Island, with the Stockton and Steelworks Channels of the Hunter River North Arm located east and west of this part of the Island.

An Orica owned chemical manufacturing facility is located approximately 150m south of the site. The Orica owned site has been declared by NSW Environment Protection Authority (EPA) as a remediation site under the Contaminated Land Management Act 1997 (CLM Act) due to significant contamination of groundwater by arsenic and nutrients (total ammonia and nitrate). It is understood that the contamination on the Orica site is currently being managed under an EPA-Approved Voluntary Management Proposal.

2.5 Geology

The Newcastle 1:250,000 Geological Series Sheet (SI 56-2) shows that the geology in the area of the site is predominantly comprised of Quaternary aged gravels, sands, silts and clays. These recent fluvial deposits extend to depths of up to 90 m, below which is Permian aged sandstone bedrock.

Fill material used to reclaim the site is predominantly comprised of dredged alluvial sediment, typically comprising light brown silty sands, with shells often encountered at depth. Phosphogypsum has also been found in isolated patches of the site. Dark brown and black organic clays have been encountered beneath the dredged materials, from approximately 2.7 m below ground surface, during previous investigations.

Previous investigations, outlined in Section 4, indicated that fill material ranges from 0.4 m bgs to 8 m bgs across the site. The previous investigation conducted by JBS identified fill material that appeared to be reworked natural material, dredged during the reclamation works conducted on Kooragang Island.

2.6 Hydrogeology

There are a number of groundwater monitoring bores present at the facility. In general, groundwater is present at less than 2 m below the existing ground level.

The site is located in relatively close proximity to the Hunter River, and as such there is a likelihood of saline influence in the shallow aquifer underlying the site. Field parameters indicate that any saline influence is limited.

The potential human beneficial uses of the aquifer in proximity of the site are limited, due to the industrial land use on the Island. Saturated subsurface soils on Kooragang Island are observed to have relatively high hydraulic conductivities. With this, there is a potential that where extraction of groundwater on the site occurs, groundwater impact known to be present underlying the south of the island (e.g. Orica controlled site) could be mobilised. This has the potential to compromise extracted groundwater.

By review of electrical conductivities recorded for groundwater underlying the site by URS 2003[1] and collected by JBS in the previous ESA conducted, and estimates of dissolved solids, the majority of the water would be classified as brackish. By reference to NHMRC (1996) 'Australian Drinking Water Guidelines' and NHMRC (2004) 'Australian Drinking water Guidelines' the water is classified as:

- Aesthetic Guideline – excessive scaling, corrosion and unsatisfactory taste; and
- Palatability – unacceptable.

The groundwater is considered unsuitable for human consumption. The likely scaling and corrosion of pipelines would also make the groundwater unsuitable for industrial uses.

2.7 Topography

A review of the Land and Property Management Authority topographic map indicated that the site is situated at an elevation of less than 5 m above Australian Height Datum (m AHD). Observations made during the site inspection indicated that the topography of the site was generally even across the site and with the surrounding properties.

2.8 Acid Sulfate Soils

Review of the Acid Sulfate Soil Risk Map provided in the NSW Natural Resource Atlas website (NRA 2011[2]) indicates that the site is located within an area which has a "*…low probability of occurrence"* of acid sulfate soils. ASS conditions were reported at two locations assessed (TP14 and TP17) during the current sit works , while remaining soils assessed did not exhibit ASS conditions including TP07, TP15 and TP16 which exhibited acidic soil (not ASS) conditions.

[1] *Remediation Action Plan, Orica, Kooragang Island, 15 Greenleaf Road, NSW*, prepared for Orica Australia Pty Ltd by URS, December 2003 (URS 2003)

[2] NSW Government (accessed 15 November 2011), *NSW Natural Resource Atlas Website*, http://www.nratlas.nsw.gov.au.

3 Site History

3.1 Historical Aerial Photographs

Historical aerial photographs dated 1959, 1965, 1974, 1979, 1983, 1990, 2001 and 2004, provided by the Land and Property Information Centre, and were reviewed for this assessment. A copy of each reviewed image is provided as **Appendix B**. The aerial photograph review identified the following features in relation to the site:

- **1959:** The resolution of the aerial photograph is poor however the majority of Kooragang Island appears to be underdeveloped. The site appears to be vacant land. There appears to be a large dredged channel to the north west of the site and there appears to be structures, possibly wharfs on the western side of the Island. The area to the north east of the site, extending into the site, appears to be submerged.
- **1965:** The resolution of the aerial photograph again is poor but shows the site to have one large rectangular building at the centre. There appears to be several smaller structures to the south of the building and in the south eastern corner. Two large circular tanks, possibly acid holders are situated to the north east of the rectangular building. The area to the north and west of the building appears to have been cleared of vegetation. The surrounding land use appears unchanged with the exception of wharfs occurring on the western side of the headland. Earthworks appear to have occurred across most of the island with the exception of a large area of vegetation to the far north of the site. A road also runs around the perimeter of the headland and there is an area of reclaimed land in the north east.
- **1974:** The site and surrounding land use has undergone a large amount of development. The rectangular building is still present in the centre of the site, along with the circular tanks. A newer rectangular building is visible perpendicular to the original building to the west. Further north, three large storage sheds have been built. A gatehouse and car parking area is located on the south western portion of the site. A large rectangular building is in the north western corner of the site, adjacent to the storage sheds. One large stockpile is located on the eastern boundary of the site spreading out onto the eastern portion of the site. The area to the south is occupied by several buildings and tanks, presumably the Orica owned Plant. Bulk earthworks are visible to the north of site. The road around the headland appears sealed with various docks and wharfs around the whole headland. Two large gas holders are located approximately 150 m to the south east of the site. Stockton Bridge has also been constructed in the north linking Kooragang Island with the mainland.
- **1979:** The site appears to have an additional three tanks (presumably acid holders) in the centre of the site. A small rectangular building appears to the south of this in the square grassed area of the site. An area in the north east is visible, where further spreading from the 1974 image stockpile is visible. The surrounding land use appears unchanged with the exception of a car parking area adjacent to the site on the northern boundary.
- **1983:** The site and surrounding land use appear unchanged.
- **1990:** The site appears unchanged, with the exception of previous stockpile spreading areas now appearing to be vegetated. The surrounding area appears

unchanged with further development, docks and wharfs along the eastern headland.

- **2001:** The site and surrounding areas appear unchanged, with the exception of the stockpiled material which appears to the south eastern corner of the site.
- **2004:** The site and surrounding areas appear unchanged.

3.2 Title Details

A historical title search for Lot 3 in Deposited Plan 1117013 was undertaken as part of this assessment. A copy of the search results is provided as **Appendix C**. The history of ownership as obtained from the title deeds search is summarised below in **Table 3.1**:

Table 3.1 Summary of Historical Title Records[1]

Lot 3 in Deposited Plan 1117013	
13/8/1954	Minister for Public Works
10/6/1986	Australian Fertilizers Ltd
7/2/1991	Greenleaf Pty Ltd
30/10/1992	Incitec Limited
9/7/2003	Incitec Fertilizers Ltd
14/12/2006	TOP Australia Ltd

Notes: 1. As summarised from title deeds search (provided as **Appendix C**)

3.3 EPA Records

A search of the EPA's public register under the *Protection of the Environment Operations Act 1997* was undertaken on 8 December 2011. A copy of the search results is provided as **Appendix D**.

An Environmental Protection Licence (EPL) has been issued for the site. Licence number 11781, has been issued to Incitec Pivot Limited, for the IPL facility, which includes the site. The licence permits the production of agricultural fertiliser (phosphate) on the IPL facility. The licence includes limits for allowable discharges of coarse particulates, fine particulates and fluoride to air, as part of the fertiliser production process. The licences also includes allowable limits for total nitrogen, phosphate, total suspended solids, zinc and pH, within event driven stormwater discharge from the facility.

A search was also undertaken of the EPA's public contaminated land register (**Appendix D**). Notices were found for nearby properties under the *Contaminated Land Management Act 1997* (CLM Act). Of these, relevant to the current site, were a notice issued in 2010 to the adjacent Orica-owned site and a notice issued in 1993 to a BP-owned site along Cormorant Road to the north.

3.4 Australian and NSW Heritage Register

Review of the NSW Office of Environment and Heritage listings indicate that the site is not listed on the register (**Appendix E**).

3.5 Council Records

3.5.1 Planning Certificate

A current planning certificate was obtained from City of Newcastle Council for Lot 3 in Deposited Plan 1117013 (**Appendix C**) which is considered to be representative of the site. This certificate included the following information regarding the site:

- The property is not identified as including or comprising critical habitat.
- The property is not affected by a listing on the State Heritage Register or an interim Heritage Order that is in force under the Heritage Act 1977.

- There are no heritage items listed in Clause 21 to the State Environmental Planning Policy 2009 situated on the land.
- The land is not listed on the National Trust of Australia (NSW).
- The land is not listed on the Australian Heritage Database.
- Council's information currently indicates that the property may be affected by land contamination. Council has adopted a policy of restricting development or imposing conditions on properties affected by land contamination.
- The property is not within a proclaimed Mine Subsidence District under the Mine Subsidence Compensation Act 1961.
- The development on this land or part of this land is subject to flood as defined in the Floodplain Development Manual: the management of flood liable land, April 2005 publish by the NSW Government.

The property has two site audit statements issued under Section 59(2) of the Contaminated Land Management Act 1997. These site audit statements are as follows:

- Site audit statement No.WRR162/4 produced by Dr William Ryall of HLA Envirosciences December 2006 (Document No.1919819); and
- Site audit statement No.162/3 produced by Dr William Ryall of HLA Envirosciences December 2006 (Document No.1919809).

Details of the extent of the areas covered by each site audit statement were not provided in the Section 149 Certificate.

3.6 Development Application and Building Approval Records

Development application and building approval records for the site were requested by JBS on the 19 August 2011 and are listed below:

- 99/0901 - DEMOLITION OF EXISTING DOUBLE STOREY SKILLION ADDITION AND ERECTION OF TWO STOREY ADDITION TO EXISTING FERTILIZER MANUFACTURE PLANT (Approved)
- 99/2770 - ALTERATIONS & ADDITIONS TO AN EXISTING INDUSTRIAL BUILDING TO ACCOMMODATE THE RECEIVAL, REPACKING, STORAGE AND BOTTLING OF GAS REFRIGERANTS (Approved)
- 00/1570 - UPGRADING OF THE DISTRIBUTION & PACKAGING OF FERTILIZERS ERECTION OF A WEIGH BRIDGE & ADDITIONS TO EXISTING BUILDINGS (Approved)
- 01/2513 - ERECTION OF A HEAVY VEHICLE FILLING & REPACKAGING PLANT FOR EXISTING AQUEOUS AMMONIA STORAGE (Approved)
- 01/2514 - CONSTRUCTION OF A NEW TANKER LOADING FACILITY (Approved)
- 05/1111 - DEMOLITION OF BUILDING AND EXTERNAL EQUIPMENT (Approved)
- 06/2260 - SUBDIVISION OF 1 LOT INTO 3 (Approved)
- 07/0686 - DEMOLITION OF BUILDINGS INCLUDING CHANGEROOM, WORKSHOP, CONTROL ROOM AND COMPRESSOR HOUSE (Approved)
- 08/1046 - INDUSTRIAL STORAGE AND DISTRIBUTION WAREHOUSE (Refused)
- 11/0060 - 2 LOT SUBDIVISON (Undetermined)

As part of the planning certificate (**Appendix C**), the land has had a development consent granted. These development consents are in relation to the two following development applications:

- Consent Number: DA07/0686
- Consent Number: DA06/2260

3.7 Site History Summary

A summary of the site history, from the reviews provided in **Sections 3.1** to **3.6,** is provided in **Table 3.2**.

Table 3.2 Summary of Historical Site Use Information

Period	Activity	Source
Pre 1954	Unknown	-
1954	The site was owned by the Minister of Public affairs	Title Documentation
1954	The site is vacant	Aerial Photograph (1954)
1965	The site appears to have begun or in the process of construction of the current plant	Aerial Photograph (1965)
1974	The site appeared to be used for industrial use	Aerial Photograph (1974)
1983	The site appeared to be used for manufacturing	Aerial Photograph (1983)
1986	The site was purchased by Australian Fertilizers	Title Documentation
1990	The site appeared to be used for manufacturing	Aerial Photograph (1990)
1991	The site was purchased by Greenleaf Pty ltd	Title Documentation
1992	The site was purchased by Incitec Limited	Title Documentation
2001	The site appeared to be used for manufacturing	Aerial Photograph (2001)
2006	The site was purchased by TOP Australia Ltd	Title Documentation

The Section 149 Certificate obtained from Newcastle City Council indicates that the site may be affected by land contamination.

3.8 Integrity Assessment

The information obtained from formal published sources noted above has been found to be in general agreement regarding the history of the site.

Based on the range of sources and the general consistency of the historical information, it is considered that the historical assessment has an acceptable level of accuracy with respect to the potentially contaminating activities historically occurring at the site.

4 Previous Assessments

The following investigations are known to have occurred at the site:

- *'Detailed Site Assessment, Chemtrans Maintenance Facility, Kooragang Island, 15 Greenleaf Road'* prepared for Incitec Ltd by HLA Envirosciences (Project number 1924), June 1999;
- *'Remediation Action Plan, Orica, Kooragang Island, 15 Greenleaf Road, NSW'* prepared for Orica Australia Pty Ltd by URS, December 2003 (URS 2003); and
- *'Baseline Contamination Assessment, Chemtrans Lease Area, Incitec Pivot Facility, Kooragang Island, NSW'* JBS Environmental, June 2009.

A summary of the findings of each report is provided in the following sections:

4.1.1 Detailed Site Assessment, Chemtrans Maintenance Facility (HLA 2009)

Incitec Ltd contracted HLA Envirosciences (HLA) to conduct a detailed site assessment (DSA) of the Chemtrans Maintenance Facility at Kooragang Island. The investigation area was located in the northern portion of the site. HLA conducted a site inspection which identified several potential contaminant sources, including diesel storage tanks and an acid truck wash water disposal area.

A total of twenty eight locations were advanced across via a truck mounted drilling drill. Soil samples were collected via a split spoon method. Soil samples were analysed for TPH, pH, sulfates, phosphates, ammonia, chromium, arsenic and available chlorine.

Of the area investigated, two areas were identified to have concentrations of contaminants above the commercial guideline criteria. These included the sealed area to the north of the maintenance bay where elevated concentrations of chromium were reported. The Diesel storage tank area was identified as having elevated concentrations of TPH but was below the guideline criteria for the site.

The report identified pH across the study area to be impacted by the discharge of various materials collected and inappropriately disposed.

The report recommended further investigation of the chromium concentrations over the study area.

4.1.2 Remediation Action Plan, Orica (URS 2003).

URS (2003) documents a Remediation Action Plan (RAP) after Incitec notified the NSW EPA under Section 60 of the CLM Act of soil and groundwater contamination at the facility. In 2001 the NSW EPA indicated that the arsenic and ammonia contamination in groundwater on the western portion of the study area represented a risk of harm. URS prepared a RAP for Incitec and well as reporting the findings of their 2002 site investigation.

The report outlined that the main source of arsenic contamination on the study area appeared to originate from a former sludge disposal pit, where high concentrations of arsenic were reported. The ammonia (NH_3) contamination at the study area was found to generally be restricted to the western boundary and appeared to be associated with the ammonia tank scrubber vent. Ammonia as NH_4 was reported to occur across the study area and was the result of various diffuse sources.

Surface water sampling of the Hunter River indicted that the groundwater contamination underlying the study area was not significantly impacting the water quality or sediment in the River.

URS (2003) recommended the control of the source of ammonia contamination by installation of a connection from the ammonia scrubber to an effluent drain and a temporary capping of the area with a polyethylene sheeting. It was also recommended that further investigation of the sludge area for arsenic contamination be conducted.

4.1.3 Baseline Contamination Assessment, Chemtrans Lease Area (JBS 2009)

JBS was engaged to conduct a Baseline Contamination Assessment for the eastern portion of Incitec Pivot Ltd's Primary Distribution Centre, which was leased to Chemtrans. The field work for the Baseline Contamination Assessment was conducted in September 2006.

Soil samples were collected from 23 targetted sampling locations across the study area. Groundwater samples were collected from 1 onsite and 4 offsite monitoring wells.

The study area had been filled with dredged silty sand and phosphogypsum. Black ash and gravel was identified in fill near the northwestern and northeastern study area boundaries. Fill in the southwestern portion of the site included building rubble. No asbestos containing material (ACM) was identified. Natural clays were encountered approximately 3.2 m below ground surface.

Hydrocarbon stained and odourous soils were identified in the eastern and western portions of the study area, in the vicinity of former fuel infrastructure. Groundwater was encountered between 1.5 m and 3 m below ground surface. The concentrations of contaminants in soil were compared to Health-based Investigation Levels for commercial/industrial landuse (HIL-F), with concentrations of arsenic and lead reported above the criteria. TPH C_{10}-C_{36} was reported above the NSW DECC endorsed criterion at two locations, near the former above ground storage tanks (ASTs). TPH impacted soils were also identified above the HIL-F in the sample collected from 3 m at this location. TPH C_{10}-C_{36} was reported above the NSW DECC endorsed criterion at another location, near the northeastern study area boundary.

The baseline groundwater conditions at the site reported metal concentrations generally below the adopted ANZECC/ARMCANZ 2000 criteria. Of the nutrients analysis Potassium was reported above the adopted ANZECC/ARMCANZ criteria. Concentrations of TPH/VOC compounds were reported to be below the ANZECC/ARMCANZ 2000 criteria.

5 Conceptual Site Model (CSM)

5.1 Potential Areas of Environmental Concern

Based on the site history review and previous site investigations, a number of areas of environmental concern and associated contaminants of potential concern have been identified (**Table 5.1**).

Table 5.1 Areas of Environmental Concern and associated Contaminants of Potential Concern

Area of Environmental Concern (AEC)
Previous site use.
Potential historic chemical storage
Potential placement of fill material of unknown origins to create existing site level.
Offsite sources

Sensitive receptors at the site are considered to include: site workers and visitors who may come into contact with potentially contaminated media within the site; the Hunter River which flows around the island is approximately 65 m to the west of the site and 70m to the east of the Site; and the building structures.

5.2 Contaminants of Potential Concern

Based on the history review and field observations from the site, the contaminants of potential concern (COPCs) have been identified and are presented in **Table 5.2**.

Table 5.2 Areas of Environmental Concern and associated Contaminants of Potential Concern

Area of Environmental Concern (AEC)	Contaminants of Potential Concern (COPC)
Previous site use.	Metals, TPH/BTEX, PAHs, OCPs/OPPs and asbestos.
Potential historic chemical storage	TPH, PAHs, PCBs, ammonia, total nitrogen, phosphorus, sulfate
Potential placement of fill material of unknown origins to create existing site level.	Lead, TPH/PCBs and asbestos materials.
Offsite sources	Metals, TPH/BTEX, PAHs, ammonia, total nitrogen, phosphorus, sulfate

5.3 Potentially Contaminated Media

Potentially contaminated media present at the site include:

- fill material beneath the site;
- groundwater; and
- hazardous materials within the current buildings.

Due to the historic use of the site, the use and storage of chemicals associated with the site practices, spillage/leakage and general site activities may have resulted in migration of contaminants through the former/current building pavements and unsealed areas at the site and via subsurface soils. As a result, subsurface soils and shallow groundwater were considered to be potentially contaminated media.

It is acknowledged that fill material may have been imported from surrounding sites, or alternatively sourced from industrial activities occurring in the region in the past, such as dredging of the Hunter River or sea bed. Based on this, the fill material underlying the site was identified as a potentially contaminated medium.

Taking into account the likely depth of groundwater and the potential leachability of the identified contaminants of concern, it was considered that groundwater was a potentially contaminated medium.

5.4 Potential for Migration

Contaminants generally migrate from site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics);
- The extent of the contaminants (isolated or widespread);
- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

The potential contaminants identified as part of the site history review and site inspection are generally in either a solid form (e.g. heavy metals etc) or liquid form (e.g. solvents, fuel, etc).

The site is predominantly grass-covered and unsealed, with the remainder of the site concrete pathways, buildings and stockpile sheds. Due to the large area of the site being unsealed grass and/or gravels, it is considered that potential for windblown dust contamination from the site is moderate. Given the large area of exposed soil, the potential for contamination migration via surface water movement and infiltration of water and subsequent migration through the soil profile are also considered to be a moderate risk.

Given the historical/current use of the site and the anticipated shallow depth to groundwater (discussed in **Section 2.7**), it is considered that there is a moderate risk for the migration of mobile contaminants from the site via groundwater.

6 Sampling and Analysis Plan

6.1 Data Quality Objectives

Data quality objectives (DQOs) were developed for the investigation, as discussed in the following sections.

6.2 State the Problem

It is understood that future works on site may include construction of buildings/structures in the site area for commercial/industrial land use. Previous investigations at the facility have identified the potential for contaminated soil and groundwater beneath the site. A detailed assessment of soil and groundwater quality is consequently required.

6.3 Identify the Decision

The following specific decisions need to be made as part of these investigations:

- Are there any unacceptable risks to likely future on-site receptors from soil with regards to background soil concentrations?
- Are there any impacts of chemical mixtures?
- Are there any aesthetic issues?
- Are there any unacceptable risks to future site users or down-gradient sensitive receptors from groundwater?
- Is there any evidence of, or potential for, migration of contaminants from the site?
- Is the site management strategy appropriate?

6.4 Identify Inputs to the Decision

Inputs to the decisions are:

- Soil and groundwater data collected as part of previous investigations from within the boundaries of the study area shown on **Figure 2**;
- Field observations, photo-ionization detector (PID) screening during field works;
- Testing for potential acid sulphate soils (ASS) was conducted as part of this ESA;
- Soil data from samples collected at testpit and borehole locations placed through the site; and
- Groundwater data from samples collected from new and existing monitoring wells.

6.5 Define the Study Boundaries

The lateral study boundary was defined as the boundaries of the site, with Heron Road situated on the western boundary, Greenleaf Road on the eastern boundary and other industrial / commercial properties located north and south. Lateral boundaries are shown on **Figures 1.**

The maximum vertical extent of the assessment works was approximately 3 m below the existing ground surface (m bgs), based on field observations and depth to groundwater, with the maximum extent of soil sampling being approximately 0.5 m below water table levels observed during test pitting.

6.6 Develop a Decision Rule

Soil and groundwater analytical data were assessed against criteria from relevant/available guidelines adopted for this assessment as presented in **Section 7**. Specific decision rules tied to the project objectives are presented in **Table 6.1** below.

Table 6.1: Decision Rules

	Decision Required	Decision Rule
1	Are there any unacceptable risks to onsite future receptors from soils, relating to background soil and groundwater concentrations?	Soil and groundwater laboratory analytical data were compared against the relevant criteria presented in **Section 6**. If the laboratory analytical data exceed the adopted criteria, the decision is Yes. If the laboratory analytical data are below the adopted criteria, the decision is No.
2	Are there any chemical mixtures?	Are there more than one group of contaminants present which increase the risk of harm? If there is, the decision is Yes. Otherwise, the decision is No.
3	Are there any aesthetic issues (i.e. odours, staining)?	If there are any unacceptable odours or soil discolouration, the answer to the decision will be Yes. Otherwise, the answer to the decision will be No.
4	Is there any evidence of, or potential for, migration of contaminants from the site?	Are contaminants present in groundwater at concentrations exceeding the adopted criteria? If yes, the decision is Yes. Otherwise, the decision is No.
5	Is a site management strategy required?	Was the answer to any of the above decisions Yes? If yes, a site management strategy is required. If no, a site management strategy is not required.

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project must be appropriate to allow decisions to be made with confidence.

Specific limits for this project were adopted in accordance with the appropriate guidance from the NSW EPA, NEPC (1999), ANZECC/ARMCANZ (2000), NHMRC (2004), appropriate indicators of data quality (used to assess quality assurance / quality control) and standard JBS Environmental procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data were assessed against pre-determined Data Quality Indicators (DQIs) for completeness, comparability, representativeness, precision and accuracy. The acceptable limit on decision error was 95% compliance with DQIs.

The pre-determined Data Quality Indicators (DQIs) established for the project are discussed below in relation to precision, accuracy, representativeness, comparability and completeness (PARCC parameters), and are shown in **Table 6.2**.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD[3]) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that is generated during this study is a measure of the closeness

[3] $$RPD(\%) = \frac{|C_o - C_d|}{C_o + C_d} \times 200$$

Where C_0 is the analyte concentration of the original sample
C_d is the analyte concentration of the duplicate sample

of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.

- **Representativeness** –expresses the degree which sample data accurately and precisely represents a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** - expresses the appropriateness of the chosen laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted site assessment criteria.

Table 6.2: Summary of Quality Assurance / Quality Control Program

Data Quality Objective	Frequency	Data Quality Indicator
Precision		
Blind duplicates (soil intra laboratory)	1 / 20 samples	<30-50% RPD[1]
Blind duplicates (water intra laboratory)	1 / 20 samples	<30-50% RPD[1]
Laboratory duplicates	1 / 20 samples	<30 - 50% RPD[1]
Trip blank	1 / sampling event	<LOR
Rinsate blank	1 / sampling event	<LOR
Trip spike	1 / sampling event	70-130%
Accuracy		
Surrogate spikes	All organic samples	70-130%[2]
Matrix spikes	1 per lab batch or 20 samples	70-130%[2]
Laboratory control samples	1 per lab batch or 20 samples	RPDs range 30 - 50%%[2]
Representativeness		
Sampling appropriate for media and analytes		-
Laboratory blanks	1 per lab batch	<LOR
Samples extracted and analysed within holding times.	-	14 days for COPC's
Comparability		
Standard operating procedures for sample collection & handling	All Samples	All samples
Standard analytical methods used for all analyses	All Samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All Samples	All samples
Limits of reporting appropriate and consistent	All Samples	All samples
Completeness		
Soil description and COCs completed and appropriate	All Samples	- All samples
Appropriate documentation	All Samples	- All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		

(1) If the RPD between duplicates is greater than the pre-determined data quality indicator, a judgement will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error has occurred.

(2) Lower recoveries may be recorded for some semi-volatile organic analyses particularly including phenols.

6.7 Optimise the Design for Obtaining Data

Various strategies for developing a statistically based sampling plan are identified in EPA (1995), including judgemental (targeted), random, systematic and stratified sampling patterns.

Based on the site inspection and known history of the site, a combination of systematic and judgemental sampling was considered the most appropriate for the current investigation with sample locations distributed evenly across the site, as well as targeted towards areas of the site where construction of buildings may occur.

Soil samples were collected from fifty-seven targeted locations at the site, fifty four from the test pits advanced across the site and three from the boreholes advanced across the site. This sampling density is appropriate for the assessment of a site approximately 33 Ha in area, in accordance with EPA (1995) '*Sampling Design Guidelines'*. JBS was advised that sampling locations were restricted by the presence of hardstand surfaces, which were not to be disturbed during this investigation. Accordingly, the achievable fifty-seven locations have been placed in areas that were accessible, as shown on **Figure 3**.

6.8 Investigation Methodology

6.8.1 Soil Sampling Methodology

Soil samples were collected via excavator and a fresh pair of disposable nitrile gloves at each sample location. Samples were collected on the surface (0-0.1 m) and at 0.5 m intervals to a maximum depth of 3.0 m, or 0.5 m below the groundwater table (whichever was shallower), or prior refusal. Additional samples were collected where there were visual or olfactory signs of contamination. During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination or PASS were noted on field reporting sheets (**Appendix F**) and on testpit logs provided as **Appendix G**.

To prevent cross contamination, a new pair of nitrile gloves was used at each soil sampling location, and soil samples were collected from the centre of the excavator bucket ensuring that no part of the sample had contacted the sides of the excavator bucket.

Sufficient sample material was collected at each soil sampling interval to allow for field and laboratory analysis. Field analysis included PASS field testing and PID screening. Detailed observations and documented descriptions were produced for each soil profile observed. PASS field screening results are provided in **Appendix F** and assessment of the results are included in **Section 9.2.2**.

Soil samples were screened on site during works using a photo-ionisation detector (PID) for the potential presence of VOCs. Samples obtained for PID screening were placed in a sealed plastic bag for a period of approximately 5 minutes to equilibrate prior to a PID being attached to the bag. Readings were then monitored for a period of approximately 1 minute or until values stabilised and the stabilised/highest reading was recorded. PID screening results are provided on the borelogs in **Appendix G**.

Collected analytical soil samples were immediately transferred to sample containers of appropriate composition (glass jars). Sample labels recorded JBS job number; sample identification number; and date of sampling. Sample containers were transferred to a chilled ice box for sample preservation prior to and during shipment to the testing laboratory. A chain-of-custody form was completed and forwarded with the samples to the testing laboratory. Chain of custody forms are provided with laboratory documentation as **Appendix H**.

Note that not all samples collected were analysed. Samples not analysed remained at the primary laboratory for a period of one month for possible future analysis (provided additional analysis of analytes was within holding times) following the receipt of initial sample results.

6.8.2 Monitoring Well Installation

Three new groundwater monitoring wells were installed across the site. The new monitoring well locations are shown on **Figure 3.**

The three new groundwater monitoring wells were installed by a drill rig with hollow flight augers attached to enable drilling in unconsolidated sands. The boreholes were advanced to 1.5 m below the level of soil saturation as observed during hollow flight drilling, of a maximum depth of 3.0 m below ground surface (bgs).

The wells were constructed of Class 18 50 mm diameter unplasticised polyvinyl chloride (UPVC) screen and casing, with appropriate gravel packs, bentonite seals, and lockable caps to complete the wells. The wells were completed at ground surface with a steel gatic cover installed flush with the surrounding concrete pavement.

Monitoring wells were installed with bentonite seals of at least 0.3 m in length to limit the potential for perched water or surface water infiltration. The construction details are included on the borehole/monitoring well installation logs presented as **Appendix G**.

The wells were developed on the day of installation with the use of a stainless steel bailer to remove turbidity created by the drilling and construction process. During development, the bores were rapidly purged and then allowed to recharge.

6.9 Groundwater Sampling

Three groundwater monitoring wells (MW101, MW102 and MW103) were installed on the site and sampled. A further 5 existing monitoring wells located on or within proximity of the site were also sampled (BH42/MW4, MW04, MW1/BH89, MW4A and MWB). Depth to groundwater and water quality parameters were measured in a further seven existing monitoring wells external to the site.

The locations of the monitoring wells sampled are provided on **Figure 3**. Drilling logs showing well construction details are not available for the existing monitoring wells at the site. Drilling logs for the three new groundwater monitoring wells installed are documented in **Appendix G.**

Prior to sampling, fourteen monitoring wells on or in close proximity to the site were gauged by the use of an interface probe, of these; one monitoring well (JMW 8) did not contain any groundwater. The eight wells listed above were then sampled. Noting potential COPCs include volatile constituents, groundwater monitoring wells were sampled by a low flow method. A peristaltic pump with small diameter tubing was used for the sampling. It is noted in the Murray-Darling Basin Groundwater Sampling Guidelines – as referenced in NEPC (1999)[4] – that air bubbles may potentially be formed in peristaltic pump tubing which cause volatilisation of volatile constituents. Small diameter tubing was used during the sampling to prevent this from occurring.

Monitoring wells were purged at the highest possible flow-rate while ensuring that minimal fluctuations in depth to water occurred. A flow cell was used to continuously monitor water quality parameters of: electrical conductivity (EC); redox potential (Eh);

[4] National Environment Protection (Assessment of Site Contamination) Measure (NEPM), National Environment Protection Council, 1999 (NEPC 1999)

pH; dissolved oxygen (DO); salinity; and temperature during purging and sampling. The groundwater samples were collected as per the sampling guidance provided to EPA Victoria (April 2000) 'Groundwater Sampling Guidelines Publication 669', where:

- Consecutive EC readings were within 3%;
- Consecutive Eh readings were within 10mV;
- Consecutive DO readings were within 10%; and
- Consecutive pH readings were within 0.5 pH units.

Groundwater field notes are provided as **Appendix F**, and field measures parameters during purging are provided as **Table C**.

6.10 Equipment Decontamination

The majority of the groundwater sampling equipment used was disposable, however, the interface probe required decontamination between sampling locations to minimise the potential for sample cross-contamination.

The interface probe was decontaminated prior to and following use at each sampling location using high pressure spray with a solution of phosphate-free detergent and water, then rinsed with a high pressure water spray before being air dried. The equipment was then inspected to ensure that no soil, oil, debris or other contaminants were visible on the equipment prior to use on the next location.

6.11 Laboratory Analyses

NATA accredited laboratories were used for all laboratory analysis of soil and groundwater samples. The primary laboratory was Envirolab Services Pty Ltd (Envirolab), and the secondary laboratory was SGS Australia Pty Ltd (SGS). In addition, each laboratory was required to meet JBS Environmental's internal Quality Assurance / Quality Control (QA/QC) requirements.

Laboratory analysis reports and Chain of Custody documentation are in **Appendix H**.

6.12 Quality Assurance / Quality Control

An assessment of QA/QC of the works has been undertaken against the DQIs presented in **Table 6.2**. The outcomes of the QA/QC assessment are provided in **Section 8**.

7 Assessment Criteria

7.1 Soil Criteria

Based on the site zoning and continued commercial / industrial use, concentrations of contaminants in the soil will be compared against human health-based investigation levels (HILs) for a commercial / industrial landuse scenario (NEHF-F[5]), adopted by NSW DEC (2006[6]) and published in the NEPC (1999) NEPM, as provided in **Table 7.1**. The exposure factors built into the HILs, as discussed in NEPC (1999), are considered adequately protective of all future site users, including temporary construction workers.

Table 7.1: Soil Criteria (all units in mg/kg)

	Limit of Reporting (mg/kg)	Health-Based Investigation Level (commercial/ industrial) (NEHF – F)[1]
METALS		
Arsenic	4.0	500
Cadmium	1.0	100
Chromium (VI)	1.0	500
Copper	1.0	5,000
Lead	1.0	1,500
Mercury (inorganic)	0.1	75
Nickel	1.0	3,000
Phosphorus	10	-[4]
Potassium	10	-[4]
Sulphur	10	-[4]
Zinc	1.0	35,000
PETROLEUM HYDROCARBONS		
C_6 – C_9 Fraction	25	65[2]
C_{10} – C_{36} Fraction	250	1000[2]
BTEX		
Benzene	1.0	1[2]
Toluene	1.0	130[2]
Ethylbenzene	1.0	50[2]
Total Xylenes	3.0	25[2]
POLYCYCLIC AROMATIC HYDROCARBONS		
Benzo(a)pyrene	0.05	5
Total PAHs	1.55	100
ORGANOCHLORINE PESTICIDES		
Aldrin + Dieldrin	0.2	50
Chlordane	0.1	250
DDT + DDD + DDE	0.3	1,000
Heptachlor	0.1	50
PCBs		
PCBs (total)	0.9	50
VOCs		
VOCs	1-10	None published, LOR adopted
OTHER		
Asbestos	Presence	No fragments of ACM and No fibres observed using NATA accredited analysis[3]
Ammonia	0.5	-[4]

[1] Column 4 (NEHF - F), Health-based Investigation Levels (DEC 2006)
[2] Table 3 (EPA 1994)
[3] There are currently no EPA-endorsed human health-based guidelines relating to asbestos in soil. As a precaution, criteria adopted are no visible asbestos containing material (ACM) and no fibres detected by laboratory analysis.
[4] There are currently no human-health based guidelines for phosphorous, potassium, sulfur or ammonia in soil.

[5] National Environmental Health Forum (NEHF), now known as enHealth.
[6] *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme, 2nd Edition*, NSW Department of Environment and Conservation, 2006 (DEC 2006)

Criteria for TPH and BTEX were sourced from EPA (1994[7]), as shown in **Table 6.1**. The BTEX criteria are a combination of ecological and human health-based threshold concentrations. The TPH criteria are indicative threshold concentrations above which risks may occur.

7.2 Groundwater Criteria

An objective of the investigation is to assess potential groundwater contamination in relation to on-going commercial/industrial land use. The nearest receiving water body is the Hunter River (a marine water body) approximately 65m west and 70m east of the site.

For assessing potential risks to groundwater from potential contamination, it is considered that, trigger values set for the protection of 95% of species protection in marine water *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000[9]), are referenced for contact with groundwater, as shown in **Table 7.2**.

Water quality guidelines for recreational purposes in ANZECC/ARMCANZ (2004[8]) may be reference for potential risks of exposure to groundwater of workers who may come into contact with groundwater. However given the location of the site within an area historically used for heavy industry and the presence of brackish groundwater underlying the site, it is considered unlikely that exposure of site workers to groundwater is likely to occur. Further discussion of the limited suitability of groundwater underlying the site for beneficial reuse is provided in **Section 10.**

Table 7.2: Groundwater Assessment Criteria: (all units in µg/L unless noted)

Substance	Limit of Reporting	ANZECC* Guidelines for Aquatic Ecosystems (marine water trigger levels) (µg/L)	Adopted GWAC
TPH/BTEX			
TPH (C_6 – C_9)	10	-	10[2]
TPH (C_{10} – C_{36})	250	-	250[2]
Benzene	1	700	700
Toluene	1	-	1
Ethylbenzene	1	-	1
Xylene (M+O+P)	3	-	3
VOCs/CHCs			
Individual VOCs/CHCs, except those below	1	-	1
Chloroethane	10	-	10
Chloromethane	10	-	10
Vinyl Chloride	10	-	10
Bromomethane	10	-	10
Di-/Tri-chloro-difluoromethane	10	-	10
1,2 Dichloroethane	1	-	10
1,1-Dichloroethene	1	-	1[3]
Carbon tetrachloride	1	-	3
Tetrachloroethene	1	-	10
Trichloroethene	1	-	30
Metals			
Arsenic	1	24	24
Cadmium	0.1	5.5	5.5
Chromium	1	4.4	4.4
Copper	1	1.3	1.3
Lead	1	4.4	4.4

[7] *Contaminated Sites: Guidelines for Assessing Service Station Sites*, NSW EPA, 1994 (EPA 1994)
[8] *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), Paper No 4, 2000 (ANZECC/ARMCANZ 2004)

Substance	Limit of Reporting	ANZECC* Guidelines for Aquatic Ecosystems (marine water trigger levels) (µg/L)	Adopted GWAC
Mercury	0.1	0.4	0.4
Nickel	1	70	70
Zinc	1	15	15
PAHs			
Total PAHs	1.55	-	1.55
Individual PAHs, except those below	0.1	-	0.1
Benzo(b)&(k)fluoroanthene	0.2	-	0.2
Benzo(a)pyrene	0.1	-	0.1[3]
Other			
Total Nitrogen	0.5	-	-
Ammonia	5	910	910
Phosphorous	50	-	-
Potassium	10	-	-
Sulphur as S	2000	-	-

[1] (ANZECC/ARMCANZ 2004) water quality guidelines for recreational purposes
[2] No published criterion available, LOR adopted as criterion
[2] LOR exceeds guideline, LOR adopted as criterion
*Trigger values for 95% level of species protection

It is noted in **Table 7.2** that where the assessment criterion is below the laboratory detection limit (LOR), the LOR has been set as the criterion. Groundwater Assessment Criteria (GWAC) in **Table 7.2** are provided only for constituents that are considered to be potential contaminants.

8 Quality Assurance / Quality Control

8.1 QA/QC Results

DQI's for soil and groundwater data have been calculated as per **Table 6.2** and are summarised in **Table 8.1** and discussed below.

Table 8.1: Summary of QA/QC Results

Data Quality Indicators	Soil Results	Groundwater Results	DQI met?
Precision			
Blind duplicates (intra laboratory)	5 in 95 samples RPDs range 18 – 102%	1 in 3 samples RPDs range 0 – 87%	Partial[1]
Split duplicates (inter laboratory)	5 in 95 samples RPDs range 24 – 100%	1 in 3 samples RPDs range 0 – 26%	Partial[1]
Laboratory Duplicates	19 in 95 samples RPDs range 30 - 50%	5 in 16 samples RPDs range 30 - 50%	Yes
Accuracy			
Surrogate spikes	All organic analyses 74 – 115% recovery	All organic analyses 64 - 116% recovery	Partial[1]
Matrix spikes	9 in 95 samples 91 – 124%	2 in 16 samples 68 – 125%	Partial[1]
Laboratory Control Sample	13 in 95 samples RPDs range 70 - 130%	7 in 16 samples RPDs range 70 - 130%	Yes
Representativeness			
Sampling appropriate for media and analytes	All sampling conducted in accordance with JBS procedures	All sampling conducted in accordance with JBS procedures	Yes
Samples extracted and analysed within holding times.	Primary and secondary samples were all extracted and analysed within holding times	Primary and secondary samples were all extracted and analysed within holding times except for one analyte	Partial[1]
Laboratory blanks	<LOR	<LOR	Yes
Rinsate	<LOR	<LOR	Yes
Trip spike	3 trip spikes, 98-110% recovery	2 trip spikes, 98 -105 % recovery	Yes
Trip blank	4trip blanks, <LOR	1 trip blank, <LOR	Yes
Comparability			
Standard operating procedures used for sample collection & handling	Two consistent field staff completed all field activities using the same standard operating procedures throughout works	Two consistent field staff completed all field activities using the same standard operating procedures throughout works	Yes
Standard analytical methods used	Standard analytical methods used.	Standard analytical methods used.	Yes
Consistent field conditions, sampling staff and laboratory analysis	Sampling was conducted by two consistent members of JBS field staff using the same operating procedures in similar conditions throughout the works. Primary and secondary labs remained consistent throughout the investigation.	Sampling was conducted by two consistent members of JBS field staff using the same operating procedures in similar conditions throughout the works. Primary and secondary labs remained consistent throughout the investigation.	Yes
Limits of reporting appropriate and consistent	Limits of reporting were consistent and appropriate for the primary laboratory.	Limits of reporting were consistent and appropriate for the primary laboratory.	Yes
Completeness			
Soil description, groundwater sampling forms & COCs completed	Borehole logs and COCs were completed appropriately	Groundwater sampling forms and COCs were completed appropriately.	Yes
Appropriate documentation	All appropriate field documentation is included in the Appendices.	All appropriate field documentation is included in the Appendices.	Yes

Satisfactory frequency/result for QC samples	The QC results are considered adequate for the purposes of the investigation.	The QC results are considered adequate for the purposes of the investigation.	Yes
Data from critical samples is considered valid	Data from critical samples is considered valid.	Data from critical samples is considered valid.	Yes
Sensitivity			
Analytical methods and limits of recovery appropriate for media and adopted site assessment criteria	All remaining limits of reporting were less than the adopted site assessment criteria.	All remaining limits of reporting were less than the adopted site assessment criteria.	Yes

8.2 Precision

Blind Duplicates

The rates of blind duplicate sampling and analysis met the DQI for the soil samples. RPDs, where able to be calculated, have been found to be generally acceptable. Exceedances were however calculated between the following duplicate samples:

- SQC4 and the primary sample TP08 for copper (67% RPD), potassium (66% RPD) and zinc (86% RPD) where the RPDs were above acceptable range.
- QC06 and primary sample TP49 for nickel (100%) where the RPDs were above the acceptable range.
- QC09 and the primary sample TP37 for potassium (100% RPD), sulfur (55% RPD), phosphorus (75% RPD) and zinc (88% RPD) where the RPDs were above the acceptable range.
- QC10 and the primary sample TP39 for potassium (54% RPD) and phosphorus (61% RPD) where the RPDs were above the acceptable range.

Additionally, it should be noted that variation in metals and nutrient concentrations may be a consequence of the heterogeneous nature of fill material.

The rates of blind duplicate sampling and analysis met the DQIs for the groundwater samples. RPDs, where able to be calculated, have been found to be generally acceptable with the following exceedance calculated between the duplicate samples:

- QW02 and primary sample BH49/MW4 for phosphorus (87%) where the RPDs were above the acceptable range.

Split Duplicates

The rates of split duplicate sampling and analysis met the DQI for the soil samples. RPDs where able to be calculated, have been found to be generally acceptable with some exceedances. The exceedances were calculated between the following duplicate samples:

- SQA2 and the primary sample TP19 for ammonia (65% RPD) and copper (67% RPD).
- SQA4 and primary sample TP08 for ammonia (67% RPD), lead (60% RPD), copper (100% RPD), mercury (55% RPD) and zinc (54% RPD).
- QA09 and primary sample TP37 for zinc (78% RPD).
- QC10 and the primary sample TP39 for chromium (24%), copper (50%) and nickel (62%).

It is noted that COPC concentrations in primary and duplicate samples were below the adopted assessment criteria, even where RPD limits were exceeded.

Additionally, it should be noted that variation in metals and nutrient concentrations may be a consequence of the heterogeneous nature of fill material.

The rates of split duplicate sampling and analysis met the DQI for the groundwater samples. RPDs where able to be calculated have been found to be acceptable.

Trip spike

All trip spike results are found to be acceptable.

Trip blank

All trip blank results are found to be acceptable.

Rinsate blank

All rinsate blank results are found to be acceptable.

8.3 Accuracy

Surrogate Spikes

Surrogate spikes for soils have been reported for analysis of all constituents. Spikes have been found to be generally acceptable, apart from occurrences of under-recovery of surrogates in some semi-volatile analyses. It is noted that under-recoveries of surrogates were within the laboratories NATA endorsed limits of 60% for semi-volatile organic compounds (SVOCs).

Surrogate spikes for groundwater have been reported for analysis of all constituents. Spikes have been found to be generally acceptable.

Noting compliance with laboratory NATA endorsed limits, surrogate recoveries are considered to have met the laboratories NATA endorsed limits and are considered acceptable.

Matrix Spikes

Matrix spikes have been reported for analysis of all constituents. Matrix spikes have been found to be generally acceptable, apart from occurrences of under-recovery of surrogates in some semi-volatile analyses. As discussed above, these were within the laboratories NATA endorsed limits of 60% for SVOCs and organics.

Matrix spike recoveries, where undertaken, were found to be acceptable.

Noting compliance with laboratory NATA endorsed limits, surrogate recoveries are considered to have met the laboratories NATA endorsed limits and are considered acceptable.

Representativeness

Sampling appropriate for media and analytes.

Sampling has been undertaken by recovery of soil samples via testpitting. These sampling methods are considered appropriate for the collection of soil samples to provide an idea of contaminant levels underlying the site.

Sampling has been undertaken by recovery of groundwater samples via a low flow peristaltic pump to minimise the drawdown in the wells. This sampling method is considered appropriate for the collection of groundwater samples to provide an idea of contaminant levels underlying the site.

Laboratory Duplicates

All laboratory duplicate results are found to be within the acceptable RPD limits of reporting.

Laboratory blanks

All levels of analytes in laboratory blanks were below detection limits.

Holding times

All soil analyses have been undertaken within holding times.

Holding times for four samples were exceeded for cyclohexane however this was below the laboratory LOR and are considered acceptable.

8.4 Comparability

The laboratory (Envirolab Services) was NATA accredited for all methods. Experienced JBS personnel undertook all sampling in accordance with standard JBS sampling methods.

8.5 Completeness

Documentation

All documentation is complete and correct.

Frequency for QC Samples

The frequency of analysis of all QC samples is considered appropriate.

8.6 Sensitivity

Laboratory analysis methods for all contaminants in soil and groundwater adopted during the investigation used limits of reporting significantly less than the site assessment criteria. This has ensured that contaminant concentrations could be confidently identified as being less than the adopted soil and groundwater site assessment criteria.

8.7 Assessment of Soil QA/QC

The results of the field and laboratory QA/QC program indicates that the data obtained from the soil sampling and analysis can be considered appropriately accurate for the objectives of the assessment. However it should be noted that there is potential heterogeneity of contaminant distributions throughout fill based materials.

8.8 Assessment of Groundwater QA/QC

The results of the field and laboratory QA/QC program indicates that the data obtained from the groundwater sampling and analysis can be considered appropriately accurate for the objectives of the assessment.

9 Soil Investigation Results

Observations made during field works have been recorded in testpit logs included in **Appendix G**. Sample locations are shown on **Figure 3**. Detailed laboratory reports and chain of custody documentation is presented in **Appendix H**. An assessment of data quality has found that the data are of a suitable quality for the intended purposes (**Section 8**).

9.1 Field Observations

Geology encountered at the site during the field works is summarised below. Soil bore logs are included in **Appendix G**. The following observations were made during the site works:

- The site has been filled with dredged silty sand, typically poorly graded and contain shell fragments. Twelve testpit locations in total reported shell fragments at depths ranging between 0.6 and 3.2 m bgs;
- The geology encountered at the site is summarised as follows:
    - Mottled light brown, dark brown and grey heterogeneous, fine grained sand to gravel fill. Dry to slightly moist, with low to moderate compaction;
    - In the eastern area of the site (grassed area), white, heterogeneous, soft sandy clay fill, dry to wet with low to medium plasticity;
    - Brown to dark brown/grey, homogeneous, fine grained sand fill underlying the fill layers, moist to saturated, with low to moderate compaction and shell fragments;
- Phosphogypsum was observed in ten test pit locations (TP03, TP04, TP06, TP07, TP11, TP12 and TP13, TP29, TP31, TP33) with thicknesses ranging from 0.2 and 1.0 m;
- Soils were observed as within the water table ranging from 1.2 to 2.7 m bgs across the site, and the water table was observed to be higher on the western portion of the site; and
- Observed seepage into the testpit excavations was reasonably fast and constant (**Appendix A**).

Olfactory odours were reported in four test pits (TP26, TP29, TP33 and TP36) across the site. A sweet, sickly odour was reported in TP26 and TP33, with a rotten organic odour reported in TP29. A rotten egg odour was reported in TP36.

Low level PID screening results ranged between 0 and 8.3 ppm, with the reported maximum at location TP17-1.0m. These levels are not indicative of the potential presence of VOCs, which is consistent with the analytical results reported in **Section 9.2**.

PASS field testing was conducted on samples collected at the groundwater table (or where there was visible evidence in the soil profile of water table fluctuation above the observed water table) from 19 testpits, as per the method described in ASSMAC (1998[9]). Field tests found the water pH ranged from 2.4 to 7.5 with pHF_{OX}[10] ranging from 2.1 to 7.4.

[9] *Acid Sulfate Soil Manual*, NSW Acid Sulfate Soil Management Advisory Committee, August 1998 (ASSMAC 1998)
[10] Field pH (pHF) and Field pH after oxidation (pHF_{ox})

Based on the field test results, selected soil samples were submitted to the laboratory for SPOCAS analysis as per the method in ASSMAC (1998) and are summarised in **Section 9.2.2** below.

As noted previously, parts of Kooragang Island, including the IPL facility, comprise land reclaimed by dredging and filling using Hunter River sediments. The observations made during test pitting are consistent with this historical reclamation, including the presence of shell fragments within soils.

9.2 Soil Analytical Results

The following section provides a summary of the soil analytical results for the ESA. The laboratory analysis reports are provided in **Appendix H** and the results are provided in **Tables A** and **B**.

9.2.1 Soil Analytical Results

Based on the field observations, 95 soil samples were submitted for laboratory analysis for selected nutrients, heavy metals, TPH, BTEX, PAHs, OCPs, PCBs, and asbestos. Relevant results are summarised as follows:

- BTEX, OCP and PCB compounds were not detected above the corresponding laboratory limits of reporting (LOR) for any sample analysed;
- PAHs were below the corresponding LORs in the majority of samples. Where PAHs were reported above LORs in eight samples (TP14 – 1.5m, TP15 – 0.5m, TP16 – 0.5m, TP20 – 1.0m, TP22 – 0.01m, TP26 – 0.01, TP30 – 0.01, TP54 – 1.5m). The maximum concentration were 0.28 mg/kg in benzo(a)pyrene and 7.88 mg/kg for total PAHs maximum, well below the adopted HILs of 5 mg/kg and 100 mg/kg respectively. There was no obvious evidence of potential PAH sources visible in the soil profile at these locations;
- TPH (C_{15}-C_{36}) fractions were detected at one location at a concentration of 1395 mg/kg, exceeding the adopted HILs (1000 mg/kg) for the site (TP26 – 0.01m). All other soil samples submitted to the laboratory for analysis did not detected concentrations of TPH fractions above LOR;
- Heavy metals were reported at concentrations below adopted HILs in all samples analysed;
- Asbestos was not detected in any soil sample analysed; and
- pH the soil samples ranged from 2.3 to 9 pH units.

Ammonia was reported in soil samples collected from locations TP14 and TP16 to TP19, TP22, TP24, TP26, TP27, TP30, TP32, TP35, TP39, TP46 and TP54 at concentrations up to 5000 mg/kg. The depths ranged from 0.01 to 3 mbgs within the fill material at the site, with higher ammonia concentrations reported at deeper depths and just above the water table. There is no endorsed HIL for ammonia available for comparison. Ammonia may be due to processes such as bacterial degradation and denitrification in oxygen-limited sediments (ANZECC/ARMCANZ 2004), or potential nutrients in fertilizers.

9.2.2 Acid Sulfate Soils

Acid sulfate soils were analysed as part of the site investigation conducted, the results are summarised as follows:

- Twelve soil samples were submitted for laboratory analysis for SPOCAS;

- Two locations, TP14 (2.5m) and TP17 (1.5m) presented characteristics of ASS due to titratable potential acidity (TPA) and/or TSA and S_{POS}% exceeding ASSMAC (1998) action criteria (except S_{POS}% at TP17) for medium-textured soils, assuming disturbance of <1000 tonnes soil may occur;
- Two locations, TP15 and TP16 presented characteristics of acidic soils due to TPA and/or TSA exceeding action criteria, but were not considered ASS as S_{POS}% was not reported above the LOR;
- One location, TP07, also exhibited potential acidic soil conditions (not ASS) based on pH, pH_{ox} and TPA/TSA results, although the TPA/TSA results were less than the action criteria; and
- The remaining eight locations did not present ASS characteristics based on SPOCAS results.

Liming rates reported by the laboratory for ASS at TP14 (0.09 % S_{POS}) and TP17 (0.01 % S_{POS}) were 15 and 5 kg $CaCO_3$ per tonne of soil respectively. However, actual treatment rates will be dependent on the amount of soil disturbance.

10 Groundwater Investigation Results

Observations during field works have been recorded on groundwater sampling forms included in **Appendix G**. Sample locations are shown on **Figure 3**. Detailed laboratory reports and chain of custody documentation is presented in **Appendix H**. An assessment of data quality has found that the data are of a suitable quality for the intended purposes (**Section 7**).

10.1 Field Observations and General Water Quality

Three groundwater monitoring wells (MW101, MW102 and MW103) were installed and sampled on the site as part of the investigation. A further 11 monitoring wells, external to the site were gauged to determine the direction of groundwater flow occurring at the IPL facility. Of these external wells certain locations were also sampled as part of the current assessment, specifically BH42/MW4, MW04, MW1/BH89, MW4A and MWB.

Water quality parameters, consisting of electrical conductivity, pH, temperature and dissolved oxygen were collected during groundwater sampling. The following was observed for groundwater the three monitoring wells sampled:

- Groundwater on site was observed to be clear and colourless with no sheen, turbidity or odours noted;
- MW04, MWA, MW101, MW102, MW103 were observed to have high levels of recharge during water sampling, with only minor variations in groundwater depth being recorded during sampling;
- MWB was purged and left for 12 hours before sufficient groundwater recharge had occurred to allow a sample to be collected;
- Groundwater electrical conductivity was relatively fresh at between 1730 µs/cm to 3.7 mS/cm, ranging from mildly acidic to mildly alkaline conditioning (5.2 to 7.56 pH units);
- Low levels of dissolved oxygen were recorded; and
- Temperature of groundwater was between 17.1 °C to 23.1°C.

The measured depth to groundwater ranged from 1.215 m below top of casing (btoc) to 3.053 m btoc. The wells were surveyed and the relative water elevations were collected. Contours of the standing water levels are shown on **Figure 4**, which infers that groundwater mounding occurs through the centre of the site with a north-south alignment. Groundwater flow appears occur outwards on both sides of the mound, migrating in both eastern and western directions towards the Hunter River, consistent with conditions reported in URS (2003).

By review of electrical conductivities recorded for groundwater underlying the site in URS 2003 and estimates of dissolved solids, the majority of the water would be classified as brackish. By reference to NHMRC (1996) 'Australian Drinking Water Guidelines' and NHMRC (2004) 'Australian Drinking water Guidelines' the water is classified as:

- Aesthetic Guideline – excessive scaling, corrosion and unsatisfactory taste; and
- Palatability – unacceptable.

The groundwater is considered unsuitable for human consumption. The likely scaling and corrosion of pipelines would make the groundwater unsuitable for industrial uses.

10.2 Groundwater Analytical Results

The following section provides a summary of the groundwater analytical results for the assessment. The laboratory analysis reports are provided in **Appendix H** and the results are provided in **Tables C** and **D.**

In total thirteen primary groundwater samples were submitted for laboratory analysis for selected nutrients, heavy metals, TPH, BTEX and PAHs as part of the latest assessment. Relevant groundwater results are summarised as follows:

- Ammonia concentrations ranged from 0.009 mg/L (BH42/MW04) to 58 mg/L (MW102) were reported. To assess the potential for ammonia concentrations in groundwater to impact down gradient receptors, comparison of the results was made to the 95% aquatic marine (0.91mg/L) criterion value. Ammonia concentrations in four of the eight samples (MW1, MW101, MW4 and BH42/MW4) were compliant. Results in four samples (MW102, MW103, MW4a and MWB) ranged from 1.7 to 58 mg/L and were in excess of the marine water criterion.
- Total nitrogen results were consistent with ammonia results at each location, with results ranging from 66,000 µg/L (MWA) to 0.001 µg/L (MW101) exceeding adopted criteria for nitrate-N (10,000 µg/L) and nitrite-N (1,000 µg/L);
- Concentrations of heavy metals were above the adopted site criteria in MW102 for cadmium and nickel. Zinc concentrations in MW102 and MW103 were also above the adopted site criteria. Remaining groundwater samples submitted for analysis were below the adopted criteria;
- Phosphorus concentrations ranged from 0.2 mg/L to 220 mg/L; and
- TPH, BTEX and PAHs, were not reported above the LOR in any of the groundwater samples.

11 Discussion

11.1 DQO Decisions

The results are discussed in the following sections in relation to the identified decisions developed as part of the DQO process (**Section 5.1**):

- Are there any unacceptable risks to likely future on-site receptors from soil with regards to background soil concentrations?
- Are there any impacts of chemical mixtures?
- Are there any aesthetic issues?
- Are there any unacceptable risks to future site users or down-gradient sensitive receptors from groundwater?
- Is there any evidence of, or potential for, migration of contaminants from the site?
- Is the site management strategy appropriate?

11.1.1 Risks to Likely Future Onsite Receptors from Soil

Representative samples of subsurface fill material were analysed for a broad range of identified potential contaminants including heavy metals, TPH, BTEX, PAHs, OCPs, PCBs, and asbestos. The analytical results indicate that there is a low risk to future on-site receptors. However, surface soil sampled from one location, TP26, at the south central portion of the site, potentially represents a risk of impact to future on-site receptors of soil. The soil sampled 0.01m bgs at this location contained TPH (C_{15}-C_{36}) concentrations above the adopted site criteria within the fill material, it was noted that phosphogypsum, a sweet odour and PID readings were reported at this depth. The test pit is adjacent to one of the main routes to the stockpile area and potentially could be due to a historical spill or release from site plant. The 95% upper confidence limit (UCL) of TPH (C_{10}-C_{36}) was calculated for the 44 soil samples analysed for these contaminants. The 95% UCL of the average TPH concentration in soil was calculated to be 203 mg/kg with a dataset standard deviation of 192, assuming a normal distribution.

It is considered that the material at this location is suitable to remain onsite without the need for remediation given that:

- The TPH C_{10}-C_{36} concentration reported in sample TP26/0.01m was less than 2.5 times the criterion value of 1000 mg/kg;
- The standard deviation of the TPH C_{10}-C_{36} dataset was less than half the criterion value of 1000 mg/kg; and
- The 95% UCL of the average TPH C_{10}-C_{36} concentration is less than the criterion value of 1000 mg/kg.

A copy of the Pro UCL output is provided in **Appendix J**.

11.1.2 Chemical Mixtures

As noted above, soil contaminant concentrations were reported above the assessment criteria for commercial/industrial for one of the test pits (TP26) advanced across the site. The test pit is adjacent to one of the main routes to the stockpile area and potentially could be due to a historical spill or release from site plant.

Five above ground acid storage holders are present on the facility.

11.1.3 Aesthetic Issues

Assessment of soil physical properties including surface staining, odour, inclusions and consistency during the field investigation identified no surface staining. Olfactory odours were reported in four test pits (TP26, TP29, TP33 and TP36) across the site. A sweet, sickly odour was reported in TP26 and TP33, with a rotten organic odour reported in TP29. A rotten egg odour was reported in TP36.

Phosphogypsum was also observed at several locations.

11.1.4 Risks to Likely Future Onsite Receptors from Groundwater

Representative samples of groundwater were analysed for a broad range of identified potential contaminants including heavy metals, TPH/BTEX, PAHs and nutrients. With the exception of ammonia, the analytical results indicate that there is a low risk to future site users or down-gradient sensitive receptors from groundwater. Ammonia concentrations exceeded the adopted site criteria for drinking water in seven of eight samples analysed from the site, and may potentially pose a risk to future site users.

However these exceedances are considered not to affect the suitability of the site for the proposed use, noting that that the potential for human beneficial uses of groundwater underlying any part of the IPL facility are significantly limited. The site is 150m north of a declared remediation site (i.e. the Orica controlled site). It is also understood that the declared site is being regulated for concentrations of ammonia and arsenic impact in groundwater. Noting that URS (2003) has reported saturated subsurface soils on the Kooragang Island have relatively high hydraulic conductivities, it is unlikely that groundwater extraction would be possible on the site without the potential for mobilisation of off site contamination.

With respect to risks to future site users from ammonia in groundwater, it is considered that remediation of groundwater is not required.

11.1.5 Migration of Contaminants from the Site and Groundwater Conditions

Based upon physical observations and chemical assessment of soil and groundwater samples obtained from locations across the site, significant widespread soil impacts associated with the imported fill material or former use of the site is not apparent. The site is predominantly grass-covered and unsealed and it is considered that the potential for windblown dust contamination from the site is moderate.

Given the large area of exposed soil, the potential for contamination migration via surface water movement and infiltration of water and subsequent migration through the soil profile are also considered to be a moderate risk from ammonia.

Ammonia has been reported by the laboratory as 'total Ammonia as N'. This includes both ammonia and ammonium. Ammonia nitrogen occurs in two forms in water. These include NH_3 (ammonia or unionized ammonia) and NH4+ (ammonium or ionised ammonia). The occurrence of ammonia relative to ammonium (and vice versa) in the aquifer is pH and temperature dependent. Above pH 9 the unionised form of ammonia (NH_3) has the dominant presence in water. The unionised form of ammonia is also the more toxic form to fish and other living organisms (URS, 2003).

The field measured pH values recorded on site at the time of the current sampling event were in the range of 5.23 to 7.56, including the wells containing the highest ammonia concentrations. All pH values were less than 9, suggesting that the total ammonia detected in groundwater samples from the site, is predominantly present in the less toxic ammonium form.

The range of ammonia concentrations reported in groundwater samples collected from the site suggests that while elevated values were present in the centre of the site, ammonia concentrations downgradient of the central groundwater mounding area are low and generally below or close to the adopted assessment criteria.

Considering all of the above factors it is considered that ammonia concentrations reported within the defined site boundaries do not pose an unacceptable risk.

Furthermore it is noted that the total ammonia/ ammonium impact is attributed to fertiliser manufacture on the site, which the site historical review indicates has occurred on the site since 1965. The detected concentrations of ammonium in groundwater are considered to be the maximum concentrations that will occur at the site, given that all manufacturing works are now subject to regulation under the EPL. As such the potential for significant on-going impacts to soil and groundwater is considered to be unlikely.

Similarly it is noted that heavy metals concentrations in samples MW102 and MW103 less than or close to the site assessment criteria and as such are considered not to pose an unacceptable risk.

12 Conclusions and Recommendations

12.1 Conclusions

Based on the field observations and analytical results presented within this report, and subject to the limitations in **Section 13**, the following conclusions are drawn:

- There were no visible fragments of asbestos containing materials (ACM) observed on the ground surface or in the subsurface fill material during site investigations.
- Observations of potential chemical contamination (e.g. staining, odours) were observed in four test pits (TP26, TP29, TP33 and TP36) across the site.
- Soils at the site comprised surficial silty/sandy topsoil underlain by clayey silt and sandy sediments, some of which are likely to represent dredged material used to reclaim parts of the island from the Hunter River.
- The concentration of TPH C_{10} – C_{36} was reported above the adopted commercial / industrial criteria (HIL-F) in one sample collected from the surface fill material at the site. The concentrations of TPH C_{10} – C_{36} in all other samples analysed were below the LOR. The 95% Upper Confidence Limit (UCL) was calculated for the 44 soil samples collected and analysed for TPH C_{10} – C_{36}. The 95% UCL of the average concentration of TPH C_{10} – C_{36} in the soil was 203 mg/kg.
- Concentrations of remaining contaminants of potential concern (COPCs) in soil were below adopted commercial / industrial criteria (HIL-F) and as such potential contaminants in soil at the site do not appear to represent potential human health risk during future commercial / industrial development at the site;
- Acid Sulfate Soil (ASS) conditions were reported at two locations assessed (TP14 and TP17), while remaining soils assessed did not exhibit ASS conditions including TP07, TP15 and TP16 which exhibited acidic soil (not ASS) conditions.
- Field tests indicated groundwater at the site was fresh to brackish, and was mildly acidic to mildly alkaline;
- Based on the elevation of groundwater within each of the thirteen wells gauged, the direction of groundwater flow was inferred to occur in two directions, to the south west and north east, with mounding occurring at the centre of the site.
- Ammonia (and associated nitrogen) concentrations in half of all groundwater samples analysed exceeded adopted guideline for protection of aquatic ecosystems. The reported ammonia concentrations indicate that, while elevated values are present in the centre of the site, the concentrations downgradient of the centre are low, generally below or close to the adopted assessment criteria. As such it is considered that the ammonia concentrations reported within the defined site boundaries do not pose an unacceptable risk to down gradient receptors.

Based on the findings of this investigation and subject to the recommendations in **Section 12.2**, the site is suitable for commercial/industrial use without further assessment, remediation or management.

12.2 Recommendations

Should the site be redeveloped for continued commercial / industrial land use then it is recommended that a construction environmental management plan (CEMP) be prepared and implemented. The CEMP should consider safety and construction requirements appropriate for the soil and groundwater conditions at the site, including ASS/PASS.

13 Limitations

This report has been prepared for use by the client who commissioned the works in accordance with the project brief only and has been based in part on information obtained from other parties. The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

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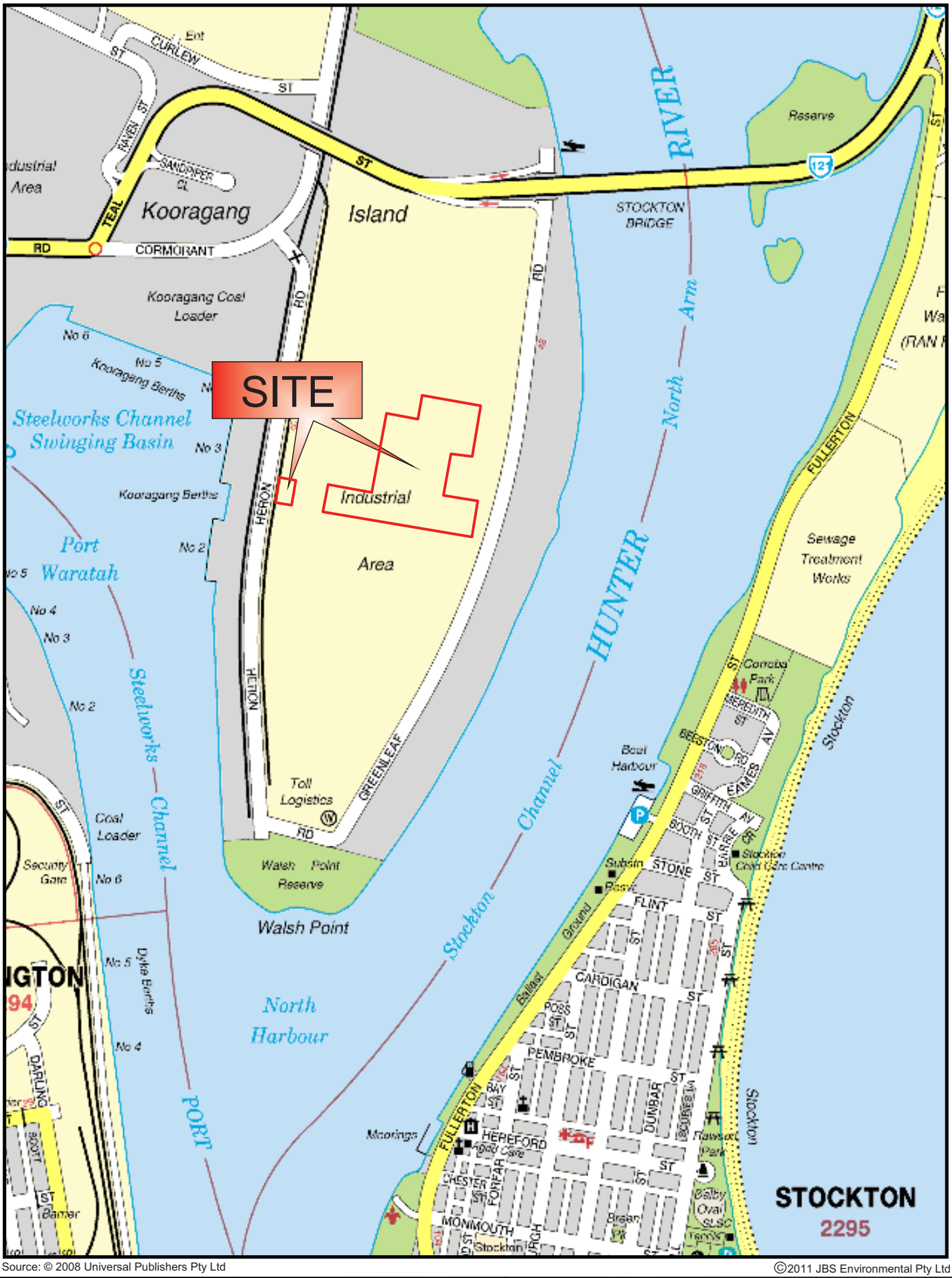
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements and site history, not on sampling and analysis of all media at all locations for all potential contaminants.

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

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

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

Figures



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Datum: MGA94 Zone 56 - AHD

Rev	Description	Drn.	Date
A	Original Issue - R003	SE	29-11-2011

Legend:

Approximate Site Boundary

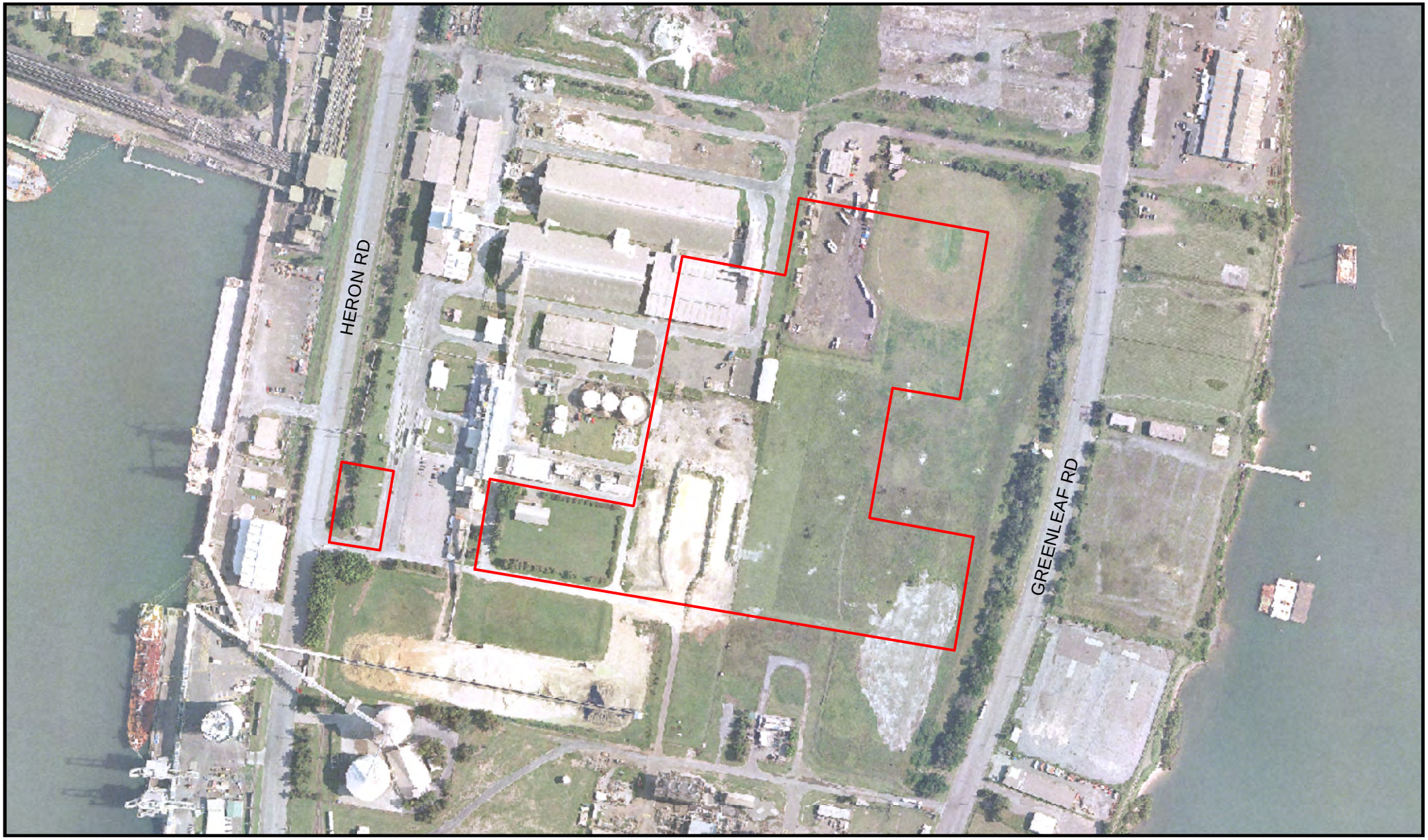
JBS ENVIRONMENTAL

Figure 1: Site Location

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_01



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Datum: MGA94 Zone 56 - AHD

Rev	Description	Drn.	Date
A4			
A	Original Issue - R003	RF	07-11-2011

Legend:

Approximate Site Boundary

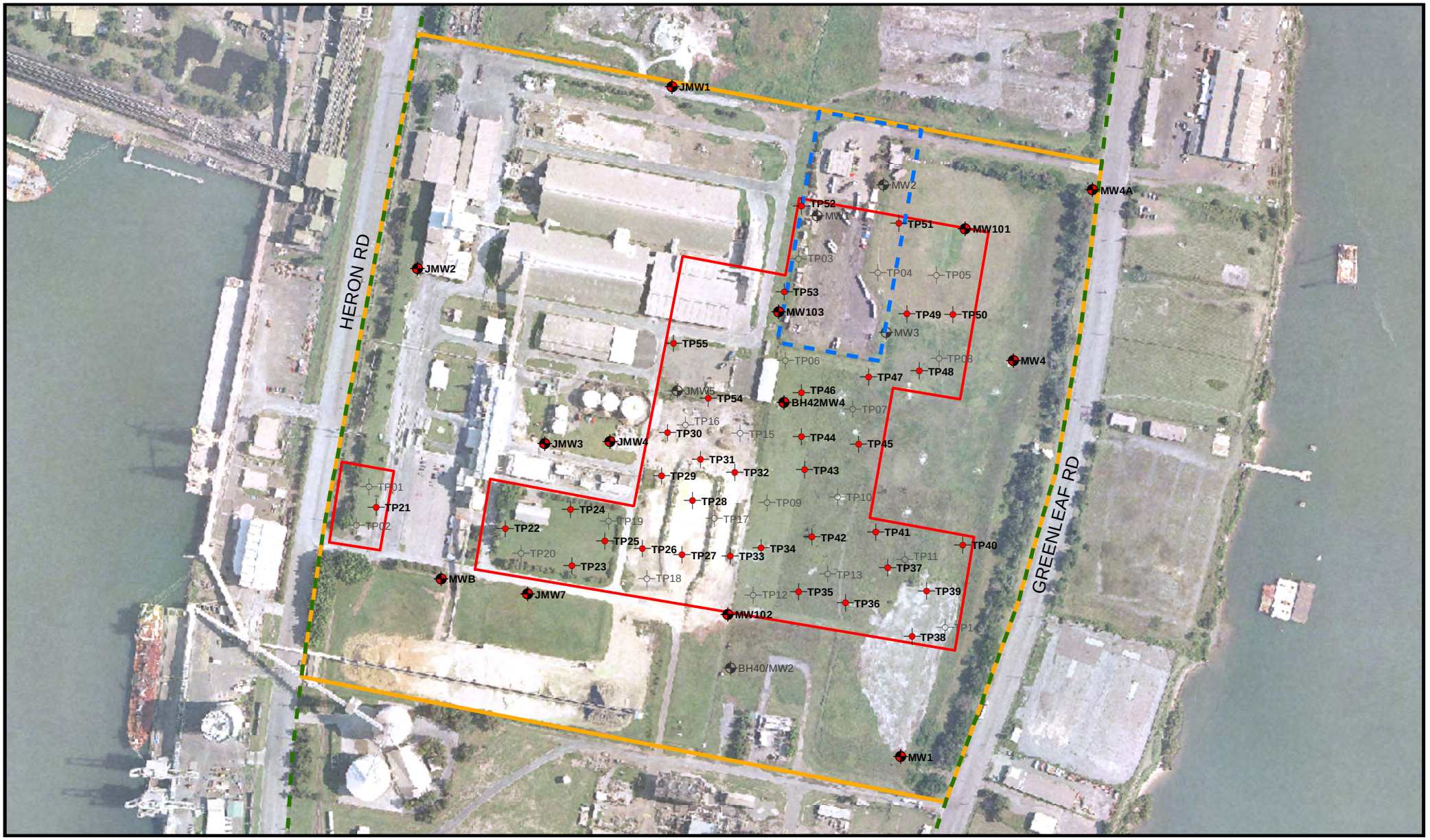
JBS ENVIRONMENTAL

Figure 2: Site Layout

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_02



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Scale: 1:4,500

Datum: MGA94 Zone 56 - AHD

Rev	Description	Drn.	Date
A4			
A	Original Issue - R03	RF	07-12--2011

Legend:

- Approximate Site Boundary
- Approximate Study Boundary JBS (2011)
- Approximate Study Boundary JBS (2009)
- Approximate Study Boundary URS (2003) area continues to the north and south
- Groundwater Monitoring Well Location - Gauged November 2011
- Groundwater Monitoring Wells - Lost/Destroyed
- Test Pits Locations - JBS November 2011
- Test Pit Locations - JBS June 2011

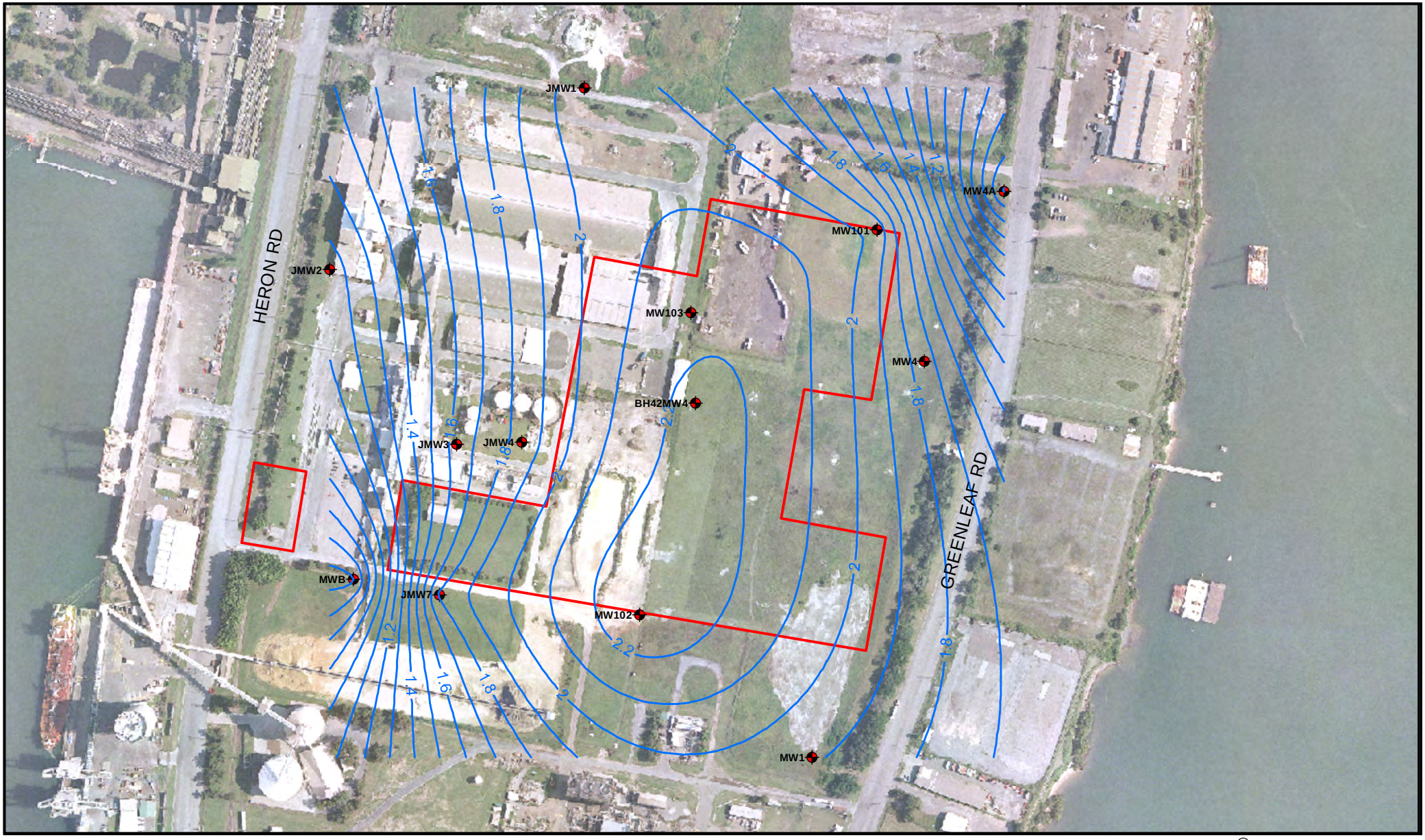
JBS ENVIRONMENTAL

Figure 3: Sample Locations and Study Areas of Former Investigations

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_03



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Scale: 1:4,500

Datum: MGA94 Zone 56 - AHD

A4

Rev	Description	Drn.	Date
A	Original Issue - R003	RF	07-12.2011

Legend:

- Approximate Site Boundary
- Groundwater Monitoring Well Location - Guaging 7-11-11
- Groundwater Elevation (mAHD)

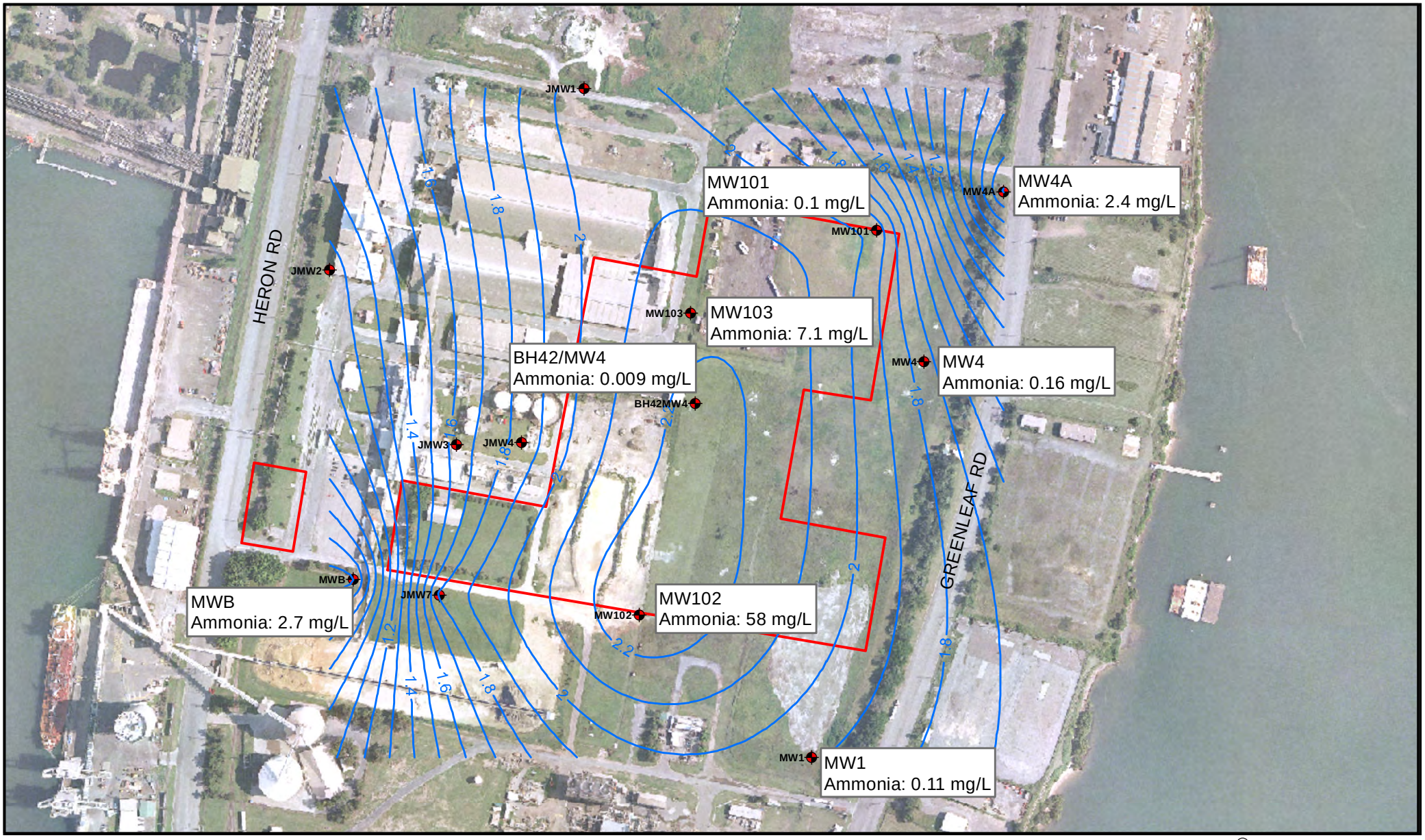
JBS ENVIRONMENTAL

Figure 4: Contours of Standing Water Level

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_04



Source: (c) 2011 Land and Property Management, NSW

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Scale: 1:4,500

Datum: MGA94 Zone 56 - AHD

Rev	Description	Drn.	Date
A4			
A	Original Issue - R003	RF	07-12.2011

Legend:

- Approximate Site Boundary
- Groundwater Monitoring Well Location - Guaging 7-11-11
- Groundwater Elevation (mAHD)

JBS ENVIRONMENTAL

Figure 5: Ammonia Concentrations in Groundwater

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_05

Tables

Table A: Summary Data - Soil Analysis - BTEX, Halogenated Benzenes, Inorganics, Metals, TPH and SPOCAS
Project: ESA, IPL Facility, KI
Client: IPL
Project Number: 41699

			BTEX							Inorganics						Lead	Metals									SPOCAS							TPH				
			Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Hexachlorobenzene	Ammonia	Moisture	pH (aqueous extract)	Sulphate	Sulphur as S	TOC	Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Phosphorus	Potassium	Zinc	Acid Reacted Calcium	Calcium in Peroxide	KCl Extractable Calcium	KCl Extractable Magnesium	Magnesium in Peroxide	Peroxide Oxidisable Sulfur	Sulfur in Peroxide	TPH C6 - C9	TPH C10 - C14	TPH C15 - C28	TPH C29-C36	TPH+C10 - C36 (Sum of total
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	pH 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
EQL			0.2	1	0.5	2	1		0.1	0.5	0.1		2	10	1000	1	4	0.5	1	1	0.1	1	10	10	1	0.005	0.005	0.005	0.005	0.005	0.005	0.005	25	50	100	100	
NEPM 1999 HIL F																1500	500	100	600000	5000	75	3000			35000												
Sample ID	**Date**	**Depth**																																			
BH101	1/11/2011	1	<0.2	<1	<0.5	<2	<1	<3	-	1	6	7.8	-	710	-	4	<4	<0.5	3	3	<0.1	2	86	170	20	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
BH101	1/11/2011	3	-	-	-	-	-	-	-	-	18	-	-	-	1800	1	<4	<0.5	3	1	<0.1	2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
BH102	1/11/2011	0.5	<0.2	<1	<0.5	<2	<1	<3	-	3.2	17	**4.9**	-	50,000	-	**260**	<4	7.3	11	15	0.2	<1	20,000	560	210	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
BH102	1/11/2011	3	-	-	-	-	-	-	-	-	-	-	-	-	1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH103	1/11/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	1.8	18	6.8	-	280	-	1	<4	<0.5	2	2	<0.1	5	340	120	54	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
BH103	1/11/2011	3	-	-	-	-	-	-	-	-	-	-	-	-	1700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP01	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP01	7/06/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	4.4	8.8	-	89	-	1	<4	<0.5	1	<1	<0.1	1	61	-	3	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP01	7/06/2011	2	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP01	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.13	0.19	0.06	<0.005	<0.005	<0.005	0.01	-	-	-	-	-
TP02	7/06/2011	0.1	-	-	-	-	-	-	<0.1	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP02	7/06/2011	0.5	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	6.4	6.2	-	3500	-	2	<4	2.6	5	<1	1.3	<1	1500	-	22	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP03	7/06/2011	1	<0.2	<1	<0.5	<2	<1	<3	-	-	5.2	-	-	-	-	6	4	1.8	5	6	<0.1	5	-	-	100	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP04	7/06/2011	0.1	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	27	**5.2**	-	130,000	-	4	<4	12	1	2	0.4	<1	1300	-	4	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP05	7/06/2011	0.1	-	-	-	-	-	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP05	7/06/2011	0.5	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	31	**4.4**	-	150,000	-	11	<4	13	1	2	0.8	<1	1200	-	3	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP06	7/06/2011	0.1	<0.2	<1	<0.5	<2	<1	<3	-	-	30	-	-	-	-	8	<4	11	2	4	2.1	<1	-	-	9	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP06	7/06/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	22	6.8	-	44,000	-	4	<4	3.1	3	2	1.1	2	820	-	18	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP06	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	1.2	1.3	0	<0.005	<0.005	1.1	-	-	-	-	-
TP07	7/06/2011	0.3	-	-	-	-	-	-	-	-	-	-	8200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP07	7/06/2011	1.3	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	16	**3.2**	-	47,000	-	6	<4	1.7	<1	<1	2.9	<1	200	-	1	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP07	7/06/2011	2.3	-	-	-	-	-	-	-	-	-	-	7000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP07	7/06/2011	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	1.9	2.2	0	<0.005	<0.005	1.7	-	-	-	-	-
TP08	7/06/2011	0.1	<0.2	<1	<0.5	<2	<1	<3	<0.1	<0.5	34	**5**	-	130,000	-	13	<4	13	5	6	1.6	<1	3000	-	40	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP09	7/06/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	12	**5.9**	-	14,000	-	2	<4	3	4	5	<0.1	6	5000	-	51	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP10	7/06/2011	2.5	<0.2	<1	<0.5	<2	<1	<3	-	-	16	-	-	-	-	<1	<4	<0.5	2	<1	<0.1	2	-	-	4	0.23	0.31	0.09	0	0.007	0.03	0.05	<25	<50	<100	<100	<250
TP11	7/06/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	13	6.5	-	29,000	-	5	<4	3.5	6	2	0.2	4	2700	-	44	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP12	7/06/2011	0.1	<0.2	<1	<0.5	<2	<1	<3	<0.1	<0.5	8.9	**4.9**	-	22,000	-	11	<4	1.1	2	2	<0.1	<1	410	-	4	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP12	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	6700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP12	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	6400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP13	7/06/2011	1	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	9	**5.9**	-	670	-	1	<4	<0.5	4	1	<0.1	4	150	-	10	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP13	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	0.31	0.31	0	<0.005	<0.005	0.17	-	-	-	-	-
TP14	7/06/2011	0.1	-	-	-	-	-	-	<2	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP14	7/06/2011	1	-	-	-	-	-	-	-	-	-	-	9500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP14	7/06/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	17	21	**2.3**	-	67,000	-	28	9	4.7	4	16	0.6	<1	2300	-	18	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP14	7/06/2011	2.5	<0.2	<1	<0.5	<2	<1	<3	-	14	22	**2.6**	13,000	8700	-	2	5	<0.5	7	31	<0.1	8	5000	-	13	0.021	0.53	0.51	<0.005	<0.005	0.09	0.69	<25	<50	<100	<100	<250
TP15	7/06/2011	0.5	<0.2	<1	<0.5	<2	<1	<3	-	-	7.4	-	-	-	-	90	<4	0.8	2	32	0.3	<1	-	-	64	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP15	7/06/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	1.8	2	<0.005	<0.005	<0.005	1.8	-	-	-	-	-
TP16	7/06/2011	0.1	-	-	-	-	-	-	<0.1	-	8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP16	7/06/2011	0.5	<0.2	<1	<0.5	<2	<1	<3	-	75	9	**3.2**	-	13,000	-	11	8	<0.5	7	10	0.1	4	980	-	24	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP16	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	1.2	1.3	0	<0.005	<0.005	1.2	-	-	-	-	-
TP17	7/06/2011	0.5	<0.2	<1	<0.5	<2	<1	<3	-	160	8.3	**3.7**	-	39,000	-	12	<4	<0.5	2	9	<0.1	3	380	-	4	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP17	7/06/2011	1	<0.2	<1	<0.5	<2	<1	<3	-	-	19	-	-	-	-	8	<4	<0.5	1	2	<0.1	<1	-	-	6	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP17	7/06/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.031	1.6	1.5	<0.005	0.005	0.1	1.5	-	-	-	-	-
TP18	7/06/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	52	17	7.3	-	12,000	-	2	<4	0.7	6	3	<0.1	9	520	-	52	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP18	7/06/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.14	0.78	0.64	0.005	0.014	0.03	0.52	-	-	-	-	-
TP19	7/06/2011	0.1	-	-	-	-	-	-	<0.1	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP19	7/06/2011	2	<0.2	<1	<0.5	<2	<1	<3	-	0.6	6.8	7.3	-	420	-	3	<4	0.5	4	10	<0.1	5	410	-	34	0.018	0.21	0.19	0	<0.005	<0.005	0.08	<25	<50	<100	<100	<250
TP20	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP20	7/06/2011	1	<0.2	<1	<0.5	<2	<1	<3	<0.1	<0.5	17	7.9	-	190	-	34	<4	1.2	8	38	0.1	5	3700	-	86	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP20	7/06/2011	2	-	-	-	-	-	-	-	-	-	-	130	-	-	-	-	-	-	-	-	-	-	-	-	0.12	0.16	0.05	<0.005	<0.005	0.005	0.01	-	-	-	-	-
TP21	3/11/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	5.4	8.7	-	110	-	<1	<4	<0.5	2	1	<0.1	2	43	-	3	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP22	2/11/2011	0.01	<0.2	<1	<0.5	<2	<1	<3	-	1.6	8.4	**5.9**	-	310	-	**110**	5	5.4	18	31	0.2	6	17,000	450	160	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP22	2/11/2011	2	-	-	-	-	-	-	-	-	18	-	-	-	-	<1	<4	<0.5	1	<1	<0.1	1	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
TP23	2/11/2011	1	-	-	-	-	-	-	-	-	20	-	-	-	-	1	<4	<0.5	2	<1	0.4	2	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
TP23	2/11/2011	1.5	-	-	-	-	-	-	-	-	18	8.9	-	-	-	1	<4	<0.5	4	1	<0.1	4	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-
TP24	2/11/2011	0.01	-	-	-	-	-	-	-	-	11	-	-	-	-	21	<4	3.1	6	41	0.4	5	-	-	150	-	-	-	-	-	-	-	-	-	-	-	-
TP24	2/11/2011	0.5	<0.2	<1	<0.5	<2	<1	<3	-	1.5	12	9	-	130	-	2	<4	<0.5	2	1	<0.1	2	180	160	9	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP25	2/11/2011	0.01	-	-	-	-	-	-	-	-	8.6	6.2	-	-	-	94	<4	2.5	11	11	0.1	3	-	-	130	-	-	-	-	-	-	-	-	-	-	-	-
TP26	2/11/2011	0.01	<0.2	<1	<0.5	<2	<1	<3	-	10	18	**2.4**	-	78,000	-	42	<4	0.7	5	8	0.4	<1	8800	53	18	-	-	-	-	-	-	-	<25	<50	**910**	**460**	**1395**
TP27	2/11/2011	0.5	-	-	-	-	-	-	-	-	5.9	-	-	-	-	2	<4	<0.5	3	1	<0.1	3	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-
TP27	2/11/2011	3	<0.2	<1	<0.5	<2	<1	<3	-	**1100**	20	**4.3**	-	12,000	-	2	<4	<0.5	4	6	<0.1	7	750	390	21	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP28	4/11/2011	0.2	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	18	**4.1**	-	89,000	-	8	<4	3.8	3	5	2.2	<1	1700	-	5	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP29	2/11/2011	0.5	-	-	-	-	-	-	-	-	6.4	**3.8**	-	-	-	3	<4	<0.5	<1	<1	<0.1	<1	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
TP29	2/11/2011	1	-	-	-	-	-	-	-	-	9	-	-	-	-	1	<4	<0.5	<1	<1	<0.1	<1	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
TP30	3/11/2011	0.01	<0.2	<1	<0.5	<2	<1	<3	-	1.9	17	7.2	-	2300	-	9	9	26	75	37	0.3	9	140,000	-	290	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP31	2/11/2011	0.5	-	-	-	-	-	-	-	-	34	-	-	-	-	7	<4	3.2	5	6	7.5	<1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
TP31	2/11/2011	1	-	-	-	-	-	-	-	-	9.2	**4.2**	-	-	-	11	<4	<0.5	<1	5	<0.1	<1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
TP32	2/11/2011	2	<0.2	<1	<0.5	<2	<1	<3	-	3.3	16	**3.7**	-	13,000	-	4	<4	<0.5	<1	<1	<0.1	<1	240	65	<1	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP33	2/11/2011	1.5	-	-	-	-	-	-	-	-	17	**3.6**	-	-	-	4	<4	<0.5	<1	<1	<0.1	<1	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
TP34	3/11/2011	1	-	-	-	-	-	-	-	-	14	**5.9**	-	-	-	1	<4	1.1	4	1	<0.1	5	-	-	39	-	-	-	-	-	-	-	-	-	-	-	-
TP35	3/11/2011	0.01	<0.2	<1	<0.5	<2	<1	<3	-	1.3	30	**4.2**	-	110,000	-	9	<4	1.5	2	3	3	<1	1000	-	4	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP36	4/11/2011	0.5	-	-	-	-	-	-	-	-	4.5	**4.2**	-	-	-	3	<4	<0.5	4	3	1.8	<1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-

Table A: Summary Data - Soil Analysis - BTEX, Halogenated Benzenes, Inorganics, Metals, TPH and SPOCAS
Project: ESA, IPL Facility, KI
Client: IPL
Project Number: 41699

			BTEX							Inorganics						Lead	Metals									SPOCAS							TPH				
			Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Hexachlorobenzene	Ammonia	Moisture	pH (aqueous extract)	Sulphate	Sulphur as S	TOC	Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Phosphorus	Potassium	Zinc	Acid Reacted Calcium	Calcium in Peroxide	KCl Extractable Calcium	KCl Extractable Magnesium	Magnesium in Peroxide	Peroxide Oxidisable Sulfur	Sulfur in Peroxide	TPH C6 - C9	TPH C10 - C14	TPH C15 - C28	TPH C29-C36	TPH+C10 - C36 (Sum of total
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	pH 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
EQL			0.2	1	0.5	2	1		0.1	0.5	0.1		2	10	1000	1	4	0.5	1	1	0.1	1	10	10	1	0.005	0.005	0.005	0.005	0.005	0.005	0.005	25	50	100	100	
NEPM 1999 HIL F																1500	500	100	600000	5000	75	3000			35000												
Sample ID	**Date**	**Depth**																																			
TP37	4/11/2011	0.5	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	23	6.1	-	17,000	-	2	<4	6	2	2	1.7	<1	2100	-	16	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP37	4/11/2011	1	-	-	-	-	-	-	-	-	30	-	-	-	-	5	<4	13	5	2	3.2	<1	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-
TP38	4/11/2011	0.9	<0.2	<1	<0.5	<2	<1	<3	-	0.6	15	**2.5**	-	59,000	-	41	<4	6	<1	1	0.8	<1	520	-	1	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP39	4/11/2011	2	<0.2	<1	<0.5	<2	<1	<3	-	2.1	21	**3.2**	-	7200	-	2	<4	<0.5	6	2	<0.1	<1	3200	-	3	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP40	4/11/2011	0.03	-	-	-	-	-	-	-	-	18	**4.7**	-	-	-	2	<4	9.5	2	2	1.6	<1	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-
TP41	4/11/2011	2.9	-	-	-	-	-	-	-	-	18	8.3	-	-	-	<1	<4	<0.5	1	<1	<0.1	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
TP42	3/11/2011	3	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	16	7.7	-	690	-	2	<4	<0.5	4	2	<0.1	5	110	-	14	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP43	3/11/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	21	**5.2**	-	2600	-	2	<4	<0.5	6	9	<0.1	3	1000	-	160	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP44	3/11/2011	1	-	-	-	-	-	-	-	-	19	**5.9**	-	-	-	2	<4	4	3	3	0.2	2	-	-	84	-	-	-	-	-	-	-	-	-	-	-	-
TP45	3/11/2011	0.5	-	-	-	-	-	-	-	-	26	**5.4**	-	-	-	2	<4	8.5	1	1	0.6	<1	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-
TP46	3/11/2011	0.01	-	-	-	-	-	-	-	-	21	-	-	-	-	4	<4	11	2	2	2.8	<1	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-
TP46	3/11/2011	0.5	<0.2	<1	<0.5	<2	<1	<3	-	0.7	27	**4.3**	-	99,000	-	3	<4	12	1	2	1.9	<1	1400	-	2	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP47	3/11/2011	1	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	5.8	7.6	-	200	-	4	<4	0.9	3	1	<0.1	2	350	-	27	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP48	3/11/2011	0.01	-	-	-	-	-	-	-	-	5.8	**5.4**	-	-	-	2	<4	9.9	2	2	0.8	<1	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-
TP49	3/11/2011	2	-	-	-	-	-	-	-	-	21	8.4	-	-	-	<1	<4	<0.5	3	<1	<0.1	3	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
TP50	3/11/2011	1.1	<0.2	<1	<0.5	<2	<1	<3	-	<0.5	7.1	8	-	220	-	<1	<4	2.8	2	<1	0.2	2	1600	-	21	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP51	3/11/2011	0.01	-	-	-	-	-	-	-	-	28	**5.2**	-	-	-	3	<4	11	2	2	0.5	<1	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-
TP52	3/11/2011	0.5	-	-	-	-	-	-	-	-	3.4	8.1	-	-	-	<1	<4	<0.5	2	<1	<0.1	2	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-
TP53	3/11/2011	0.5	-	-	-	-	-	-	-	-	3.3	-	-	-	-	10	5	0.9	7	6	<0.1	4	-	-	45	-	-	-	-	-	-	-	-	-	-	-	-
TP53	3/11/2011	2.5	-	-	-	-	-	-	-	-	8.4	6.7	-	-	-	5	<4	0.7	6	4	<0.1	4	-	-	36	-	-	-	-	-	-	-	-	-	-	-	-
TP54	2/11/2011	1.5	<0.2	<1	<0.5	<2	<1	<3	-	**5000**	13	**5.1**	-	27,000	-	20	<4	2.7	34	19	0.4	6	30,000	2800	750	-	-	-	-	-	-	-	<25	<50	<100	<100	<250
TP55	2/11/2011	0.5	-	-	-	-	-	-	-	-	3.1	**5.2**	-	-	-	1	<4	<0.5	4	7	<0.1	<1	-	-	19	-	-	-	-	-	-	-	-	-	-	-	-

Bold (NEHF - F), Health-based Investigation Levels (DEC 2006)

Table A (cont.): Summary Data - Soil Analysis - Organochlorine Pesticides, PAHs, PCBs
Project: ESA, IPL Facility, KI
Client: IPL
Project Number: 41699

			Organochlorine Pesticides																				PAH / Phenols															Polychlorinated Biphenyls						
			4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)&(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
			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	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
EQL			0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 1999 HIL F						50							1000								50							5																		
Sample ID	**Date**	**Depth**																																											
BH101	1/11/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH101	1/11/2011	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH102	1/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.1	0.09	<0.2	<0.1	0.2	<0.1	0.3	<0.1	<0.1	<0.1	0.2	0.3	-	-	-	-	-	-	-
BH102	1/11/2011	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH103	1/11/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
BH103	1/11/2011	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP01	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP01	7/06/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP01	7/06/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP01	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP02	7/06/2011	0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP02	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP03	7/06/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP04	7/06/2011	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP05	7/06/2011	0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP05	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP06	7/06/2011	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP06	7/06/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP06	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP07	7/06/2011	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP07	7/06/2011	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP07	7/06/2011	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP07	7/06/2011	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP08	7/06/2011	0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP09	7/06/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP10	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP11	7/06/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP12	7/06/2011	0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP12	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP12	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP13	7/06/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP13	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP14	7/06/2011	0.1	<2	<2	<2	<4	<2	<2	<2	<2	<2	<2	<6	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	<2	<2	<2	<2	<2	<2
TP14	7/06/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP14	7/06/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.1	0.11	0.2	<0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1	0.1	-	-	-	-	-	-	-
TP14	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP15	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	0.06	<0.2	<0.1	0.1	<0.1	0.3	<0.1	<0.1	<0.1	0.2	0.2	-	-	-	-	-	-	-
TP15	7/06/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP16	7/06/2011	0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP16	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	0.08	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP16	7/06/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP17	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP17	7/06/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP17	7/06/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP18	7/06/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP18	7/06/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP19	7/06/2011	0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP19	7/06/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP20	7/06/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP20	7/06/2011	1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP20	7/06/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP21	3/11/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP22	2/11/2011	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.2	0.28	0.4	0.2	0.2	<0.1	0.4	<0.1	0.2	<0.1	0.1	0.4	-	-	-	-	-	-	-
TP22	2/11/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP23	2/11/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP23	2/11/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP24	2/11/2011	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A (cont.): Summary Data - Soil Analysis - Organochlorine Pesticides, PAHs, PCBs
Project: ESA, IPL Facility, KI
Client: IPL
Project Number: 41699

			Organochlorine Pesticides																				PAH / Phenols															Polychlorinated Biphenyls						
			4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)&(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260
			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	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	mg/kg
EQL			0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 1999 HIL F						50							1000								50							5																		
Sample ID	**Date**	**Depth**																																												
TP24	2/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP25	2/11/2011	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP26	2/11/2011	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	<0.1	0.2	0.6	0.48	1.1	0.3	0.8	<0.1	1.4	<0.1	0.4	<0.1	0.2	2.3	-	-	-	-	-	-	-
TP27	2/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP27	2/11/2011	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP28	4/11/2011	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP29	2/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP29	2/11/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP30	3/11/2011	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	0.05	<0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP31	2/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP31	2/11/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP32	2/11/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP33	2/11/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP34	3/11/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP35	3/11/2011	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP36	4/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP37	4/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP37	4/11/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP38	4/11/2011	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP39	4/11/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP40	4/11/2011	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP41	4/11/2011	2.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP42	3/11/2011	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP43	3/11/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP44	3/11/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP45	3/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP46	3/11/2011	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP46	3/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP47	3/11/2011	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP48	3/11/2011	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP49	3/11/2011	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP50	3/11/2011	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP51	3/11/2011	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP52	3/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP53	3/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
TP53	3/11/2011	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP54	2/11/2011	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	0.07	<0.2	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	0.2	-	-	-	-	-	-	-
TP55	2/11/2011	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Bold (NEHF - F), Health-based Investigation Levels (DEC 2006)

Table B: Summary Data - Groundwater Analysis - Heavy Metals, BTEX, TPH, PAHs (Page 1 of 2)
Project: ESA, IPL Facility, KI
Client: IPL
Project Number: 41699

		BTEX						Metals										TPH				
		Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Phosphorus	Potassium	Zinc (Filtered)	TPH C6 - C9	TPH C10 - C14	TPH C15 - C28	TPH C29-C36	TPH+C10 - C36 (Sum of total)
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL		1	1	1	2	1		0.001	0.0001	0.001	0.001	0.001	0.0001	0.001	0.05	0.5	0.001	10	50	100	100	
ADW 2000 (95% marine)		**700**	**180**	**5**	**350**				**0.0055**	**0.0044**	**0.0013**	**0.0044**	**0.0004**	**0.07**			**0.015**					
Sample ID	**Date**																					
BH42/MW4	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	11	2.5	-	-	-	-	-	-
MW1/BH89	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	0.2	6.7	-	-	-	-	-	-
MW101	7/11/2011	<1	<1	<1	<2	<1	<3	0.002	<0.0001	<0.001	0.002	<0.001	<0.0001	0.002	0.08	2.5	0.01	<10	<50	<100	<100	<250
MW102	7/11/2011	<1	<1	<1	<2	<1	<3	*0.032*	**0.034**	<0.001	0.01	<0.001	<0.0001	**0.22**	17	12	**0.81**	<10	<50	<100	<100	<250
MW103	7/11/2011	<1	<1	<1	<2	<1	<3	0.005	0.001	<0.001	0.004	<0.001	<0.0001	0.015	0.4	8.4	**0.036**	<10	<50	<100	<100	<250
MW4	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	2.1	-	-	-	-	-	-
MW4A	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	32	-	-	-	-	-	-
MWB	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	55	-	-	-	-	-	-

Bold Exceedance of ANZECC (2004)

		PAH / Phenols															
		Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)&(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Cyclohexane
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L
EQL		0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.001
ADW 2000 (95% marine)																	
Sample ID	**Date**																
BH42/MW4	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW1/BH89	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW101	7/11/2011	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.001
MW102	7/11/2011	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.001
MW103	7/11/2011	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.001
MW4	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW4A	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MWB	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Bold Exceedance of ANZECC (2004)

Table B: Summary Data - Groundwater Analysis - Organochlorine Pesticides, PAHs, PCBs (Page 2 of 2)
Project: ESA, IPL Facility, KI
Client: IPL
Project Number: 41699

		Chlorinated Hydrocarbons																													
		1,1,1,2-tetrachloroethan	1,1,1-trichloroethane	1,1,2,2-tetrachloroethan	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,3-trichloropropane	1,2-dibromo-3-chloropro	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Hexachlorobutadiene	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropen	Vinyl chloride
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	1	10	1	1	1	1	1	1	1	1	10
ADW 2004							*30*				*3*							*3*								*0.7*		*50*			*0.3*
ANZECC 2000 (95% marine)																															
Sample ID	**Date**																														
BH42/MW4	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW1/BH89	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW101	7/11/2011	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<10	<1	<1	<1	*<1*	<1	<1	<1	<1	*<10*
MW102	7/11/2011	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<10	<1	<1	<1	*<1*	<1	<1	<1	<1	*<10*
MW103	7/11/2011	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<1	<10	<1	<1	<1	*<1*	<1	<1	<1	<1	*<10*
MW4	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW4A	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MWB	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Bold Exceedance of ANZECC (2000)

		Halogenated Benzenes																MAH									
		1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	1,2-dibromoethane	Bromomethane	Dichlorodifluoromethane	Trichlorofluoromethane	Ammonia	Sulphur as S	Total Nitrogen	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Isopropylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL		1	1	1	1	1	1	1	1	1	1	10	10	10	0.005	0.5		1	1	1	1	1	1	1	1	1
ADW 2004				*1500*		*40*				*300*	*1*														*30*	
ANZECC 2000 (95% marine)															**0.9**											
Sample ID	**Date**																									
BH42/MW4	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	0.009	500	0.9	-	-	-	-	-	-	-	-	-
MW1/BH89	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	460	0.6	-	-	-	-	-	-	-	-	-
MW101	7/11/2011	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	0.1	240	0.1	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW102	7/11/2011	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	**58**	560	88	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW103	7/11/2011	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10	<10	**7.1**	480	12	<1	<1	<1	<1	<1	<1	<1	<1	<1
MW4	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	0.16	490	0.8	-	-	-	-	-	-	-	-	-
MW4A	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	**2.4**	280	3.2	-	-	-	-	-	-	-	-	-
MWB	7/11/2011	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.7**	270	3.6	-	-	-	-	-	-	-	-	-

Bold Exceedance of ANZECC (2000)

Table C: Groundwater Parameters
Project: ESA, IPL Facility, KI
Client: IPL
Project Number: 41699

Well ID	Date Gauged and Purged	Depth to water (mbTOC) (m AHD)	Top of Screen (mbTOC)	Standing Water Level (m AHD)	Depth to Bottom of Screen (mbTOC)	Purged Volume (L)	Physical Parameters						Comments
							Dissolved Oxygen (%)	Electrical Conductivity (uS/cm)	pH	Redox (mV) (Vs Ag/AgCL)	Temperature (°C)	Total Dissolved Solids (ppm)	
BH42/MW4	7/11/11	2.173	4.4	2.227	3.835	9	3.0	2003	6.48	-111	20.3	1217	Clear, colourless, no odours
JMW1	7/11/11	1.665	3.74	2.075	3.955	12	5.9	3700	6.96	140	20.9	2.28	Clear, colourless, no odours
JMW2	7/11/11	2.515	3.66	1.145	3.095	3	11.1	3400	6.71	179	20.8	303	Clear, colourless, no odours
JMW3	7/11/11	2.394	4.04	1.646	3.233	8	16.5	1730	7.21	115	22.1	1049	Clear, colourless, no odours
JMW4	7/11/11	2.483	4.32	1.837	3.815	8.5	5.2	3500.0	5.23	173	23.1	2.15	Clear, colourless, no odours
JMW7	7/11/11	1.677	3.5	1.823	3.063	9	6.5	2024	7.09	125	21.6	1254	Clear, colourless, no odours
MW1/BH89	7/11/11	2.115	4.03	1.915	3.545	10	6.5	1285	7.14	-121	19.3	1291	Clear, colourless, no odours
MW101	7/11/11	2.041	4.01	1.969	3.709	9	7.4	1508	7.01	-62	20.4	904	Clear, colourless, no odours
MW102	7/11/11	1.855	4.15	2.295	3.545	12	3.5	2900	6.26	148	20.7	1.79	Clear, colourless, no odours
MW103	7/11/11	1.215	3.39	2.175	2.995	9	9.3	2184	6.96	119	22.2	1330	Clear, colourless, no odours
MW4	7/11/11	2.314	4.06	1.746	5.345	18	3.8	2190	6.92	-37	17.1	334	Clear, colourless, no odours
MW4A	7/11/11	2.609	3.2	0.591	10.919	48	3.2	2160	7.56	51	19.4	1313	Clear, colourless, no odours
MWB	7/11/11	3.053	3.63	0.577	6.674	21	5.1	2850	7.41	-71	22.1	1.72	Clear, colourless, no odours

Comment
bTOC = Below top of casing

Appendix A

Photographic Log

Site Photographs – 31 October – 8 November 2011

Photograph 1 – View looking into Test Pit TP25, advanced across the site.

Photograph 2 – View looking north into Test Pit TP25, advanced across the site. Water ingress is collapsing the pit the western wall.

Photograph 3 – View looking south across the site.

Photograph 4 – Stockpile generated during Test Pit TP52 excavation showing the sandy fill.

Photograph 5 – Test pit TP54 with electrical pipework at 1.5 mbgs.

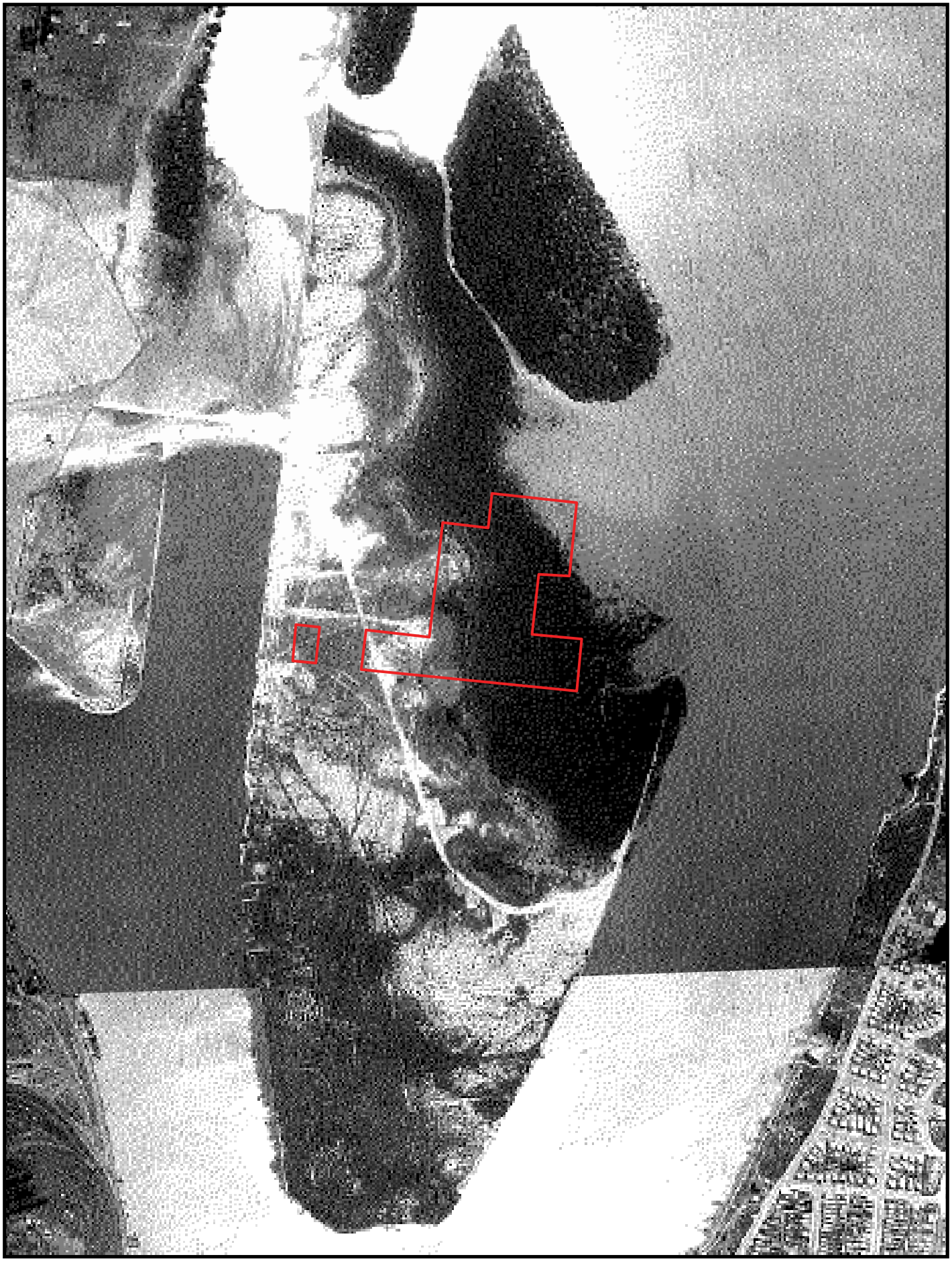
Photograph 6 – Soft white Clay layer within Test Pit TP46, which appears all across the eastern area of the site.

Photograph 7 – Test Pit TP38 with Phosphorus material (Yellow)

Photograph 8 – Test Pit TP38 with Phosphorus material (Yellow)

Appendix B

Historical Aerial Photographs



Source: © 2011 Land and Property Management Authority, NSW

0 75 150 300 m

Scale: Approximate

A4			
A	Original Issue - R003	RF	23-11-2011
Rev	Description	Drn.	Date

Legend:

Approximate Site Boundary

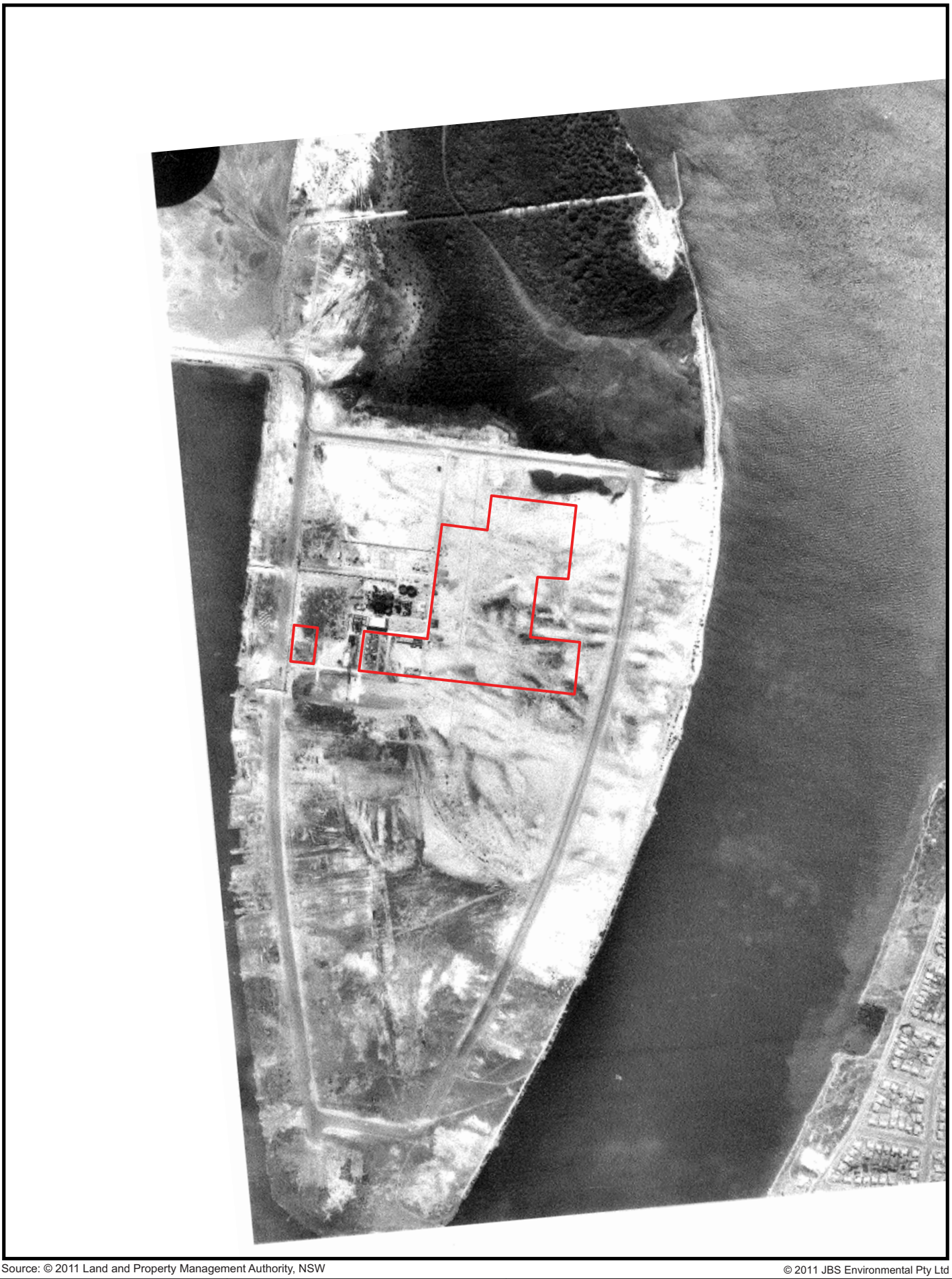
JBS ENVIRONMENTAL

Figure: Newcastle - Run 8: Nov 1959

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_Aerials



Source: © 2011 Land and Property Management Authority, NSW

0 75 150 300 m

Scale: Approximate

Legend:

Approximate Site Boundary

Rev	Description	Drn.	Date
A	Original Issue - R003	RF	23-11-2011
A4			

JBS ENVIRONMENTAL

Figure: Newcastle - Run 2: 26-9-65

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_Aerials

Source: © 2011 Land and Property Management Authority, NSW

0 75 150 300 m

Scale: Approximate

A4			
A	Original Issue - R003	RF	23-11-2011
Rev	Description	Drn.	Date

Legend:

Approximate Site Boundary

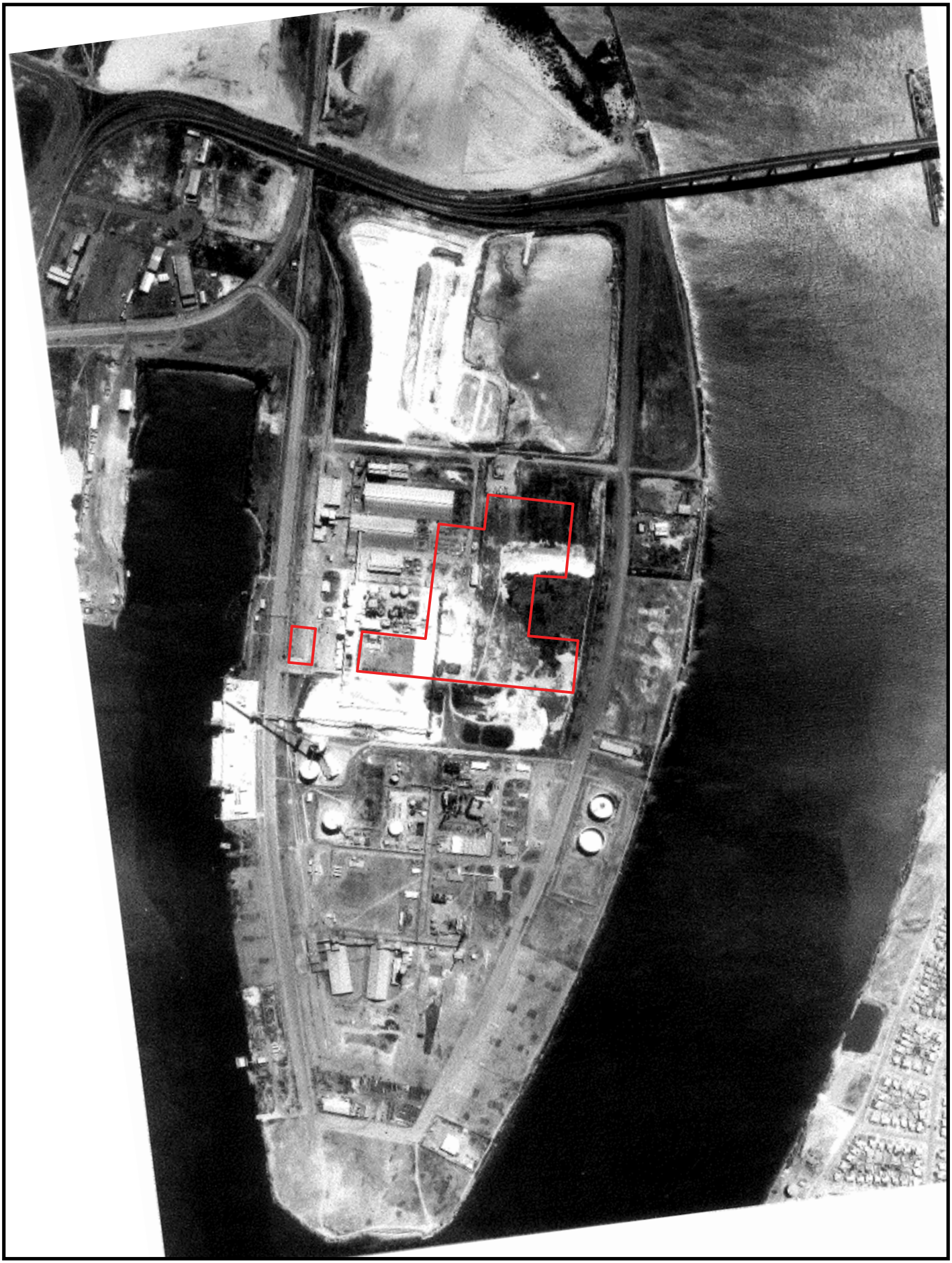
JBS ENVIRONMENTAL

Figure: Newcastle - Run 9: 19-10-1974

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_Aerials



Source: © 2011 Land and Property Management Authority, NSW

0 75 150 300 m

Scale: Approximate

A4			
A	Original Issue - R003	RF	23-11-2011
Rev	Description	Drn.	Date

Legend:

Approximate Site Boundary

JBS ENVIRONMENTAL

Figure: Newcastle - Run 9: 7-10-1979

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_Aerials

Source: © 2011 Land and Property Management Authority, NSW

0 75 150 300 m

Scale: Approximate

A4			
A	Original Issue - R003	RF	23-11-2011
Rev	Description	Drn.	Date

Legend:

Approximate Site Boundary

JBS ENVIRONMENTAL

Figure: Newcastle - Run 9: 13-9-1983

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_Aerials

Source: © 2011 Land and Property Management Authority, NSW

0 75 150 300 m

Scale: Approximate

A4			
A	Original Issue - R003	RF	23-11-2011
Rev	Description	Drn.	Date

Legend:

Approximate Site Boundary

JBS ENVIRONMENTAL

Figure: Newcastle - Run 2: 28-4-1990

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_Aerials

Source: © 2011 Land and Property Management Authority, NSW

0 75 150 300 m

Scale: Approximate

A4			
A	Original Issue - R003	RF	23-11-2011
Rev	Description	Drn.	Date

Legend:

Approximate Site Boundary

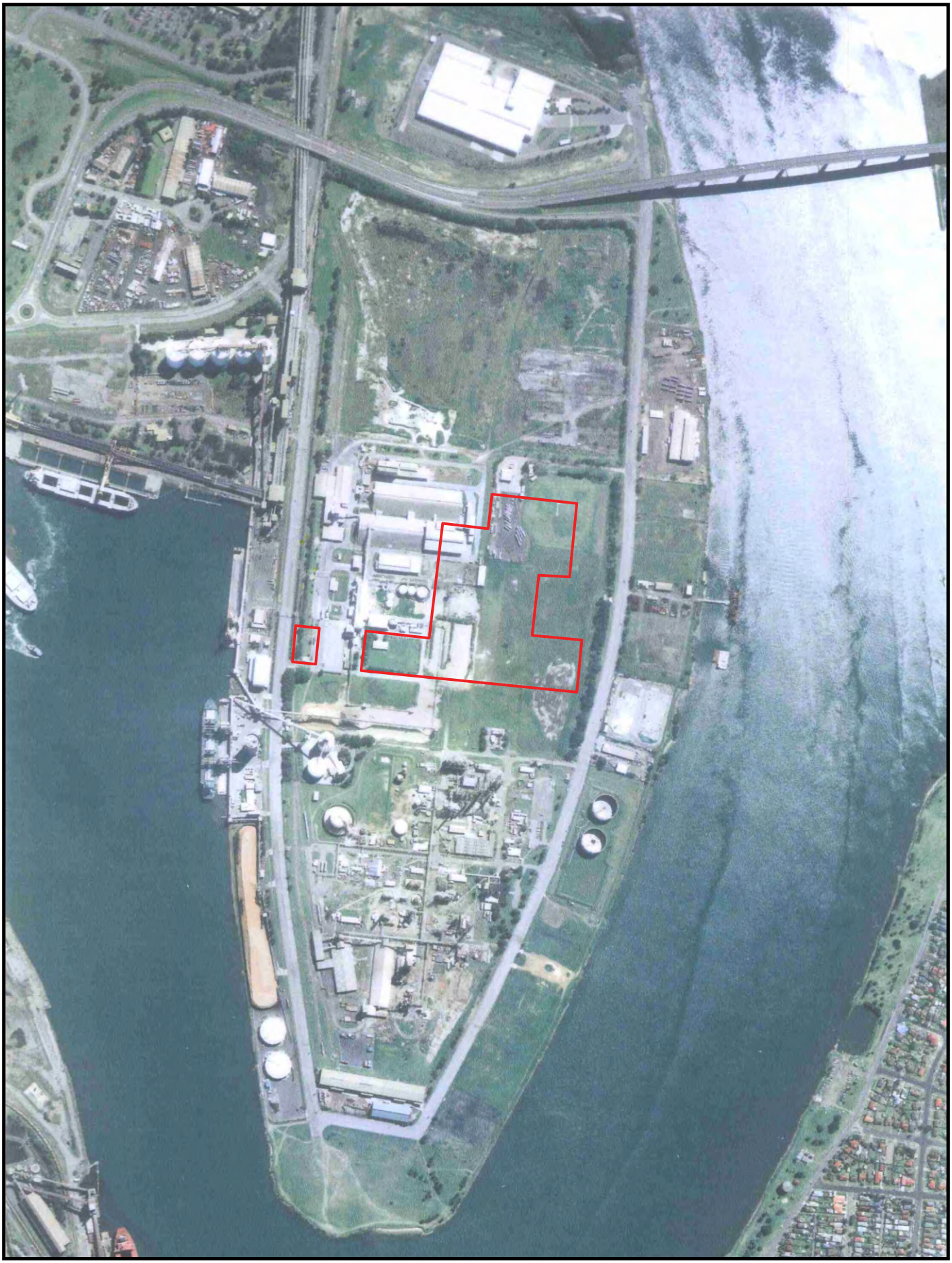
JBS ENVIRONMENTAL

Figure: Newcastle - Run 11: 3-1-2001

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_Aerials



Source: © 2011 Land and Property Management Authority, NSW

0 75 150 300 m

Scale: Approximate

A4			
A	Original Issue - R003	RF	23-11-2011
Rev	Description	Drn.	Date

Legend:

Approximate Site Boundary

JBS ENVIRONMENTAL

Figure: Newcastle - Run 11: 3-10-2004

Client: Incitec Pivot Ltd

Project: Environmental Site Assessment

Job No: 41699 File Name: 41699_Aerials

Appendix C

Historical Land Title Search Results and Planning Records

PLANNING CERTIFICATE

The City of Newcastle

Section 149, Environmental Planning and Assessment Act 1979

To: THOMAS HARDING
PO BOX 940
MASCOT NSW 1460

Certificate No: 158435
Fee $ 133.00
Receipt No. 3177278

Date of Issue: 10/08/11

The Land: LOT 3 DP 1117013.
39 HERON RD, KOORAGANG.

Advice provided on this Certificate:

Advice under section 149(2): see items 1 – 17
Additional advice under section 149 (5): see Items 18 – 28

IMPORTANT: Please read this certificate carefully

This certificate contains important information about the land.

Please check for any item which could be inconsistent with the proposed development of the land. If there is anything you do not understand, phone Council's **Customer Enquiry Centre** on (02) 4974 2030, or come in and see us.

The information provided in this certificate relates only to the land described above. If you need information about adjoining or nearby land, or about the Council's development policies for the general area, contact Council's **Customer Enquiry Centre**.

All information provided is correct as at 10/08/2011. However, it's possible changes to occur within a short time. We recommend that you only rely upon a very recent certificate.

The City of Newcastle

PO Box 489
NEWCASTLE 2300

Phone: (02) 4974 2000
Facsimile: (02) 4974 2505

Enquiries:
S149 Certificates 4974 2511
Rates 4974 2306

In person: Customer Enquiry Centre
Ground floor,
Wing Street, Newcastle

Office hours
Mondays to Fridays 8.30 am to 5.00 pm

PART 1:

ADVICE PROVIDED UNDER SECTION 149(2)

ATTENTION: The explanatory notes appearing in italic print within Part 1 are provided to assist understanding, but do not form part of the advice provided under section 149(2). These notes shall be taken as being advice provided under section 149(5).

1. Names of relevant planning instruments and DCPs

The following environmental planning instruments, proposed environmental planning instruments and development control plans apply to the land, either in full or in part.

State Environmental Planning Policy No. 4—Development without Consent and Miscellaneous Exempt and Complying Development

State Environmental Planning Policy No. 6—Number of Storeys in a Building

State Environmental Planning Policy No. 21—Caravan Parks

State Environmental Planning Policy No. 30—Intensive Agriculture

State Environmental Planning Policy No. 32—Urban Consolidation (Redevelopment of Urban Land)

State Environmental Planning Policy No. 33—Hazardous and Offensive Development

State Environmental Planning Policy No. 36—Manufactured Home Estates

State Environmental Planning Policy No. 44—Koala Habitat Protection

State Environmental Planning Policy No. 50—Canal Estate Development

State Environmental Planning Policy No. 55—Remediation of Land

State Environmental Planning Policy No. 62—Sustainable Aquaculture

State Environmental Planning Policy No. 64—Advertising and Signage

State Environmental Planning Policy No. 65—Design Quality of Residential Flat Development

State Environmental Planning Policy No. 71—Coastal Protection

State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004

State Environmental Planning Policy (Major Development) 2005

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (Temporary Structures and Places of Public Entertainment) 2007

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Exempt and Complying Development Codes) 2008

State Environmental Planning Policy (Affordable Rental Housing) 2009

Newcastle Development Control Plan 2005

2. Zoning and land use under relevant LEPs

NOTE: *The land is listed as a State significant site in Schedule 3 of State Environmental Planning Policy (Major Development) 2005. The listing establishes a planning regime for the site including zoning, permitted and prohibited uses and heritage conservation provisions (if applicable).*

Refer to State Environmental Planning Policy (Major Development) 2005 for details.

3. Complying development

Note Other requirements: *The advice below for all Compyling Development Codes, is limited to identifying whether or not the* ***land,*** *the subject of the certificate, is land on which complying development may be carried out because of Clauses 1.17A(c) & (d) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 (the Codes SEPP). There are other requirements under the Codes SEPP that must also be satisfied to be considered as complying development. Clauses 1.17 and 1.18 of the Codes SEPP identify the general requirements to be classified as complying development.*

General Housing Code

Complying development under the General Housing Code may NOT be carried out on this land. The land is affected by:

Specific land exemptions being land identified on an Acid Sulfate Soils Map as being Class 1 or Class 2.

Rural Housing Code

Complying development under the Rural Housing Code may NOT be carried out on this land. The land is affected by:

Specific land exemptions being land identified on an Acid Sulfate Soils Map as being Class 1 or Class 2. Unless complying development is carried out on the part of the lot to which clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 does not apply.

Housing Alterations Code

Complying development under the Housing Alterations Code MAY be carried out on this land.

General Development Code

Complying development under the General Development Code MAY be carried out on this land.

General Commercial and Industrial Code

Complying development under the General Commercial and Industrial Code MAY be carried out on this land.

Subdivision Code

Complying development under the Subdivision Code MAY be carried out on this land.

Demolition Code

Complying development under the Demolition Code MAY be carried out on this land.

4. Coastal Protection Act 1979

The land IS AFFECTED by the operation of sections 38 or 39 of the Coastal Protection Act 1979.

4A. Certain information relating to beaches and coasts

The land IS NOT AFFECTED by an order under Part 4D of the Coastal Protection Act 1979 in relation to emergency coastal protection works (within the meaning of that Act) on the land (or on public land adjacent to that land), except where the council is satisfied that such an order has been fully complied with.

The Council HAS NOT been notified under section 55X of the Coastal Protection Act 1979 that emergency coastal protection works (within the meaning of that Act) have been placed on the land (or on public land adjacent to that land).

4B. Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works

The land IS NOT subject to an agreement for annual charges under section 496B of the Local Government Act 1993 for coastal protection services (within the meaning of section 553B of that Act).

5. Mine Subsidence Compensation Act 1961

The land IS NOT within a proclaimed Mine Subsidence District under the Mine Subsidence Compensation Act 1961.

NOTE: The above advice is provided to the extent that Council has been notified by the Mine Subsidence Board. For up-to-date details, contact the Mine Subsidence Board, 117 Bull Street, Newcastle West. Ph (02) 49084300.

6. Road widening or realignment

NOTE: The Roads and Traffic Authority may have proposals that are not referred to in this item. For advice about affectation by RTA proposals, contact the Roads and Traffic Authority, Locked Mail Bag 30 Newcastle 2300. Ph: 13 1782.

The land IS NOT AFFECTED by any road widening or road realignment under Division 2 of Part 3 of the Roads Act 1993.

The land IS NOT AFFECTED by any road widening or road realignment under an environmental planning instrument.

The land IS NOT AFFECTED by any road widening or road realignment under a resolution of the Council.

7. Policies on hazard risk restrictions

Except as stated below, the land is not affected by a policy referred to in Item 7 of Schedule 4 of the Environmental Planning and Assessment Regulation 2000 that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

Earthquake: The Council has adopted standards for earthquake resistant construction in a Local Approvals Policy titled "Building Materials & Practices Structural Quality Policy" (dated 11 July 1995). This document may be inspected or purchased at Council's Customer Enquiry Centre.

Land Contamination: Council's information currently indicates that the property may be affected by Land Contamination. Council has adopted a policy of restricting development or imposing conditions on properties affected by Land Contamination. Refer to the Newcastle Development Control Plan 2005, which may be inspected or purchased at Council's Customer Enquiry Centre.

NOTE: The absence of a policy to restrict development of the land because of the likelihood of a particular risk does not imply that the land is free from that risk. The Council considers the likelihood of natural and man-made risks when determining development applications under section 79C of the Environmental Planning and Assessment Act 1979. Detailed investigation carried out in conjunction with the preparation or assessment of a development application may result in the Council either refusing development consent or imposing conditions of consent on the basis of risks that are not identified above.

7A. Flood related development controls information

Council's information currently indicates that the property is, or contains, flood prone land as defined in the Floodplain Development Manual: the management of flood liable land, April 2005 published by the NSW Government.

Development of flood prone land is controlled by Element 4.3 of the Newcastle Development Control Plan 2005. The Newcastle Development Control Plan 2005 provides restrictions or imposes conditions with respect to all development of flood prone land. This includes development for the purpose of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings.

The Newcastle Development Control Plan 2005 may be inspected or purchased at Council's Customer Enquiry Centre.

NOTE: More detailed flood information specific to the property is available on separate flooding certificate application through Council's Customer Enquiry Centre on (02) 4974 2050.

8. Land reserved for acquisition

The land is not identified for acquisition by a public authority (as referred to in section 27 of the Act) by any environmental planning instrument or proposed environmental planning instrument applying to the land.

9. Contributions plans

The following contribution plan/s apply to the land.

Section 94A Development Contributions Plan 2009 - Updated March 2011:

The Plan specifies section 94A contributions that may be imposed as a condition of development consent.

NOTE: Contributions plans are available on Council's website or may be inspected or purchased at Council's Customer Enquiry Centre.

9A. Biodiversity certified land

The land IS NOT biodiversity certified land within the meaning of Part 7AA of the Threatened Species Conservation Act 1995.

10. Biobanking agreements

The land IS NOT land to which a biobanking agreement under Part 7A of the Threatened Species Conservation Act 1995 relates.

11. Bush fire prone land

The land IS NOT bush fire prone land for the purposes of the Environmental Planning and Assessment Act 1979.

12. Property vegetation plans

Not applicable. The Native Vegetation Act 2003 does not apply to the Newcastle local government area.

13. Orders under Trees (Disputes Between Neighbours) Act 2006

Council HAS NOT been notified that an order has been made under the Trees (Disputes between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

14. Directions under Part 3A

The land IS NOT AFFECTED by a direction by the Minister in force under section 75P (2) (c1) of the Act.

15. Site compatibility certificates and conditions for seniors housing

(a) The land IS NOT AFFECTED by a current site compatibility certificate (of which the Council is aware) issued under the State Environmental Planning Policy (Housing for Seniors and People with a Disability) 2004.

(b) The land IS NOT AFFECTED by any terms of kind referred to in clause 18(2) of the State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004, that have been imposed as a condition of consent to a development application granted after 11 October, 2007 in respect of the land.

16. Site compatibility certificates for infrastructure

The land IS NOT AFFECTED by a valid site compatibility certificate (of which the Council is aware) issued under the State Environmental Planning Policy (Infrastructure) 2007.

17. Site compatibility certificates and conditions for affordable rental housing

The land IS NOT AFFECTED by a valid site compatibility certificate (of which the Council is aware) issued under the State Environmental Planning Policy (Affordable Rental Housing) 2009.

Note. The following matters are prescribed by section 59(2) of the Contaminated Land Management Act 1997.

Council is in possession of the following site audit statement which may be examined upon request by contacting our Environmental Services Unit, phone (02) 4974 2525.

Site Audit Statement No. WRR162/4 (14/12/06) produced by Dr William Ryall of HLA-Envirosciences Pty Ltd. DataWorks Document Number: 1919819.

Site Audit Statement No. WRR162/3 (14/12/06) produced by Dr William Ryall of HLA-Envirosciences Pty Ltd. DataWorks Document Number: 1919809.

NOTE: Contamination information that relates to the land that is not required to be disclosed under section 59(2) Contaminated Land Management Act 1997, may be provided under a section 149(5) certificate

PART 2:

ADVICE PROVIDED UNDER SECTION 149(5)

ATTENTION: Section 149(6) of the Act states that a Council shall not incur any liability in respect of advice provided in good faith pursuant to sub-section 149(5).

18. Outstanding written request issued by Council.

The land IS NOT AFFECTED by an outstanding written request issued by Council.

NOTE: The Council has not inspected the premises immediately prior to the issue of this certificate. It is possible that the premises are affected by matters of which the Council is unaware.

NOTE: This Certificate does not include any advice regarding outstanding notices or orders issued under the Environmental Planning and Assessment Act 1979, the Local Government Act 1993 or the Swimming Pool Act 1992. To obtain advice regarding these matters, you should lodge an application for a Certificate as to Outstanding Notices and Orders (accompanied by the appropriate fee). For further information, please contact the Customer Enquiry Centre on (02) 4974 2030.

19. Development consents

Development consent HAS been granted in relation to the land within the five years preceding the date of this certificate. Summary details are as follows:

Consent No.:	DA 07/0686	Date: 24/08/2007
Consent No.:	DA 06/2260	Date: 3/07/2007

NOTE: More information about these consents may be obtained by inspecting the Register of Development Consents at the Council's Customer Enquiry Centre.

20. Heritage Items

There are no heritage items listed in Clause 21 to the State Environmental Planning Policy (Major Development) Amendment (Three Ports) 2009 situated on the land.

21. Suspension of covenants, agreements and instruments

For the purpose of enabling development on land within the Three Ports Site to be carried out in accordance with Part 20 of Schedule 3 of State Environmental Planning Policy (Major Development) 2005 or with a development consent granted under the Act, any agreement, covenant or other similar instrument that restricts the carrying out of that development does not apply to the extent necessary to serve that purpose.

Clause 19 of State Environmental Planning Policy (Major Development) Amendment (Three Ports) 2009 does not apply:

(a) to a covenant imposed by the relevant council or that the relevant council requires to be imposed, or

(b) to any prescribed instrument within the meaning of section 183A of the Crown Lands Act 1989, or

(c) to any conservation agreement within the meaning of the National Parks and Wildlife Act 1974, or

(d) to any Trust agreement within the meaning of the Nature Conservation Trust Act 2001. orl

(e) to any property vegetation plan within the meaning of the Native Vegetation Act 2003, or

(f) to any biobanking agreement within the meaning of Part 7A of the Threatened Species Conservation Act 1995, or

(g) to any planning agreement within the meaning of Division 6 of Part 4 of the Act.

Clause 19 does not affect the rights or interests of any public authority under any instrument.

22. Unexhibited proposed environmental planning instruments

The land IS NOT AFFECTED by a resolution of the Council to endorse a planning proposal which has yet to have a gateway determination pursuant to section 56(2) of the Act.

23. Draft development control plans

The following draft development control plan/s APPLY to the land. The draft plan/s has been exhibited pursuant to Part 3 of the Environmental Planning and Assessment Regulation 2000.

Draft Newcastle Development Control Plan 2011

24. Heritage Act 1977

The land IS NOT AFFECTED by a listing on the State Heritage Register or an Interim Heritage Order that is in force under the Heritage Act 1977.

NOTE: The above advice is provided to the extent that Council has been notified by the Heritage Council of NSW. For up-to-date details, contact the Department of Planning - Heritage Branch, Locked Bag 5020, Parramatta NSW 2124. Ph: (02) 9873 8500.

25. Listings by the National Trust of Australia

The land IS NOT AFFECTED by a listing of the National Trust of Australia (NSW).

NOTE: The above advice is provided to the extent that Council has been notified by the National Trust of Australia (NSW). For up-to-date details, contact the National Trust.

26. Australian Heritage Database

The land IS NOT AFFECTED by a listing on the Australian Heritage Database.

NOTE: The above advice is provided to the extent that Council has been notified by the Department of the Environment, Heritage, Water and the Arts. For up-to-date details, contact the Department of the Environment, Heritage, Water and the Arts, King Edward Terrace, Parkes ACT 2600. Ph (02) 6274 2111.

27. Environment Protection & Biodiversity Conservation Act 1999 (Cth)

Under the (Commonwealth) *Environment Protection and Biodiversity Conservation Act 1999*, actions which have, may have or are likely to have, a significant impact on a matter of national environmental significance may be taken only with the approval of the Commonwealth Minister for the Environment.

Approval is also required for actions that have a significant effect on the environment of Commonwealth land. These actions may be on Commonwealth land or other land.

This approval is in addition to any approvals under the (NSW) Environmental Planning and Assessment Act 1979 or other NSW legislation.

Matters of national environmental significance are:

- declared World Heritage areas
- declared Ramsar wetlands
- listed threatened species and ecological communities
- listed migratory species
- nuclear actions
- the environment of Commonwealth marine areas.

Locations within the City of Newcastle that are a declared Ramsar wetland include Kooragang Nature Reserve and Shortland Wetlands. Listed threatened species and listed migratory species are known to occur within the City of Newcastle.

28. Other matters

The land is affected by the following:

Newcastle earthquake

Earthquakes occurred in the vicinity of Newcastle on 28th December 1989 and 6 August 1994. Buildings on the land may have suffered damage as a consequence of the earthquakes. Prospective purchasers are advised to make their own enquiries as to whether the property is affected by any damage.

Newcastle Urban Strategy

The Newcastle Urban Strategy was adopted by the Council on 11 March 1998. The contents of the Strategy will be taken into account when the Council determines development applications.

Note: The Strategy is available for purchase from Council's Customer Enquiry Centre.

Contaminated land information

This land has been identified as being affected by soil or groundwater contamination. Council is in possession of the following report(s) which may be examined upon request by contacting our Environmental Services Unit, phone (02) 4974 2525. Recommendations have been made regarding restrictions or special conditions over the use or development of the land. A site management plan has also been prepared for the ongoing use of the land. Persons relying on this certificate are advised to examine and consider the contents of each report.
Report 1: URS Pty Ltd (December 2003) Remediation Action Plan, Orica - Kooragang Island. Prepared for Orica Australia Pty Ltd. Dataworks Document Number 1349662.
Report 2: URS Pty Ltd (6 October 2006) Environmental Management Plan. Prepared for Orica Australia Pty Ltd. Dataworks Document Number: 1788929.
Report 3: Australian Radiation Services Pty Ltd (December 2006) Incitec Pivot Limited Kooragang Island Newcastle, New South Wales, Radiation Assessment. DataWorks Document Number: 1903043.
Report 4: Western Radiation Services (December 2006) Report on Radiation Site Survey at Incitec Pivot Limited, Kooragang Island Site, Newcastle, New South Wales, by William P Chandler & Rex S C Breheny, Prepared for Incitec Pivot Limited on behalf of TOP Australia Limited. DataWorks Document Number: 1903043.
Report 5: HLA-Envirosciences Pty Ltd (14 December 2006) Site Audit Report, Proposed Lot 4 Subdivision, Incitec Pivot Site, Heron Road, Kooragang Island, NSW. Ref: S4072404_SARLot4_14Dec06. DataWorks Document Number: 1919823.
Report 6: HLA-Envirosciences Pty Ltd (14 December 2006) Site Audit Report, Proposed Lot 3 Subdivision, Incitec Pivot Site, Heron Road, Kooragang Island, NSW. Ref: S4072403_SARLot3_14Dec06. DataWorks Document Number: 1919816.
Report: Letter 7: JBS Environmental Pty Ltd (5 June 2007) Incitec Pivot Limited Proposed Subdivision on Kooragang Island (06/2260) Response to Newcastle City Council queries. Ref: JBS40271-11554 (Rev 3). DataWorks Document Number: 1999149.
Report 8: Radiation Advice & Solutions Pty Ltd (8 December 2006) Radiological Assessment of suitability of phosphogypsum tailings dams at Kooragang Island for sale as industrial/commercial land. DataWorks Document Number 1918258.
Report 9: JBS Environmental Pty Ltd (November 2006) Draft Environmental Site Assessment (ESA) Prepared for Mallesons Stephen Jacques, Under Legal Privilege, Incitec Pivot Limited, Proposed Lot 3 Subdivision, Kooragang Island, NSW. Ref: JBS 40145-11114. DataWorks Document Number: 1916517
Report 10: JBS Environmental Pty Ltd (November 2006) Environmental Site Assessment (ESA) Prepared for Mallesons Stephen Jacques, Under Legal Privilege, Incitec Pivot Limited, Proposed Lot 4 Subdivision, Kooragang Island, NSW. Ref: 40145-11115. DataWorks Document Number 1916535.
Report 11: JBS Environmental Pty Ltd (June 2007) Environmental Management plan, Former Gypsum Dam

Proposed lots 1&2 Subdivision, Kooragang Island. JBS 40271-11628 (Revision 2). Dataworks Document Number 1917261.
Report 12: URS Pty Ltd (March 2008) Environmental Management Plan (Revision 1) Prepared for Orica Australia Pty Ltd. Ref No. 43217570/EMP_FINAL_REV1. DataWorks Document Number 2139294.
Report 13: Soil & Groundwater Consulting (June 2008). Soil Investigation Kooragang Island Primary Distribution Centre Development. Kooragang Island, New South Wales. DOC. REF: SG081541. Dataworks Document Number: 3401509.
Report 14: Soil & Groundwater Consulting (2 May 2008). Letter re: IPL Kooragang Island Primary Distribution Centre Development. Environmental Site Assessment Addendum. DOC. REF: SG081541L2. Dataworks Document Number: 3401519.

Property with a System of Sewage management

Council records indicate that a system of sewage management is installed on the property. Prospective purchasers are advised to investigate the current status of the system and its compliance with all relevant approvals. For information on Council approvals and inspections of the system, contact the Environmental and Health Services Unit on Phone 02 49742522.

NOTE: A person who purchases (or otherwise acquires) land on which any sewage management facilities are installed may operate a system of sewage management without the approval required under the Local Government Act for the period of three (3) months after the date on which the land is transferred or otherwise conveyed to the person, whether or not an approval is in force, as at that date, in relation to the operation of a system of sewage management on that land.

Further, if the person duly applies, within the period of two (2) months after the date on which the land is transferred or otherwise conveyed to the person, for approval to operate the system of sewage management concerned, the person may continue to operate that system of sewage management without approval until the application is finally determined.

Newcastle and Kooragang Island Risk Assessment Study

The land IS within an area identified by the 'Newcastle and Kooragang Island Area Risk Assessment Study' (Department of Planning, 1991) as being subject to risk levels which exceed adopted criteria for residential areas. The Study recommends the carrying out of risk reduction measures and development controls preventing the intensification of residential development in the affected areas whilst risk levels remain above adopted criteria. However, the Council has not specifically adopted a policy to restrict the development of the land because of this risk.

NOTE: For further information, please contact Council's Customer Enquiry Centre, or Department of Infrastructure, Planning and Natural Resources, 464 King Street, Newcastle).

ATTACHMENTS: NONE

Issued without alterations or additions, 10/08/11.

for:
PHIL PEARCE
GENERAL MANAGER

~ Search ~

re Lot 3 in DP 1117013

Title Tree

3/1117013

↓

5/262783

↓

V. 15161 F. 55

↓

V. 9766 F. 190

↓

Primary Applⁿ 43438

↓

Crown Land

9/8/11

Jenners Title Searching Co.
ESTABLISHED 1949

~ Search ~

re Lot 2 in DP 1117013

Schedule of Registered Proprietors

Gaz. 13/8/54 Folios 2450 & 1	Minister for Public Works
26/7/63 Folio 2126.	
Lease W343047 Reg. 10/6/86 (V. 15161 F. 55)	Australian Fertilizers Limited
Lease W707689 Reg 22/1/87 (V 5161 F 55)	AFL Pty. Limited
CN 2456698 Reg. 7/2/91 (5/262783)	Greenleaf Pty. Ltd.
Lease E862495 Reg. 30/10/92 (5/262783)	Incitec Ltd

9/8/11

Jenners Title Searching Co.
ESTABLISHED 1949

~ Search ~

re Lot 3 in DP 1117013

Schedule of Rega Proprietors Contd.

Tr 9771874 Reg 9/7/2003 (S/262783)	Incitec Fertilizers Limited
Tr AC 812757 Reg 14/12/2006 (S/262783)	Lop Australia Limited

9/8/11

Jenners Title Searching Co.

ESTABLISHED 1949

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 3/1117013

SEARCH DATE	TIME	EDITION NO	DATE
9/8/2011	12:04 PM	2	24/6/2008

LAND

LOT 3 IN DEPOSITED PLAN 1117013
AT KOORAGANG ISLAND
LOCAL GOVERNMENT AREA NEWCASTLE
PARISH OF NEWCASTLE COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP1117013

FIRST SCHEDULE

TOP AUSTRALIA LIMITED

SECOND SCHEDULE (6 NOTIFICATIONS)

1 LAND EXCLUDES MINERALS T447400
2 Z456699 EASEMENT FOR ELECTRICITY PURPOSES 7 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
3 DP1117013 EASEMENT FOR ACCESS 19 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
4 DP1117013 EASEMENT FOR SERVICES 19 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
5 AD985683 EASEMENT FOR ACCESS AFFECTING THE PART SHOWN AS (B) IN DP1117013
6 AD985683 EASEMENT FOR SERVICES AFFECTING THE PART SHOWN AS (A) IN DP1117013

NOTATIONS

DP1151580 NOTE: PLAN OF ACQUISITION
UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

JBS-Kooragang Isl PRINTED ON 9/8/2011

**ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.*

PLAN FORM 2 — Plan Drawing only to appear in this space

SIGNATURE AND SEALS ONLY.

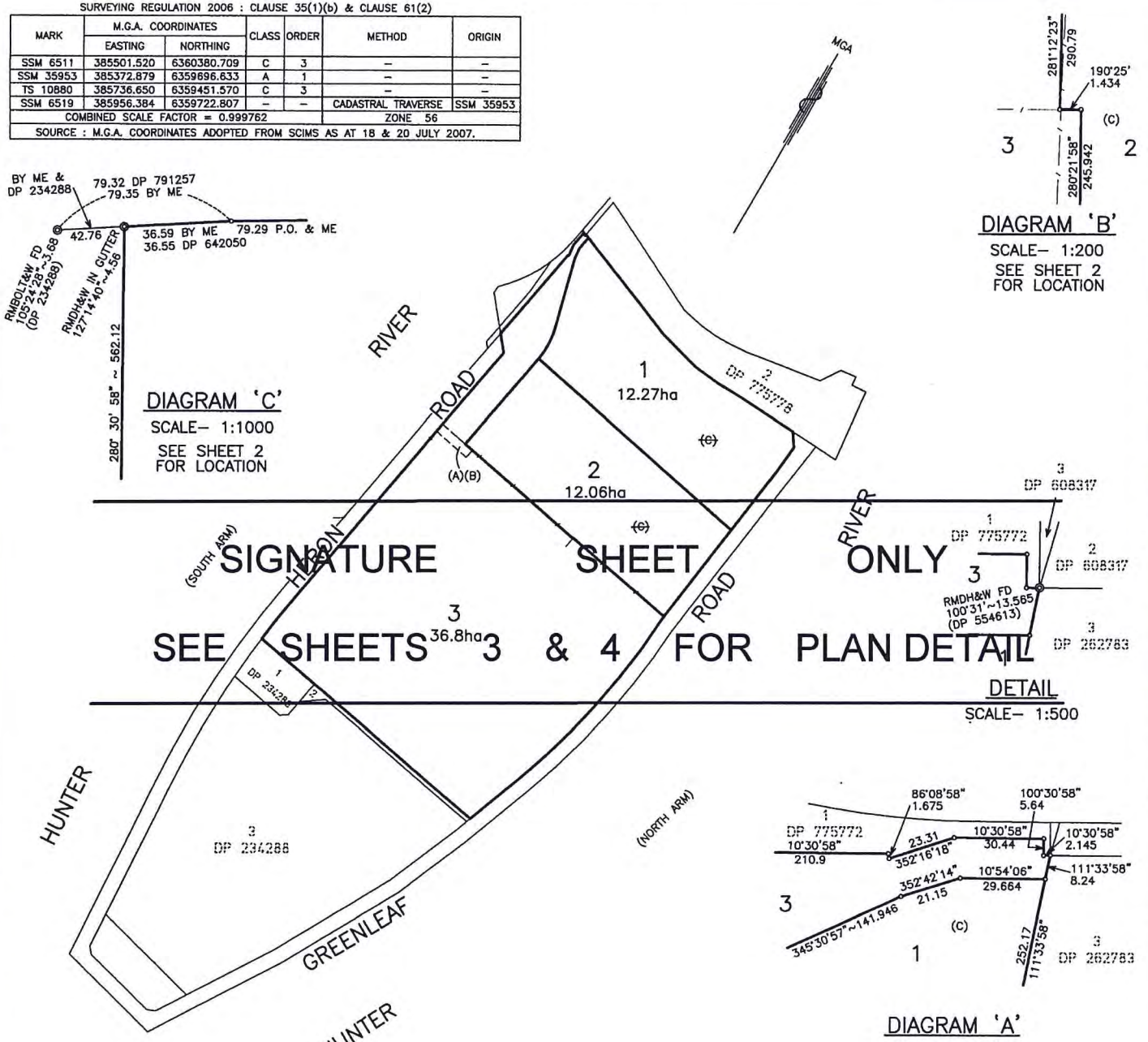
Executed by TOP Australia Ltd in accordance with S127 of the Corporations Act by being signed by 2 directors:

KERRY J GLEESON
DIRECTOR ACN 007 656 046

JAMES E FAZZINO
DIRECTOR

SURVEYING REGULATION 2006 : CLAUSE 35(1)(b) & CLAUSE 61(2)

MARK	M.G.A. COORDINATES EASTING	M.G.A. COORDINATES NORTHING	CLASS	ORDER	METHOD	ORIGIN
SSM 6511	385501.520	6360380.709	C	3	–	–
SSM 35953	385372.879	6359696.633	A	1	–	–
TS 10880	385736.650	6359451.570	C	3	–	–
SSM 6519	385956.384	6359722.807	–	–	CADASTRAL TRAVERSE	SSM 35953
COMBINED SCALE FACTOR = 0.999762					ZONE 56	
SOURCE : M.G.A. COORDINATES ADOPTED FROM SCIMS AS AT 18 & 20 JULY 2007.						



(A) – EASEMENT FOR ACCESS 19 WIDE (A).
(B) – EASEMENT FOR SERVICES 19 WIDE (B).
~~(C) – POSITIVE COVENANT.~~

Department of Lands Approval

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

Signature: .....
Date: .....
File No.: .....
Office: .....

Subdivision Certificate

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

SUBDIVISION ..... set out herein
* (Insert "subdivision" or "new road")

G. Manwell
* Authorised Person/General Manager/Accredited Certifier

Consent Authority: Newcastle City Council
Date of endorsement: 14/08/07
Accreditation no: .....
Subdivision Certificate no: 80098
File no. DA 06/2260

Note: When the plan is to be lodged electronically in Land and Property Information, it should include a signature in an electronic or digital format approved by the Registrar-General.

* Delete whichever is inapplicable

SURVEYOR'S REFERENCE: 06120DPA – (01/08/2007)

DP1117013 (E)

Registered 19.9.2007
Title System: TORRENS
Purpose: SUBDIVISION
Ref. Map: U7257-71
Last Plan: DP262783

PLAN OF SUBDIVISION OF LOT 5 DP 262783

Lengths are in metres. Reduction Ratio 1: 6000

L G A NEWCASTLE
Locality: KOORAGANG ISLAND
Parish: NEWCASTLE
County: NORTHUMBERLAND

This is sheet 1 of my plan in 2 4 sheets. (Delete if inapplicable)

Surveying Regulation 2006
I, STEPHEN ANDREW BARR
of MONTEATH & POWYS Pty Ltd
a surveyor registered under the Surveying Act, 2002, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation, 2006 and was completed on 31 JULY 2007
The survey relates to 1–3
(here specify the land actually surveyed, or specify any land shown in the plan that is not the subject of the survey)
(Signature) ..... Dated 01/08/07
Surveyor registered under the Surveying Act, 2002
Datum Line: 'X'–'Y'
Type: Urban/Rural

Plans used in preparation of survey/compilation.

DP 234288	DP 775772
DP 262783	DP 791257
DP 642050	DP 775778

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

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

1) EASEMENT FOR ACCESS 19 WIDE (A).
2) EASEMENT FOR SERVICES 19 WIDE (B).
3) POSITIVE COVENANT.

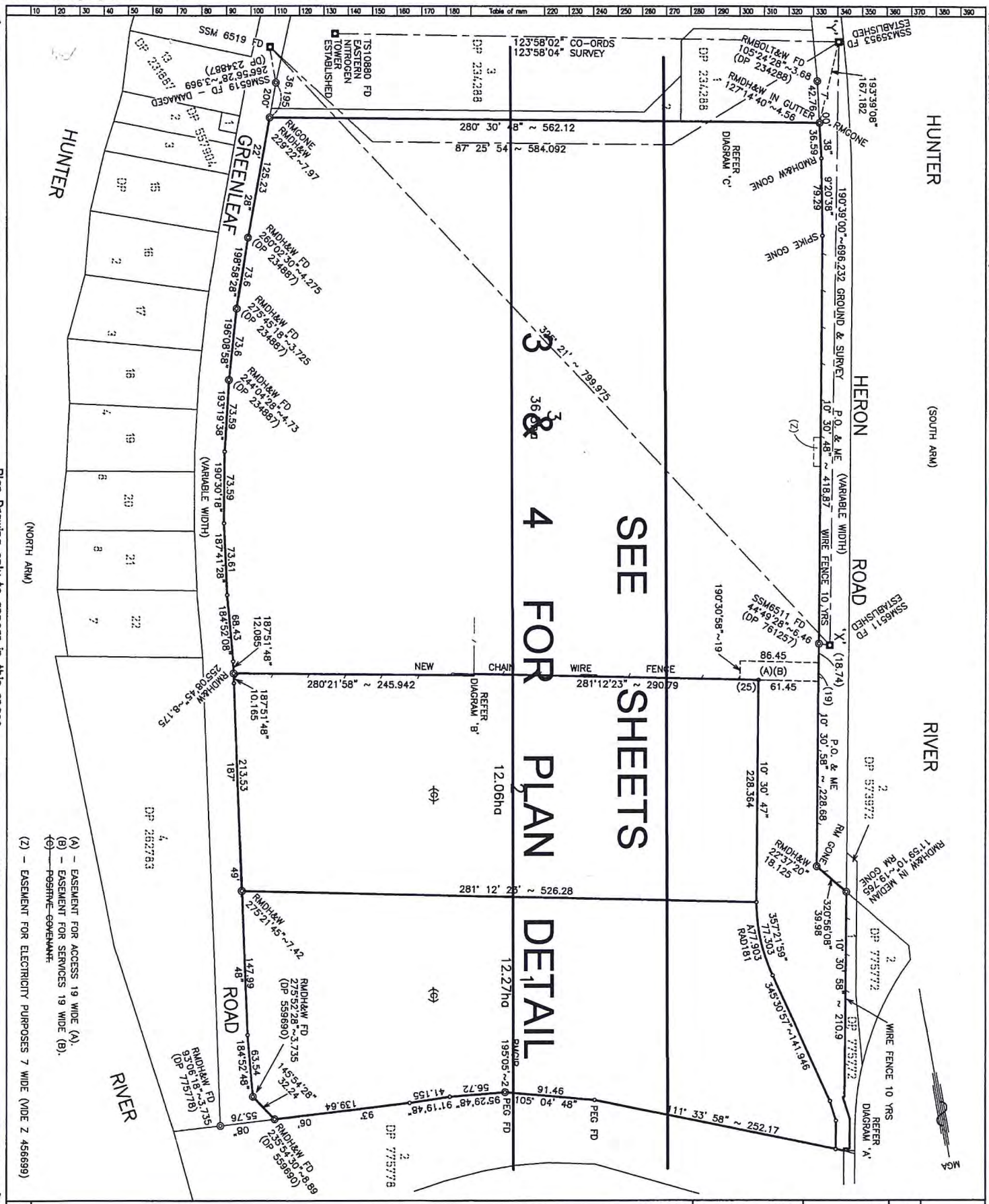
*OFFICE USE ONLY

SHEETS 3 & 4 ADDED IN LPI AT SURVEYOR'S REQUEST VIDE 2007/1759 AE 9.10.2007

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

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

PLAN FORM 3 — To be used in conjunction with Plan Form 2 — WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION



Plan Drawing only to appear in this space

SURVEYOR'S REFERENCE: 06120DPA

DP1117013	
Registered 19.9.2007 *	This is sheet 2 of my plan in 2-4 sheets dated
Surveyor registered under the Surveying Act, 2002	This is sheet of the plan of sheets covered by Subdivision Certificate No. of
Authorised Person/Council/Manager/Accredited Certifier	For use where space is insufficient in any panel on Plan Form 2

Reduction Ratio 1: 2500

(01/08/2007) SHEETS 3 & 4 ADDED IN LPI AT SURVEYOR'S REQUEST VIDE 2007/1759 AE 9.10.2007

*OFFICE USE ONLY

PLAN FORM 2

Plan Drawing only to appear in this space

SIGNATURE AND SEALS ONLY.

FOR SIGNATURES AND SEALS - SEE SHEET 1

SURVEYING REGULATION 2006 : CLAUSE 35(1)(b) & CLAUSE 61(2)

MARK	M.G.A. COORDINATES		CLASS	ORDER	METHOD	ORIGIN
	EASTING	NORTHING				
SSM 6511	385501.520	6360380.709	C	3	–	–
SSM 35953	385372.879	6359896.633	A	1	–	–
TS 10880	385736.650	6359451.570	C	3	–	–
SSM 6520	386087.829	6360162.229	–	–	CADASTRAL TRAVERSE	SSM 35953
SSM 6519	385956.765	6359722.854	–	–	CADASTRAL TRAVERSE	SSM 35953
COMBINED SCALE FACTOR = 0.999762					ZONE 56	
SOURCE : M.G.A. COORDINATES ADOPTED FROM SCIMS AS AT 18 & 20 JULY 2007.						

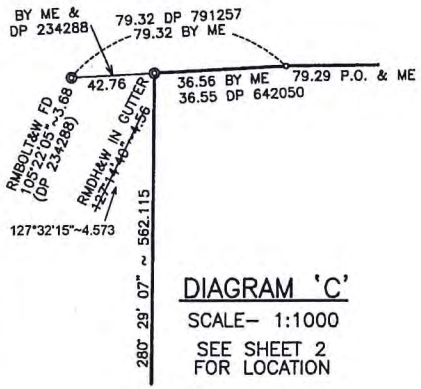
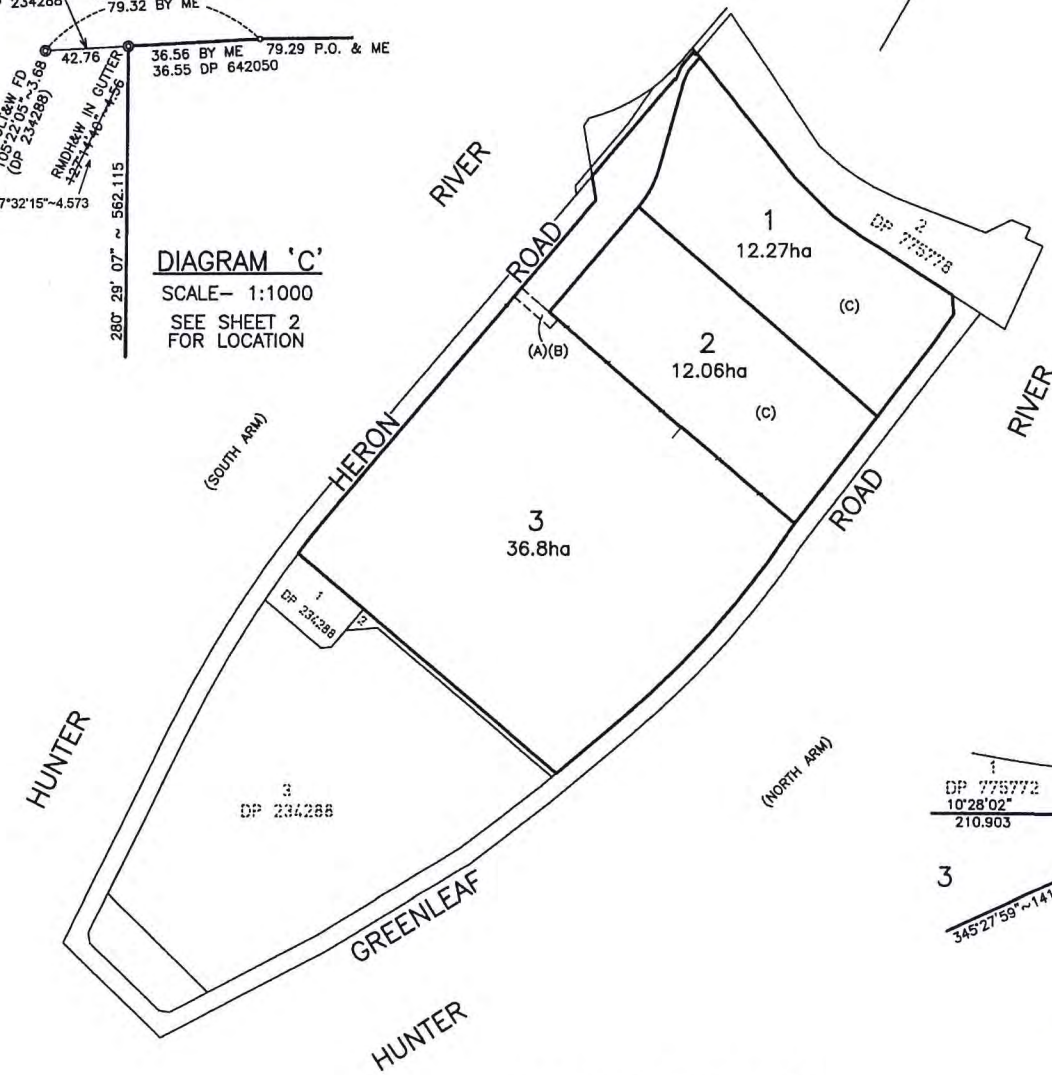


DIAGRAM 'C'
SCALE– 1:1000
SEE SHEET 2 FOR LOCATION



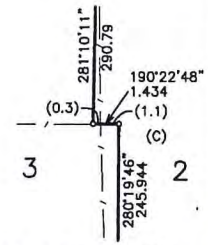
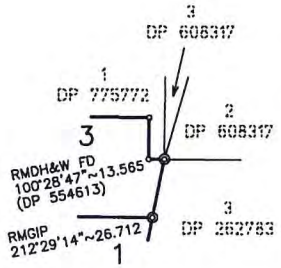


DIAGRAM 'B'
SCALE– 1:200
SEE SHEET 2 FOR LOCATION



DETAIL
SCALE– 1:500

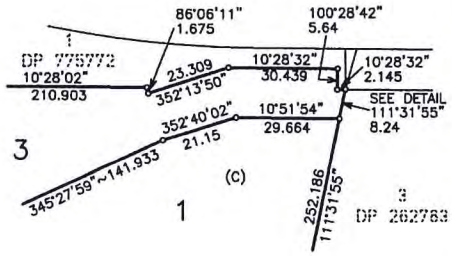


DIAGRAM 'A'
SCALE– 1:1000
SEE SHEET 2 FOR LOCATION

(A) – EASEMENT FOR ACCESS 19 WIDE (A).
(B) – EASEMENT FOR SERVICES 19 WIDE (B).
(C) – POSITIVE COVENANT.

Department of Lands Approval

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

Signature: .....

Date: .....

File No.: .....

Office: .....

Subdivision Certificate

I hereby certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed .....* (Insert "subdivision" or "new road") set out herein

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

Consent Authority: .....

Date of endorsement : SEE SHEET 1

Accreditation no : .....

Subdivision Certificate no : .....

File no. .....

Note: When the plan is to be lodged electronically in Land and Property Information, it should include a signature in an electronic or digital format approved by the Registrar-General.

* Delete whichever is inapplicable

SURVEYOR'S REFERENCE: 06120DPA – (27/08/2007)

DP1117013 (E)

Registered 13.9.2007

Title System:

Purpose:

Ref. Map:

Last Plan:

*OFFICE USE ONLY

PLAN OF SUBDIVISION OF LOT 5 DP 262783

Lengths are in metres. Reduction Ratio 1: 6000

L G A NEWCASTLE

Locality: KOORAGANG ISLAND

Parish: NEWCASTLE

County: NORTHUMBERLAND

This is sheet 1 of my plan in 4 sheets. (Delete if inapplicable)

Surveying Regulation 2006

I, STEPHEN ANDREW BARR

of MONTEATH & POWYS Pty Ltd

a surveyor registered under the Surveying Act, 2002, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation, 2006 and was completed on 31 JULY 2007

The survey relates to 1–3 (here specify the land actually surveyed, or specify any land shown in the plan that is not the subject of the survey)

(Signature) ..... Dated: 01/08/07

Surveyor registered under the Surveying Act, 2002

Datum Line: 'X'–'Y'

Type: Urban/Rural

Plans used in preparation of survey/compilation.

DP 234288	DP 775772
DP 262783	DP 791257
DP 642050	DP 775778
DP 234287	DP 554613
DP 1018949	DP 775773

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

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

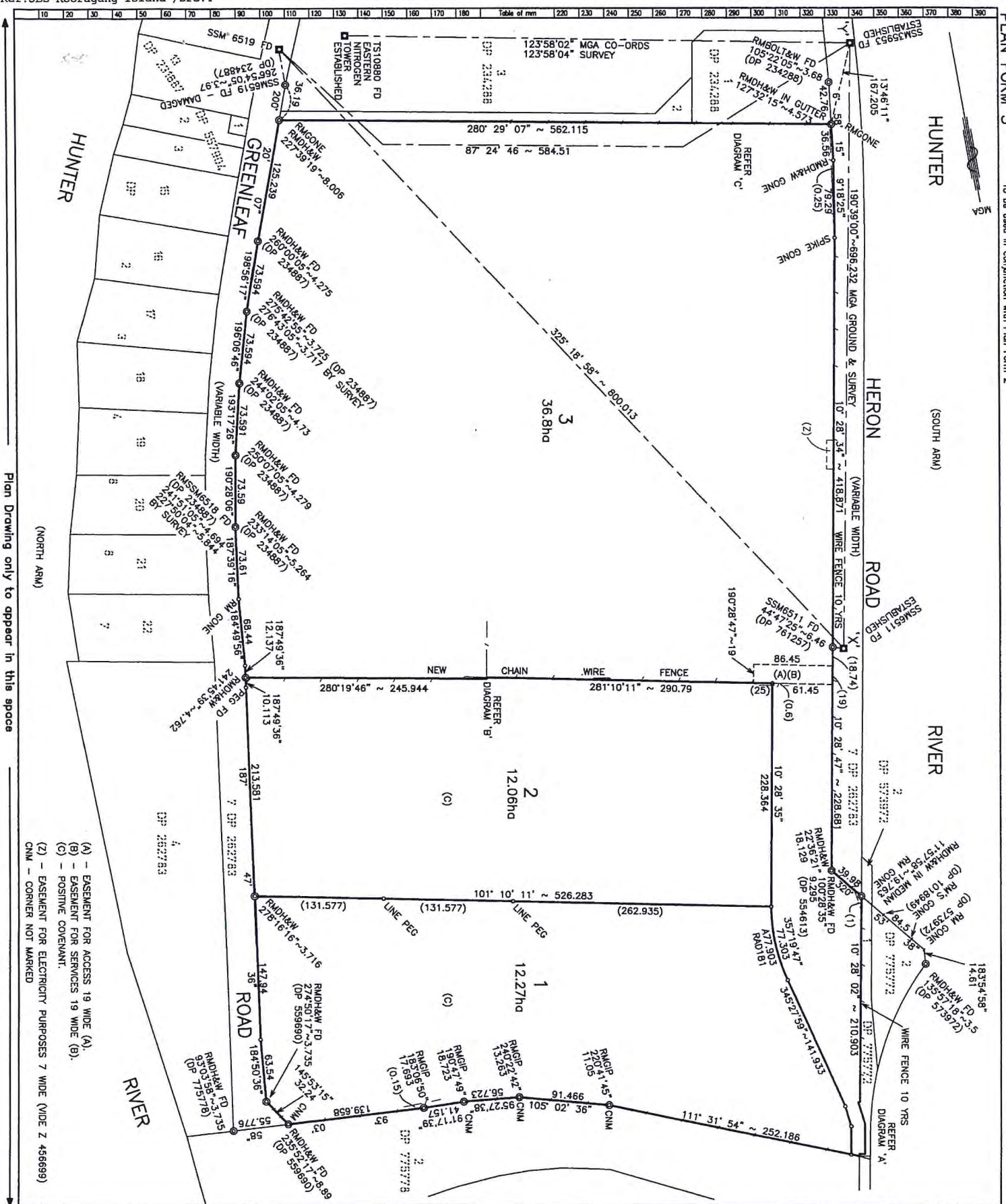
1) EASEMENT FOR ACCESS 19 WIDE (A).
2) EASEMENT FOR SERVICES 19 WIDE (B).
3) POSITIVE COVENANT.

AE 9.10.2007

SHEET 3 ADDED IN LPI AT SURVEYOR'S REQUEST VIDE 2007/1769

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

PLAN FORM 3 — To be used in conjunction with Plan Form 2 — WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION



(A) – EASEMENT FOR ACCESS 19 WIDE (A).
(B) – EASEMENT FOR SERVICES 19 WIDE (B).
(C) – POSITIVE COVENANT.
(Z) – EASEMENT FOR ELECTRICITY PURPOSES 7 WIDE (VIDE Z 456699)
CNM – CORNER NOT MARKED

Plan Drawing only to appear in this space

SURVEYOR'S REFERENCE: 06120DPA

Reduction Ratio 1: 2500

DP1117013

Registered 13.9.2007

This is sheet 2 of 4 sheets

This is sheet of the plan of covered by Subdivision Certificate No. sheets

Surveyor registered under the Surveying Act, 2002

Authorised Person/General Manager/Accredited Certifier

For use where space is insufficient in any panel on Plan Form 2.

*OFFICE USE ONLY

(27/08/2007) SHEET 4 ADDED IN LPI AT SURVEYOR'S REQUEST VIDE 2007/1759 AE 9.10.2007

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
9/8/2011 12:05PM

FOLIO: 3/1117013

First Title(s): OLD SYSTEM
Prior Title(s): 5/262783

Recorded	Number	Type of Instrument	C.T. Issue
13/9/2007	DP1117013	DEPOSITED PLAN	FOLIO CREATED EDITION 1
20/6/2008	DP1127742	DEPOSITED PLAN	
24/6/2008	AD985683	TRANSFER GRANTING EASEMENT ETC OVER OWN LAND	EDITION 2
19/5/2010	DP1151580	DEPOSITED PLAN	
11/5/2011	AG160020	CANCELLATION OR EXTINGUISHMENT OF EASEMENT	

*** END OF SEARCH ***

JBS-Kooragang Isl PRINTED ON 9/8/2011

**ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.*

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
9/8/2011 12:05PM

FOLIO: 5/262783

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 15161 FOL 55

Recorded	Number	Type of Instrument	C.T. Issue
5/6/1987		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
26/6/1987		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
22/3/1989	DP642050	DEPOSITED PLAN	
7/2/1991	Z456698	CHANGE OF NAME	
7/2/1991	Z456699	GRANT OF EASEMENT	EDITION 1
30/10/1992	E862495	TRANSFER	EDITION 2
9/7/2003	9771874	TRANSFER	EDITION 3
14/12/2006	AC812757	TRANSFER	EDITION 4
13/9/2007	DP1117013	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

JBS-Kooragang Isl PRINTED ON 9/8/2011

**ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.*

RP 13 STAMP DUTY

OFFICE USE ONLY

E 862495 F

OFFICE OF STATE REVENUE (N.S.W. TREASURY) 1992/93 P20 NO STAMP DUTY IS PAYABLE ON THIS INSTRUMENT

TRANSFER

REAL PROPERTY ACT, 1900

T of $

DESCRIPTION OF LAND Note (a)	Torrens Title Reference	If Part Only, Delete Whole and Give Details	Location
	5/262783	WHOLE	AT KOORAGANG ISLAND NEWCASTLE

TRANSFEROR Note (b)

GREENLEAF PTY LTD (A.C.N. 010 806 532)

ESTATE Note (c)

(the abovenamed TRANSFEROR) hereby acknowledges receipt of the consideration of $ NIL - DISTRIBUTION IN-SPECIE ON WINDING UP and transfers an estate in fee simple in the land above described to the TRANSFEREE

TRANSFEREE Note (d)

INCITEC LTD (A.C.N. 010 767 263)

OFFICE USE ONLY

TENANCY Note (e)

~~as joint tenants/tenants in common~~

PRIOR ENCUMBRANCES Note (f)

subject to the following PRIOR ENCUMBRANCES 1. Z 456699 2. ..... 3. .....

DATE 30th SEPTEMBER 1992

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

EXECUTION Note (g)

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

THE COMMON SEAL OF GREENLEAF PTY LTD
Signature of Witness

was affixed by ROBERT JOHN FRED BURNS
Name of Witness (BLOCK LETTERS)

its duly appointed Liquidator
Address and occupation of Witness

THE COMMON SEAL OF Greenleaf Pty Ltd A.C.N. 010 806 532

Signature of Transferor

Liquidator

Note (g)

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

THE COMMON SEAL OF INCITEC LTD was here
Signature of Witness

unto affixed in accordance with its
Name of Witness (BLOCK LETTERS)

Articles of Association in presence of
Address and occupation of Witness

ROGER GRIMLEY, Company Secretary

Signature of Transferee

JACK CAIN, Managing Director

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

LODGED BY Elsworth & Elsworth

Delivery Box Number 271Q

LOCATION OF DOCUMENTS

CT	OTHER	
		Herewith.
		In L.T.O. with
		Produced by

OFFICE USE ONLY

Checked	Passed	REGISTERED - -19
Signed	Extra Fee	

Secondary Directions			
Delivery Directions			

(12)

Form: 01T
Release: 2.1
www.lpi.nsw.gov.au

TRANSFER

New South Wales
Real Property Act 1900

9771874D

PRIVACY NOTE: this information is legally required and wi

STAMP DUTY Office of State Revenue use only

Office of State Revenue
NSW Treasury
YEAR 2000 - 2005
P6
NO DUTY PAYABLE
Section No: 281
ID 1426905

(A) TORRENS TITLE See Annexure A

(B) LODGED BY

Delivery Box	Name, Address or DX and Telephone	CODES
323X ~~2710~~	~~EBSWORTH & EBSWORTH DX 103 SYDNEY Ph. (02) 9234 2366~~ AUSEARCH PTY LTD Reference: ~~RJS~~ ABL GW	T TW (Sheriff)

(C) TRANSFEROR INCITEC LTD (ABN 41 010 767 263)

(D) CONSIDERATION The transferor acknowledges receipt of the consideration of $ See Annexure A and as regards

(E) ESTATE the land specified above transfers to the transferee an estate in fee simple

(F) SHARE TRANSFERRED

(G) Encumbrances (if applicable):

(H) TRANSFEREE INCITEC FERTILIZERS LIMITED (ABN 56 103 709 155)

(I) TENANCY:

(J) DATE 1 APRIL 2003

Certified correct for the purposes of the Real Property Act 1900 by the corporation named below the common seal of which was affixed pursuant to the authority specified and in the presence of the authorised person(s) whose signature(s) appear(s) below.
Corporation: INCITEC LTD (ABN 41 010 767 263)
Authority: section 127 of the Corporations Act 2001

Signature of authorised person:
Name of authorised person: GJ WITCOMBE
Office held: ~~MANAGING~~ DIRECTOR

Signature of authorised person:
Name of authorised person: CB ELKINGTON
Office held: SECRETARY

Certified correct for the purposes of the Real Property Act 1900 by the corporation named below the common seal of which was affixed pursuant to the authority specified and in the presence of the authorised person(s) whose signature(s) appear(s) below.
Corporation: INCITEC FERTILIZERS LIMITED (ABN 56 103 709 155)
Authority: section 127 of the Corporations Act 2001

Signature of authorised person:
Name of authorised person: GJ WITCOMBE
Office held: ~~MANAGING~~ DIRECTOR

Signature of authorised person:
Name of authorised person: CB ELKINGTON
Office held: SECRETARY

COMMON SEAL INCITEC FERTILIZERS LIMITED ACN 103 709 155

All handwriting must be in block capitals.

Annexure A to TRANSFER

Parties:

INCITEC LTD (ABN 41 010 767 263) AS TRANSFEROR AND INCITEC FERTILIZERS LIMITED (ABN 56 103 709 155) AS TRANSFEREE

Dated: 1 APRIL 2003

(A) Folio Identifiers 12/1041841, 5/774824, 2/301982, 1/225720, 39/234758, 3/869302, 21/1015311, 2/849094, 5/262783, 18/803079, 2/832155 and 18/859317

(D) Pursuant to an Asset Sale Agreement dated 1 April 2003 between Incitec Ltd as Vendor and Incitec Fertilizers Limited as Purchaser.

EXECUTED BY INCITEC LTD (ABN 41 010 767 263)
by affixing its seal in accordance with
Section 127 of the Corporations Act 2001

Signature of Authorised Person

GJ WITCOMBE

Name of Authorised Person

MANAGING DIRECTOR

Office Held

Signature of Authorised Person

CB ELKINGTON

Name of Authorised Person

SECRETARY

Office Held

COMMON
INCITEC FERTILIZERS
LIMITED
ACN 103 709 155
SEAL

EXECUTED BY INCITEC FERTILIZERS
LIMITED (ABN 56 103 709 155)
by affixing its seal in accordance with
Section 127 of the Corporations Act 2001

Signature of Authorised Person

GJ WITCOMBE

Name of Authorised Person

MANAGING DIRECTOR

Office Held

Signature of Authorised Person

CB ELKINGTON

Name of Authorised Person

SECRETARY

Office Held

Form: 01T
Licence: 04-03-349
Licensee: Mallesons Stephen Jaques

TRANSFER

New South Wales
Real Property Act 1900

AC812757J

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorise required by this form for the establishment and maintenance of the Real Property Act Register. Section 96B RP Act requires the Register is made available to any for search upon payment of a fee, if any.

STAMP DUTY Office of State Revenue use only

NEW SOUTH WALES DUTY
13-12-2006 0003937079-001
SECTION 281-ORIGINAL
NO DUTY PAYABLE

(A) **TORRENS TITLE** If appropriate, specify the part transferred
Folio Identifier 5/262783

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODES
41J	Mallesons Stephen Jaques DX 113 Sydney T +61 2 9296 2000 LLPN: 123008U Reference (optional): SLM 03-5147-5163	T TW (Sheriff)

(C) **TRANSFEROR** INCITEC FERTILIZERS LIMITED ACN 103 709 155

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $ 45,800,000 (excl. GST) and as regards
(E) **ESTATE** the land specified above transfers to the transferee an estate in fee simple.

(F) **SHARE TRANSFERRED**

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

(H) **TRANSFEREE** TOP AUSTRALIA LIMITED ACN 007 656 046

(I) **TENANCY:**

(J) **DATE** 1 / 12 / 2006
dd mm yyyy

Certified correct for the purposes of the Real Property Act 1900.

EXECUTED by **INCITEC FERTILIZERS LIMITED (ACN 103 709 155)** in accordance with section 127(1) of the Corporations Act 2001 (Cwlth) by authority of its directors:

Signature of director

JAMES E PRZILNO
Name of director (block letters)

Signature of director/company secretary*
*delete whichever is not applicable

KERRY J GLEESON
Name of director/company secretary* (block letters)
*delete whichever is not applicable

EXECUTED by **TOP AUSTRALIA LIMITED (ACN 007 656 046)** in accordance with section 127(1) of the Corporations Act 2001 (Cwlth) by authority of its directors:

Signature of director

JOHN WATSON
Name of director (block letters)

Signature of director/company secretary*
*delete whichever is not applicable

KERRY J GLEESON
Name of director/company secretary* (block letters)
*delete whichever is not applicable

ALL HANDWRITING MUST BE IN BLOCK CAPITALS

15161055

NEW SOUTH WALES

[redacted]IFICATE OF TITLE

[redacted]AL PROPERTY ACT, 1900

First Title : Old System

Prior Title : Vol.9766 Fol.190

Vol. 15161 Fol. 55

EDITION ISSUED 25 11 1983

(Page 1) Vol. 15161 Fol. 55

I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

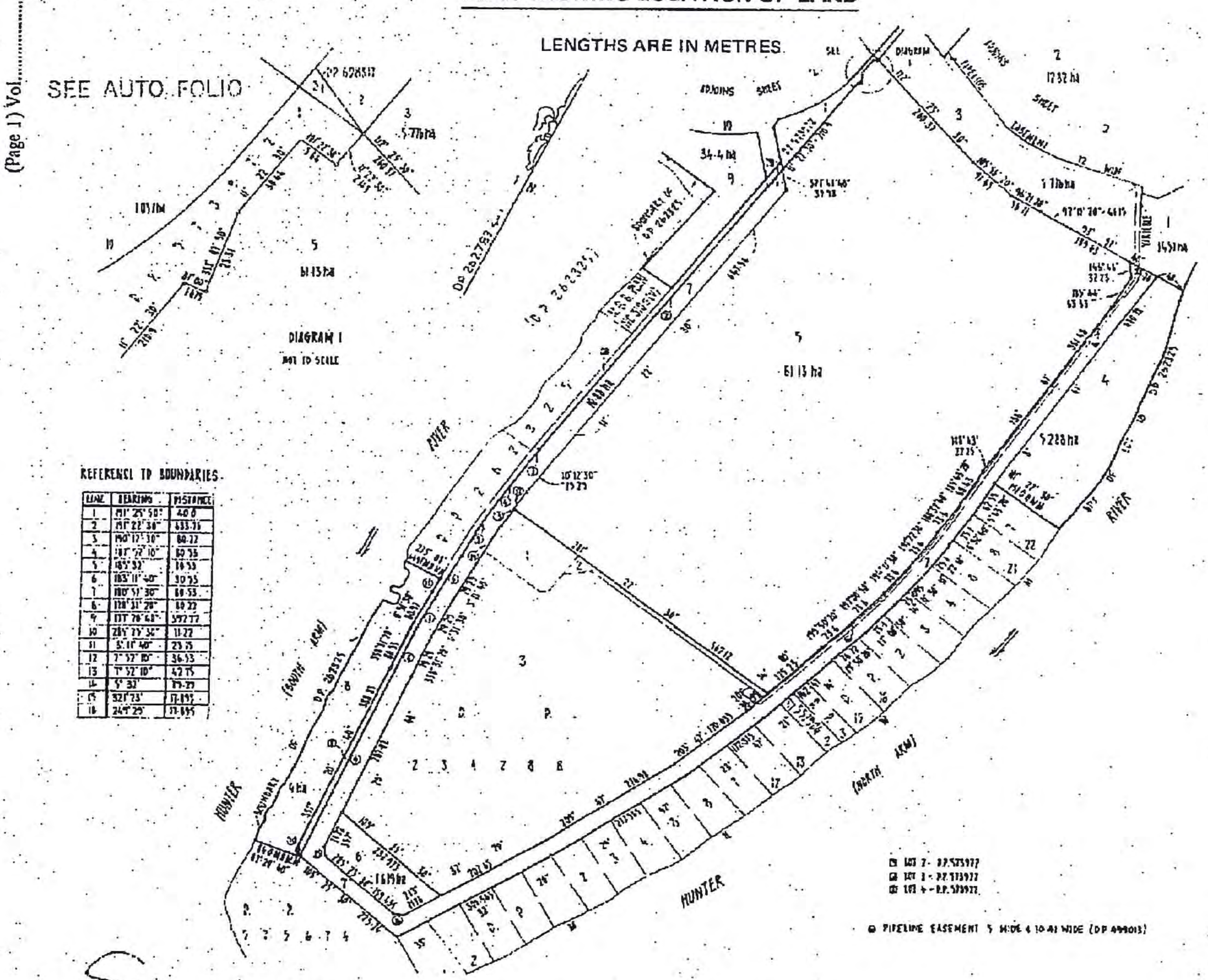
Registrar General.

CANCELLED

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES.



S

LAND REFERRED TO

Lot 5 in Deposited Plan 262783 at Kooragang Island in the City of Newcastle Parish of Newcastle and County of Northumberland.

FIRST SCHEDULE

~~MINISTER FOR PUBLIC WORKS~~.

GRN

SECOND SCHEDULE

XM 1. Land excludes minerals - See T447400.

L.O. 1066 D. West, Government Printer

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR — Registrar General

~~Australian Fertilizers Limited by Transfer H543047. Registered 10-6-1986.~~

AFL Pty Limited by Application W707689. Registered 22-1-1987.

SECOND SCHEDULE (continued)

PARTICULARS — Registrar General — CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

09766190

NEW SOUTH WALES [redacted] TIFICATE OF TITLE
PERTY ACT, 1900, as amended.

For prior Titles see Deposited Plan.

Vol. 9766 Fol. 190

MA

1st Edition issued 5-8-1964

Issued on Primary Application No.43438 (and consolidation)

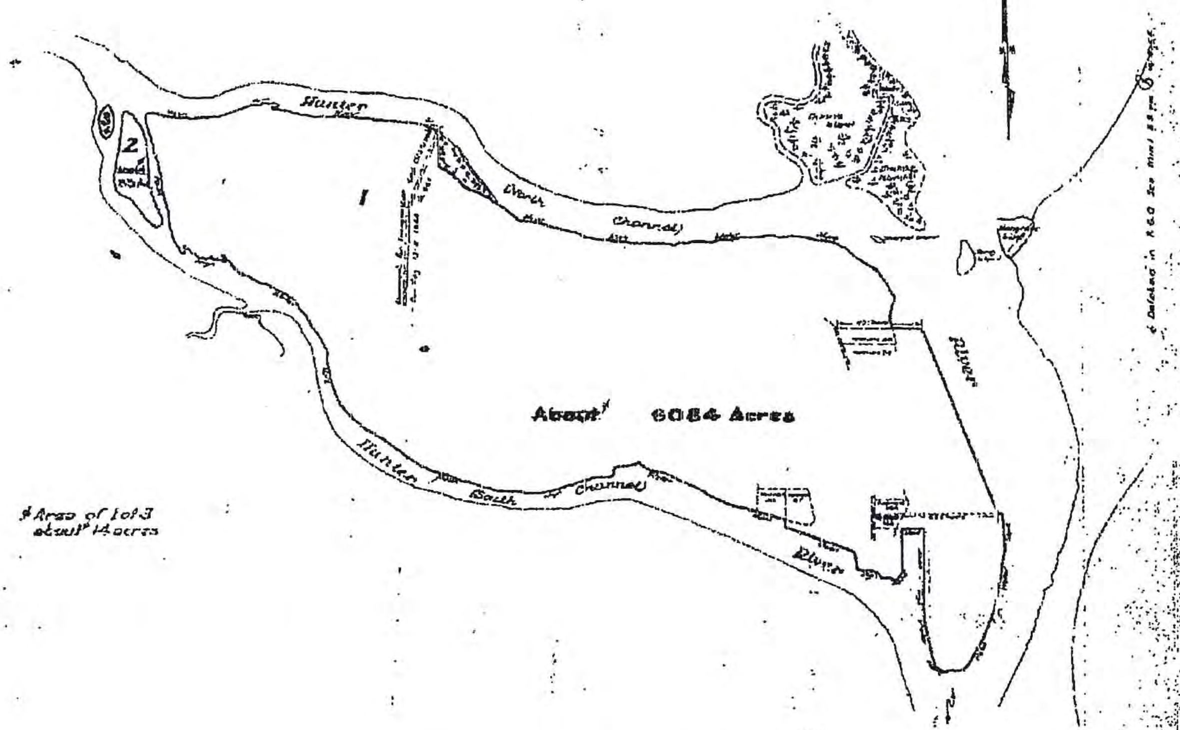
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Witness

Registrar General.

PLAN SHOWING LOCATION OF LAND

CANCELLED W



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lots 1, 2 and 3 in Deposited Plan 219706 in the City of Newcastle Parish of Newcastle and County of Northumberland excepting thereout the mines and deposits specified in Section 141 of the Public Works Act 1912.

FIRST SCHEDULE (continued overleaf)

~~MINISTER FOR PUBLIC WORKS.~~

Registrar General.

SECOND SCHEDULE (continued overleaf)

1. Easement for Transmission Line created by notification in Government Gazette of 13th March 1964 Folio 861 affecting the piece of land 151·5 links wide shown in the plan hereon.

Registrar General.

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
This deed is cancelled as to PART. New Certificates of Title have issued on 29-9-1967 for lots in Deposited Plan No. 234288 as follows:- Lots 1, 2 and 3 Vol. 10657 Fols 144, 145 & 146 respectively. Registrar General. This deed is cancelled as to part. New Certificates of Title have issued on 7-2-1968 for lots in Deposited Plan No. 232359 as follows:- Lots 1, 2 Vol. 10767 Fol 236 respectively. Registrar General	This deed is cancelled as to PART. New Certificates of Title have issued on 22-3-1973 for lots in Deposited Plan No. 528326 as follows:- Lots 3 Vol 12074 Fol 98 respectively. REGISTRAR GENERAL				
	NEW CERTIFICATE(S) OF TITLE ISSUING ON DP594332 NO DEALING TO BE REGISTERED WITHOUT REFERENCE TO SURVEY DRAFTING BRANCH. NEW CERTIFICATE(S) OF TITLE ISSUING ON DP588833 NO DEALING TO BE REGISTERED WITHOUT REFERENCE TO SURVEY DRAFTING BRANCH				

N/Cs Issuing on D.P. 581473 - No Dealings to be Registered without Ref to S.D.B.

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION			
RESUMPTION	J892295	12-1-1965	Easement for Transmission Line created by Notice of Resumption Number J892295 affecting the piece of land 151.5 lks wide shown within described in the plan hereon.	21-9-1965	[signature]				
~~Lease~~	~~K701218~~	~~14-5-1967~~	~~of part of the land being Lot 1 in Deposited Plan 234767 to Tar Coatings Pty Limited~~	11-8-1967	[signature]	Expired	27-7-1978	[signature]	
~~Lease~~	~~N451573~~	~~21-8-1973~~	~~of part of the land within described being Lot 4 in D.P. No 557123 to Cicol (Australia) Pty Limited~~	15-1-1974	[signature]	Expired	16-10-1981 S421510		

This deed is cancelled as to part. New Certificates of Title have issued on 14-8-1975 for lots in Deposited Plan No. 575674 as follows:- Lots 1 Vol. 12844 Fol 99 respectively.

Registrar General

This deed is cancelled as to COST. New Certificates of Title have issued on 16-7-76 for lots in Deposited plan No 58567 as follows: Lots 1 Vol 13055 Fol 113 respectively.

REGISTRAR GENERAL

P2 32400 Lse (Part) (1st Lease) (COST) PARTS 7 & 2 ... Ex P23 ...

P233557 LSE (PART) (Lot 2 DP 554991) -58 ...

N36568 ... Lot 3 ... 528326 excepting mines and minerals ... easement to drain ...

N36569 ... Lot 3 ... DP ...

N50200 ...

Vol. 9766 Fol. 190

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
As to part this Deed is cancelled and New Certificate of Title issued. Vol. 14129 Fol. 89 dated 2-6-1980 Vide R579495 as regards Lot 1 in DP583729 and Lot 1 in DP 599099 REGISTRAR GENERAL					
as to Part this Deed is cancelled and New Certificate of Title issued. Vol. 14612 Fol. 188 dated 10-12-1981 Vide S424510 REGISTRAR GENERAL					
John Edwin Hooper, Secretary for the time being of the Australian Gas Light Company as to Lot 3 in DP499013 by Application T922030. Registered 29-11-1984.					
I.M. Engineering Pty. Limited as regards Lot 1 in DP575675 and Minister for Public Works and Ports as regards the residue by Transfer W608006. Registered 18.12.1986.					

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		
Covenant	R579495	—	as regards lot 1 in D.P. 583729 and lot 1 in D.P. 599099	12-5-1980				
Lease	R974830		to I.M. Engineering Pty. Ltd. of Lot 1 in DP 575675 excluding the land at medium filum (together with option to purchase). Expires 31-12-1989.	28-10-1980		Merged	W608005	
S399832			Lease to Hammersley Chemicals (Aust) Pty Limited of part being Lot 2 in D.P. 575675 Together with option to purchase. Expires 1-3-1986. Registered 26-5-1981.					
S424510			Covenant as regards Lot 4 in DP557123 Registered 16-10-1981					
S399832 Lease.	S680680		Mortgage to Australia and New Zealand Banking Group Limited. Registered 22-3-1982.					
S399832 LEASE.	S744534		Mortgage to Commonwealth Development Bank of Australia. Registered 22-3-1982.					
T5131			Lease to A. Mathews Pty. Limited of part being lot 2 in D.P. 601468 together with an option to purchase. Expires 30-9-1983 Registered 27-5-1982.					
T26265			Lease to The Broken Hill Proprietary Company Limited of part being Lot 1 in DP621530 excluding the land ad medium filum viae. Expires 31-12-1984 Registered 15-9-1982					
T24182			Covenant affecting Lot 4 in D.P.528326. Registered 28.10.1982. (Reserving Rights)			4-2-1991	Z483003	
W62267			Lease to Sawmillers Exports Pty. Ltd of part being lot 1 D.P. 616497 with option of renewal expires 31-5-1990. Registered 10-3-1987.					

R974830 Lease to I.M. Engineering Pty Ltd of Lot 1 in DP575675 excluding the land ad medium filum (together with option to purchase) Expires 31-12-1989

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

Margin notes: DP621011; SHT.3 DP499013 PIPELINES ACT; DP621530; T5131 Lsc — 32CCL; Lot 2 DP601468; T24182 — B3766; T206465 Lot 1 DP621530; T262267; DP264090; T786214; T986215; T776113; DP70053; T873624

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
The Shortland County Council as regards Lot 1 on D.P. 228469 and Minister for Public Works as regards the residue					
Title is cancelled as to part and New Certificate of Title Vol. 13673 Fol. 5 issued on 31-7-1978 for Lot 1 on D.P. 228469 on Q412845.	Transfer	Q412845	——	10-3-1978	
Australian Fluroien Chemicals Pty. Limited as to part, being Lot 1 in Deposited Plan 559697 and the Minister for Public Works as to the residue.					
Samset Pty. Limited as to part being lot 1 in D.P. 583729 and Lot 1 in D.P. 599099 and the Minister for Public Works as to the residue	Transfer	Q937879	———	17-4-1979	
Commonwealth Trading Bank of Australia as to part being lot 4 in DP 557123 and Minister for Public Works as regards the residue by Transfer S424510 Registered 16-10-1981	Transfer	R579495		12-5-1980	
Klaus Hilmer and Monica Maria Hilmer as joint tenants as regards Lot 4 in D.P. 528326 by Transfers T24182 and T24183. Registered 28.10.1982.					
Roads and Traffic Authority of New South Wales as to part being Lot 3 in DP 775778 and Minister for Public Works and Ports as regards the residue by Resumption Y820298. Registered 19-4-1990.					

SECOND SCHEDULE (continued)

NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		
~~Caveat~~	~~R21710~~	~~——~~	~~of part being Lot 4 in Deposited Plan 557123 by The National Bank of Australasia Limited~~					
~~Lease~~	~~R105036~~	~~——~~	~~to Walter L. Manyska Inc. Pty. Limited of Lot 4 in Deposited Plan 528326. Together with Option of Renewal, Together with Option to Purchase. Expires 31-1-1987.~~	~~27-2-1979~~		Withdrawn	S424509	
Lease	R141462	——	to The Commonwealth Industrial Gases Limited, of Lot 1 in Deposited Plan 554991 and Lot 1 in Deposited Plan 574181. Together with Option of Renewal, Together with Option to Purchase. Expires 31-12-1985.	~~19-6-1979~~		Merged	T141776	
				19-6-1979.				

As to Part.
this Deed is cancelled and New Certificate of Title issued.
Vol. 5941 Fol. 234 dated 3-10-1979.
Vide 9937879 as regards Lot 1 in DP 59699.

REGISTRAR GENERAL

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

Vol. 9766 Fol. 190

SECOND SCHEDULE (continued)

Instrument Nature	Instrument Number	Instrument Date	Particulars	Entered	Signature of Registrar General	Cancellation
			~~This deed is cancelled as to part~~ New Certificates of Title have issued on 16-5-1977 for lots in Deposited Plan No. 557123 as follows:- Lots 2 Vol. 13309 Fol. 133 respectively. [signature] REGISTRAR GENERAL			
			This deed is cancelled as to part New Certificates of Title have issued on 8-6-1977 for lots in Deposited Plan No. 588833 as follows:- Lots 1-2 Vol. 13341 Fol. 189-190 respectively. [signature] REGISTRAR GENERAL			
Resumption	Q436837	—	Part of the land within described being lots 1 and 2 in Deposited Plan 590032 ~~is public road~~ for Railway Purposes.	5-12-1977	[signature]	
Covenant	Q412845	—	Created by Transfer No. Q412845 as regards Lot 1 in D.P. 228469	10-3-1978	[signature]	
			This deed is cancelled as to part and New Certificates of Title Vol. 13594 Fol. 138, 139 issued 19-4-1978 for DP594332. [signature]			
~~Lease~~	~~Q697906~~	—	~~of part being Lot 1 in D.P. 612 ... to Koppers Australia ... Koppers Australia Pty Limited ... Pty Limited Expiry Date ...~~	[illegible]	[signature]	

Margin notes: DP594332 [illegible]; Q412845 Tel covt (Lot 1 DP228469); Q436837 (Lots 1+2 DP590032 R); DP594332 23/3/78; Q697906 LP 7 c.t. R; Q937879 TE 80 ... Lot 1 in DP 594??; DP599099; R.02151 OPH Lot 4 DP557123; DP499013 Sh. 1-17 incl Pipelines Act ... Pt Lot DP ... Received and ... Monitor ... Reg. 11.1.10 Fol. 11; SHT 14 DP 4990? Resumed for Pipeline ... 1972 ... 80F; RT°

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

(Pages of pages)

SECOND SCHEDULE (continued)

Instrument Nature	Instrument Number	Date	Particulars	Entered	Signature of Registrar General	Cancellation		
Lease	P232400	—	of part of the land within described being lots 1&2 in plan annexed to Lease No. P232400 together with rights (together with an option to purchase) to Kooragang Cement Pty. Limited	8-10-1975	[signature]			
Lease	P233557	—	of part of the land within described being Lot 2 in DP554991 (together with an option to purchase) to Simsmetal Pty. Ltd	8-10-1975 Expires 19.3.1984	[signature]	Expired	19-4-1985	
Lease	P706283		of part of the land within described being Lots in DP559497 to Australian Fluorine Chemicals Pty Limited	15-6-1976	[signature]			
Resumption	P989107	—	of an Easement for Water Main affecting that part of the land within described designated (A) in the plan annexed to Resumption No. P989107	23-12-1976	[signature]			
Lease	Q47371	—	of part being Lot 5 in D.P. 520326 to Newcastle Lime and Cement Co. Limited Expiry date 31.12.1998	11-4-1979	[signature]	Y472009		

This deed is cancelled as to Part
New Certificates of Title have issued on 1-9-1976 as follows:-
for lots in Deposited Plan No. 559497 as follows:-
Lots 1-2 Vol. 13131 Fol. 134-135 respectively.
Consolidation vide RPA 52120

[signature]
REGISTRAR GENERAL

This deed is cancelled as to PART.
New certificates of Title have issued on 27-12-1979
for lots in DEPOSITED Plan No. 590031 as follows:
Lots 1&2 Vol. 14023 Fol. 185/186 respectively.

[signature]
REGISTRAR GENERAL

... cancelled as to ... Certificate of Title Vol. 13306 Fol. 232
Issued on 4-5-77 for lots 1-4 in DP 573972.

[signature]

Margin notes: P518054 7/lots ... P706283 (Lots 1-3C) DP583325; DP583551 9.25/6/71 (STET) Lots 1-4 DP573972; Resumed for railway ... Gaz. ... Fol. 255; Pt lots 4 D.P. 528... Resumption of easement for water supply Gaz. ... Fol. 593; P954473Te (Lot 2 D.P. 557...); Q47371L (Lot ...); DP583833 ... 231; Q212587 (Lot ...) Lots 1&2 DP ... Resumed for ...

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

SECOND SCHEDULE (continued)

Instrument Nature	Instrument Number	Instrument Date	Particulars	Entered	Signature of Registrar General	Cancellation		
T574443			Caveat by Perpetual Trustee Company of New South Wales, affecting the part of Lots 9, 11 and 14 in D.P.262783 and part of Lot 100 in D.P.630449 within described shown in the plan annexed to T574443. Registered 3-8-1983					
			This deed is cancelled as to part. New Certificate of Title issued on 24-11-1983 for lots in deposited Plan 262783 as follows:- Lots 1 to 16 Vol. 15161 Fol. 51 & 66 respectively. REGISTRAR GENERAL					
T920822			~~Lease to Imtadan Pty. Limited of part being Lot 1 shown in plan annexed to Lease T920822 together with and reserving rights and an option of renewal. Expires 31-7-1987. Registered 13-6-1984.~~			Expired	1.6.1988	
X474326			~~Lease to Simsmetal Ltd. of Lot 2 in DP554991. Expires: 19.3.1990. With an Option of Renewal for 3 years. 1.6.1988.~~					
			As to part being lot 3 in DP 479013 this Deed is cancelled and New Certificate of Title issued. Vol 15296 Fol 28 dated 7.1.1985 Vide T922030.					
V601966			~~Lease to Simsmetal Ltd of premises and land being lot 2 in D.P.554991 Expires 19-3-1987 Option of renewal 3 years. Registered 19-4-1985.~~			Expired	1.6.1988	
X474326			Lease to Simsmetal Ltd. of part being Lot 2 in DP554991. Expires: 19.3.1990. With an Option of Renewal for 3 years. 1.6.1988.					
X516917			Lease to Imtadan Pty. Limited of part being Lot 1 in DP771501. Expires: 31.7.1992. With an Option of Renewal for 5 years. Registered 1.6.1988.					
Y672009			Lease to I. M. Engineering Pty. Limited of Lot 5 in D.P. 528326. Expires 31-5-1992. Option of renewal 5 years. Registered 21-9-1989.					
Y812098			Resumption. Part of the land described being lot 3 in DP 775778 is acquired for pipeline. Registered 19-4-1990.					

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

RG 2/74

Margin notes: DP 700776 Regd 19/12/ T950894 L 682 DP Cancelled; DP 636705 Reg 4/1/ 861; V601966 L pt. being lot D.P.554991; W608005 L 671 7/1; Lot 1 DP 579675; DP 771501 R; X515821 L; X474326 L; X516917 L; DP 775778; Y812098 R; LOT 3, DP 775778; Res & veste in the Road & Traffic Auth Gaz. 22/12/8; Fol. 11560; Y873631 L; Z160186 L; Z237394 L; Z293003 D 04 L; (Lot 63 D 1802)

Vol. 9766 Fol. 190

LAND IN M.S.B. PLAN NC310 s(V) COMPRISED Pt Lot 22 in DP62928

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	NUMBER	DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION
Y873681 Lease to I.M. Engineering Pty Ltd. of Lot 4, DP554991. Expires 31-12-1992. Option of renewal 3 years. Registered 4-5-1990.						
Z160186 Lease to Eglo Engineering Pty Ltd of part being lots 1 & 2 in DP611243. Expires 31-12-1299. Registered 4-2-1991						
Z160187 Lease to Eglo Enginee Ring Pty. Limited of part being lot 1 in DP621016. Expires 31-12-1999. Registered 4-12-1991						
			~~THE RESIDUE COMPRISES LOTS 1, 2 & 3 IN DP608317 AND LAND IN M.S.B. PLAN NC310 s(V)~~			
			THE RESIDUE COMPRISES: LOTS 2 AND 3 IN DP219706, LOTS 1, 2 AND 3 IN DP 608317 ~~AND THE LAND IN M.S.B. PLAN NC 310 s (V)~~	20.6.1991		
			FOLIO CANCELLED. NEW FOLIO FOR THE RESIDUE IS AUTO CONSOL 9766-190 NO FURTHER DEALINGS TO BE REGISTERED.			

R.P.A. 43438

Crown Instrument not liable to Stamp Duty or payment of Registration or other fees.
J. Molloy
Crown Solicitor

DP219706

OHMS

J-478803

J-476035

REAL PROPERTY ACT, 1900

10 10 63

APPLICATION UNDER SECTION 31A OF THE REAL PROPERTY ACT, 1900 IN RESPECT OF LAND AT NEWCASTLE BY THE MINISTER FOR PUBLIC WORKS

The Registrar General,

SYDNEY.

The Minister for Public Works for the State of New South Wales hereby certifies that two Notifications of Resumption, copies of which are hereunto annexed, appeared in the Government Gazette of the 13th August, 1954 folios 2450 and 2451 and of the 26th July, 1963 folios 2126 respectively and the said Minister hereby applies to the Registrar General for a consolidated Certificate of Title for so much of the lands described in the said Notifications as are not under the provisions of the Real Property Act, 1900, as amended, save and except all such mines and deposits of coal ironstone kerosene shale limestone and other minerals under the said lands as are referred to in Section 141 of the Public Works Act, 1912 as amended TOGETHER with the residue of the lands comprised in the said Notifications of Resumption hereinbefore referred to save and except all such mines and deposits as aforesaid and certifies this application to be correct for the purposes of the Real Property Act, 1900 as amended.

Vide N/R G252211

DATED at Sydney this twenty fourth day of September 1963.

THE SEAL of the MINISTER FOR PUBLIC WORKS the Constructing Authority under the Public Works Act, 1912 as amended was hereto affixed in the presence of:

MINISTER FOR PUBLIC WORKS ACT, 1912 THE CONSTRUCTING AUTHORITY

D. Phillips J.P.

Cert. of T., issued Vol. ~~9765~~ 9766 Fol. 190

Dated 5 AUG 1964

[*Published in Government Gazette No. 125 of 13th August, 1954.*] Vols. 2450 & 2451.

PUBLIC WORKS ACT, 1912.—NEWCASTLE HARBOUR IMPROVEMENTS ACT, 1953.

Acquisition of Land.

IT IS HEREBY NOTIFIED AND DECLARED by His Excellency the Governor, acting with the advice of the Executive Council, that so much of the land described in the Schedule hereto as is Crown land is hereby appropriated and so much of the said land as is private property is hereby resumed under Division 1 of Part V of the Public Works Act, 1912, for improvement works in or adjacent to Newcastle Harbour, a work authorised by the Newcastle Harbour Improvements Act, 1953; AND the said land is vested in the Minister for Public Works as Constructing Authority.

Dated the 4th day of August, 1954.

J. NORTHCOTT, Governor.

By His Excellency's Command,

J. B. RENSHAW, Minister for Public Works.

SCHEDULE.

All that piece or parcel of land situate in the Shire of Lower Hunter, parish of Newcastle and county of Northumberland, comprising Moscheto, Ash and Dempsey Islands, and the beds of channels and creeks separating or flowing through those islands: Commencing on the mean high-water mark along the northern bank of the south channel of the Hunter River at the south-western corner of portion 90; and bounded thence generally on the south-west by that mean high-water mark generally north-westerly to its intersection with the mean high-water mark along the southern bank of the north channel of the Hunter River; generally on the north-east by that mean high-water mark south-easterly to its intersection with the mean high-water mark along the western bank of Moscheto channel; on the north by a line easterly to the intersection of the mean high-water mark along the eastern bank of Moscheto channel with the aforesaid mean high-water mark along the southern bank of the north channel of the Hunter River; again generally on the north-east by that lastmentioned mean high-water mark generally south-easterly to its intersection with the mean high-water mark along the north-eastern bank Mangrove Creek forming the generally south-western boundary of portion 45; on the east by a line southerly to the north-eastern corner of portion 40; generally on the east and again generally on the south-west by the mean high-water mark forming the boundary of the land resumed for wharfage improvements by Gazette notification of 18th March, 1914, generally southerly and generally north-westerly to the north western corner of portion 77; on the south-west by a line north-westerly to the intersection of the mean high-water mark along the western bank of Moscheto Channel with the aforesaid mean high-water mark along the northern bank of the south channel of the Hunter River; again generally on the south-west by that lastmentioned high-water mark generally north-westerly to its intersection with the mean high-water mark along the eastern bank of Dempsey's Channel; again on the south-west by a line north-westerly to the intersection of the mean high-water mark along the western bank of Dempsey's Channel with the aforesaid mean high-water mark along the northern bank of the south channel of the Hunter River; and again generally on the south-east by the lastmentioned mean high-water mark generally south-westerly to the point of commencement,—having an area of about 5,493 acres, and said to be in the possession of The Broken Hill Proprietary Coy. Ltd. and others.

Also, all that piece or parcel of land situate as aforesaid, being Hexham Island, as shown on the map of the parish of Newcastle,—having an area of about 83 acres, and said to be in the possession of Thomas Cowlishaw and others.

And also, all that piece or parcel of Crown land situate as aforesaid, being Campbell Island, as shown on the map of the parish of Newcastle and having an area of about 14 acres.

(H.R. 53-1,591) (5229)

Sydney: A. H. Pettifer, Government Printer—1954.

[*Published in Government Gazette No. 68 of 26th July, 1963.*] Vo 2126.

PUBLIC WORKS ACT, 1912, AS AMENDED.—NEWCASTLE HARBOUR IMPROVEMENTS ACT, 1953

ACQUISITION OF LAND

IT is hereby notified and declared by His Excellency the Governor, acting with the advice of the Executive Council, that so much of the land described in the Schedule hereto, as is Crown land, is hereby appropriated, and so much of the said land, as is private property, is hereby reserved under Division 1 of Part V of the Public Works Act, 1912, as amended, for improvement works in or adjacent to Newcastle Harbour, a work authorised by the Newcastle Harbour Improvements Act, 1953; and the said land is vested in the Minister for Public Works as Constructing Authority.

Dated this 17th day of July, 1963.

E. W. WOODWARD, Governor.

By His Excellency's Command,

P. D. HILLS, Acting Minister for Public Works.

SCHEDULE

All that piece or parcel of land situate in the City of Newcastle, parish of Newcastle and county of Northumberland, being part of the former bed of the south channel of the Hunter River: Commencing on the generally south-western boundary of the land resumed by notification in Gazette of the 13th August, 1954, at the south-western corner of portion 42; and bounded thence generally on the north-east by part of that boundary generally south-easterly to its intersection with the mean high water mark along the northern bank of the said south channel of the Hunter River; on the south-west by that mean high water mark generally north-westerly to its intersection with the southerly prolongation of the western boundary of the said portion 47; and on the west by that prolongation northerly to the point of commencement,—having an area of 16 acres or thereabouts and said to be in the possession of the Crown.

Also, all that piece or parcel of land situate in the City of Newcastle, parish of Newcastle and county of Northumberland, being part of the land resumed for Harbour Improvements by notification in Gazette of the 17th May, 1918, and adjoining land including part of the bed of the Hunter River: Commencing on the generally eastern boundary of the land resumed by notification in Gazette of the 13th August, 1954, at the north-eastern corner of portion 40; and bounded thence on the north by the easterly prolongation of the northern boundary of that portion easterly to a point distant 45 chains from the north-western corner of that portion; on the north-east by a line bearing south-easterly to a point on the easterly prolongation of the northern boundary of portion 14A distant 66 chains easterly from the north-western corner of that portion; again on the north by that prolongation easterly to its intersection with the mean high water mark along the eastern face of the retaining wall forming the western bank of the north channel of the Hunter River; thence generally on the south-east and south-west by that mean high water mark and the mean high water mark along the northern bank of the south channel of that river generally south-westerly and generally north-westerly to the said generally eastern boundary of the land resumed by notification in Gazette of 13th August, 1954; and generally on the west by part of that boundary generally northerly to the point of commencement,—having an area of 670 acres or thereabouts and said to be in the possession of the Minister for Public Works and the Crown. H.R. 1,037-9. (657)

Sydney: V. C. N. Blight, Government Printer—1963

Appn 43438 ~~[illegible]~~ parts
N/R G 759211 parts — ? to be expanded to Resume
See SD+3 Report

These are the Notifications referred to in the Application by the MINISTER FOR PUBLIC WORKS hereunto annexed dated the 23rd day of September 1963.

~~The value of the land in the annexed Application at date of resumption was £~~

Crown Solicitor

53 CT to Print S

Certificates of Title to be lodged at Land Titles Office

VOLUME	FOLIO	VOLUME	FOLIO
81	109	1320	~~225~~
86	131	1525	56
500	145	1953	21
884	221	1955	96
886	49	2652	22
886	50	2652	23
942	92	2652	24
944	41	2652	25
970	3	2688	169
977	205	3069	72 & 73
982	45	3072	26
982	88	4165	148
982	117	4982	212
982	119	5074	92
1016	56	5227	88
1018	244	5227	89
1020	124	5512	180
1037	193	5845	144
1190	38	5845	145
1212	212	5929	50
1242	106	5929	51
1250	86	5929	52
1264	243	6110	99
1274	25	6266	206
1280	89	6728	79
1291	136	6744	34

DP 219706

Shire of Lower Hunter

Original not in this Department.

PLAN

Shewing islands in Hunter River at Newcastle

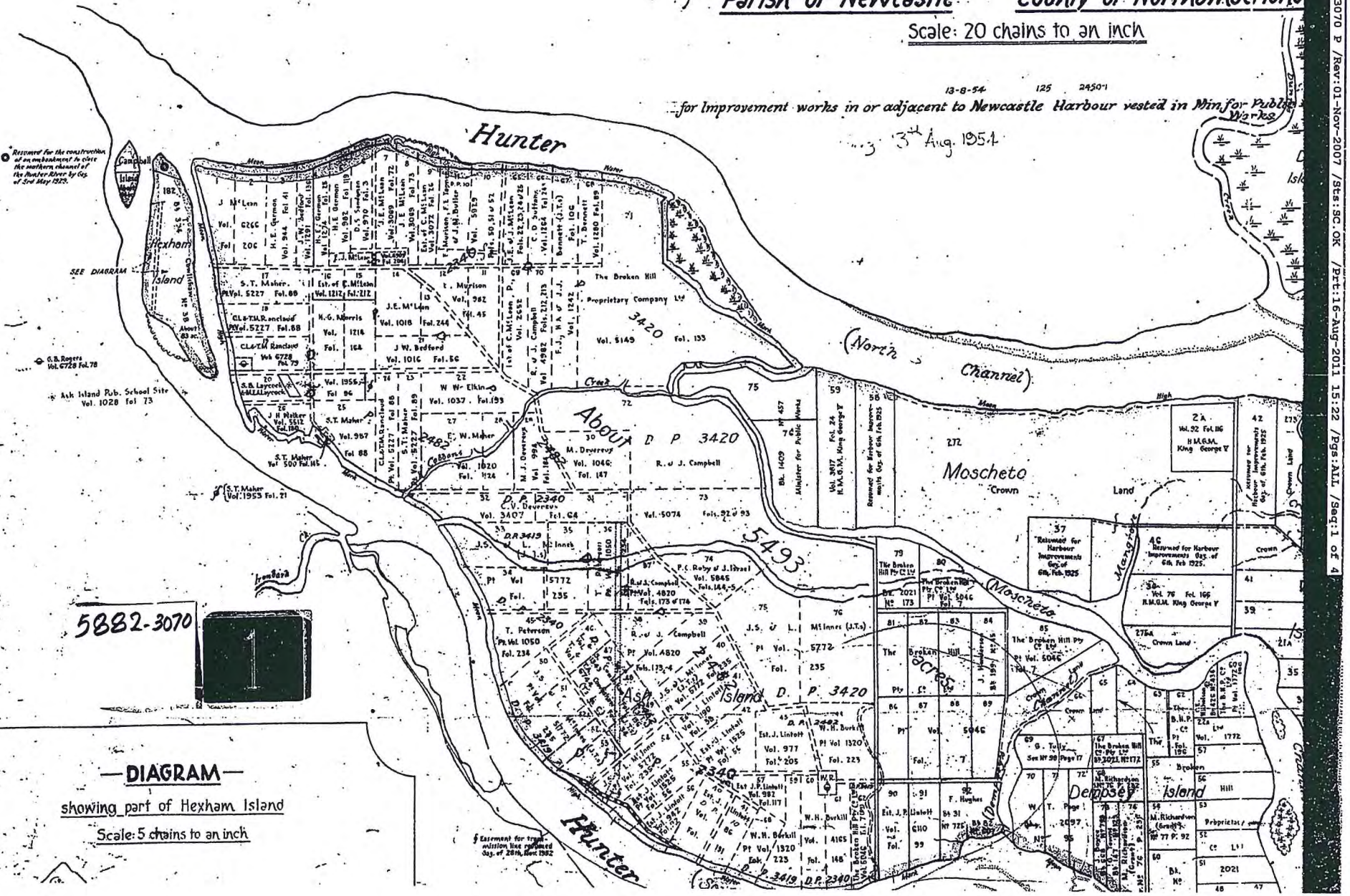
Parish of Newcastle **County of Northumberland**

Scale: 20 chains to an inch

13-8-54 125 2450-1

for Improvement works in or adjacent to Newcastle Harbour vested in Min for Public Works

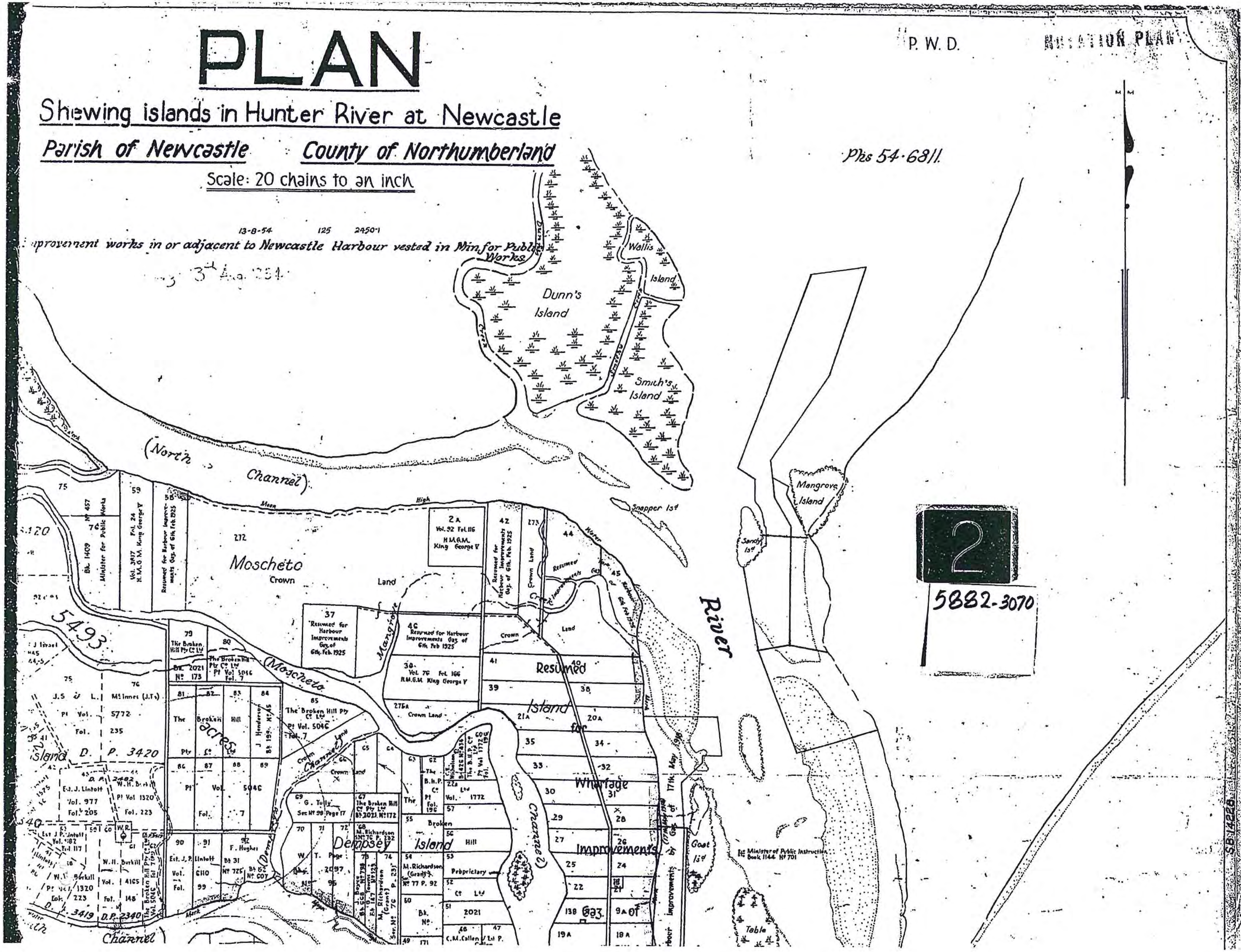
3rd Aug. 1954

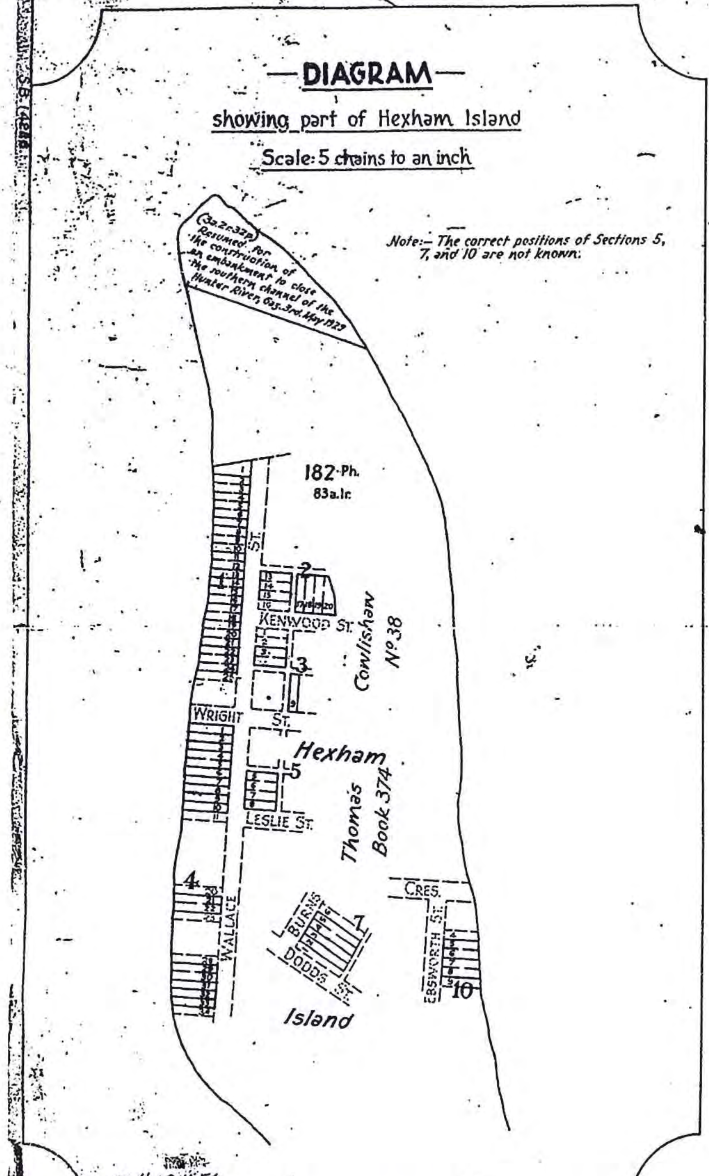


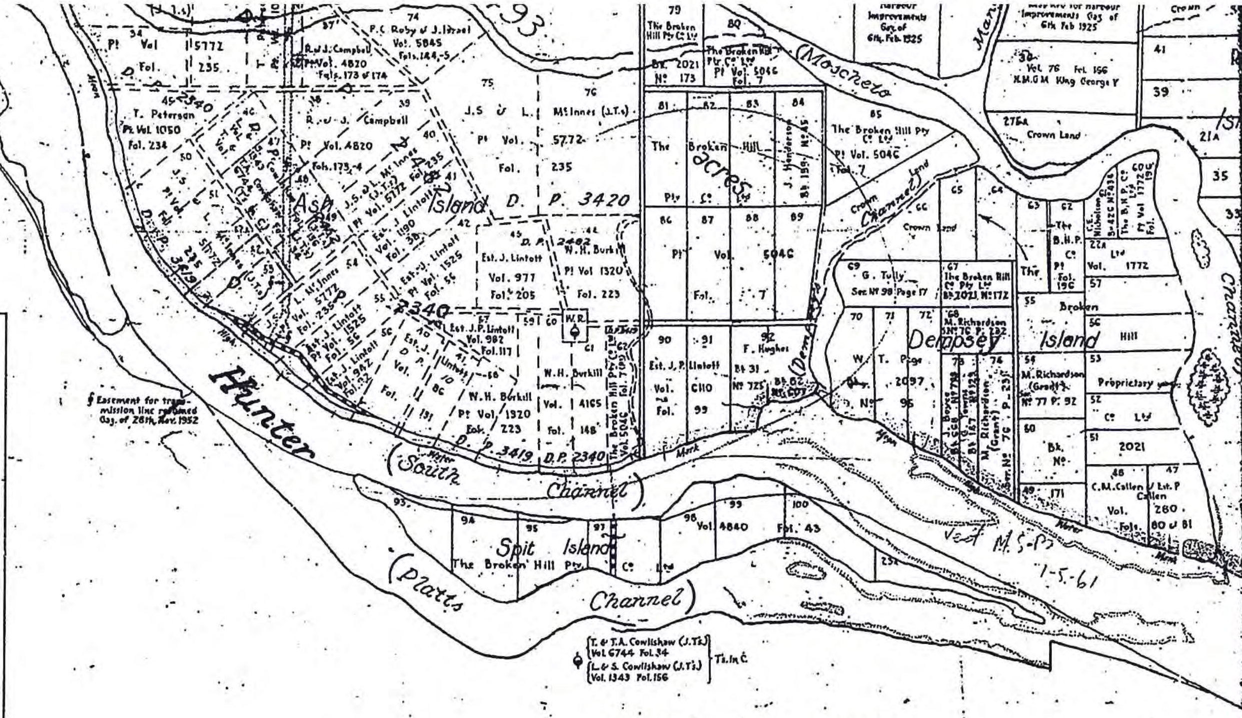
DIAGRAM

showing part of Hexham Island

Scale: 5 chains to an inch


PLAN
Shewing islands in Hunter River at Newcastle
Parish of Newcastle
County of Northumberland
Scale: 20 chains to an inch
P. W. D.
Phs 54·6811.
13-8-54 125 2450·1
...provement works in or adjacent to Newcastle Harbour vested in Min. for Public Works
Dunn's Island
Wallis Island
Smith's Island
Snapper Isd
Mangrove Island
Sandy Isd
Goat Isd
Table
(North Channel)
River
Moscheto Crown Land
Moscheto Channel
Dempsey Island
Resumed Island for Wharfage Improvements
Broken Hill Proprietary Co Ltd
Resumed for Harbour Improvements Gaz. of 6th Feb. 1925
Minister for Public Works
H.M.G.M. King George V
Minister of Public Instruction Bk. 1144 No 701
D. P. 3420
D.P. 2340
5493
5882-3070
2
SB 14228





3

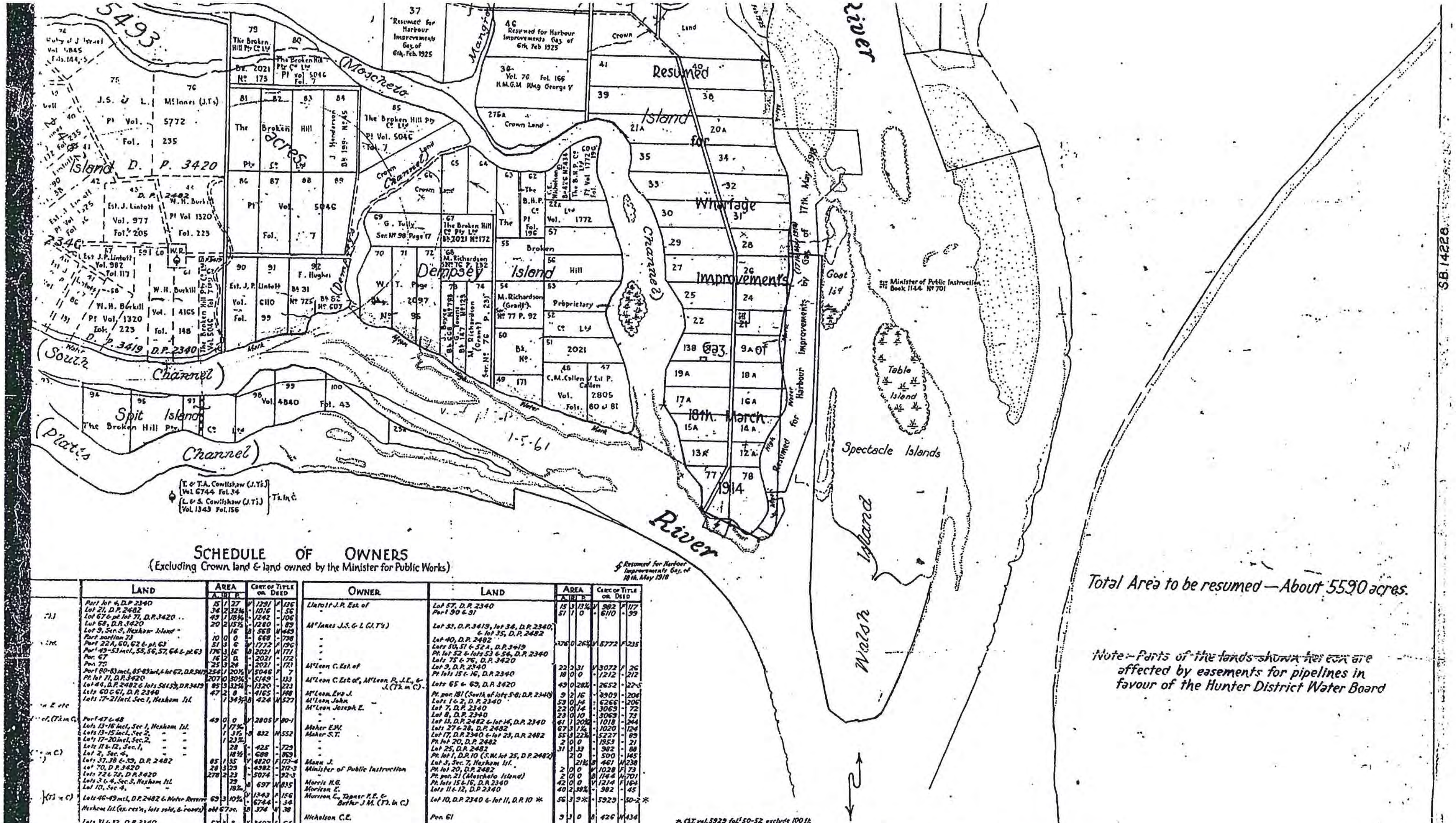
5882-3070

SCHEDULE OF OWNERS

(Excluding Crown land & land owned by the Minister for Public Works)

Owner	Land	Area A	R	P	Cert. of Title or Deed	Vol		Fol
Bedford J.W.	Part lot 4, D.P. 2340	15	1	27	V	1291	F	136
-	Lot 21, D.P. 2482	34	2	32¾	-	1016	-	56
Bennett F.J., H.A., & J.J. (J.Ts)	Lot 67 & pt. lot 71, D.P. 3420	49	1	18¾	-	1242	-	106
Bennett T.	Lot 68, D.P. 3420	20	2	15½	-	1280	-	89
Block A.	Lot 9, Sec. 3, Hexham Island			16	B	568	N	463
Boyce J.	Part portion 73	10	0	0	-	668	-	798
Broken Hill Proprietary Co. Ltd.	Port 22A, 60, 62 & pt. 63	51	3	6	V	1772	F	196
-	Port 49–53 incl., 55, 56, 57, 64 & pt. 63	176	3	16	B	2021	N	171
-	Por. 67	16	2	0	-	2021	-	172
-	Por. 73	25	3	24	-	2021	-	173
-	Port 80–83 incl., 85–89 incl., & lot 62, D.P. 3420	254	1	20½	V	5046	F	7
-	Pt. lot 71, D.P. 3420	207	0	30½	-	5149	-	133
Burkill W.H.	Lot 44, D.P. 2482 & lots 58 (59), D.P. 3419	85	3	32¾	-	1320	-	223
-	Lots 60 & 61, D.P. 2340	47	2	8	-	4165	-	148
Burns J.F.	Lots 17–21 incl. Sec. 1, Hexham Isl.		1	34¾	B	424	N	527
Butler J.M. — see Murison E. etc								
Cullen C.M. & Cullen P. Est. of, (T's in C)	Port 47 & 48	49	0	0	V	2805	F	90-1
Cutler J.H.	Lots 13–16 incl., Sec. 1, Hexham Isl.		1	17¾				
-	Lots 13–15 incl., Sec. 2, " "		1	3½	B	832	N	552
-	Lots 17–20 incl., Sec. 2, " "		1	23¾				
Campbell A.	Lots 11 & 12, Sec. 1, " "			28	-	425	-	729
Campbell E. & Reed E. (T's in C)	Lot 2, Sec. 4, " "			18½	-	688	-	862
Campbell R. & J. (T's in C)	Lots 37, 38 & 39, D.P. 2482	85	1	35	V	4820	F	173-4
-	Lot 70, D.P. 3420	28	3	29	-	4982	-	212-3
-	Lots 72 & 73, D.P. 3420	278	2	23	-	5074	-	92-3
Capper E.P. & H.H.	Lots 3 & 4, Sec. 3, Hexham Isl.			29	B	697	N	835
-	Lot 10, Sec. 4, " "			18¾				
Cowlishaw L. & S. (J.Ts) (T's in C)	Lots 46–49 incl., D.P. 2482 & Water Reserve	69	3	10¾	V	1343	F	156
Cowlishaw T. & T.A. (J.Ts) (T's in C)					-	6744	-	34
Cowlishaw T.	Hexham Isl. (ex. res'n, lots sold, & roads)	abt 67 ac.			B	374	N	38
Devereux C.V.	Lots 31 & 32, D.P. 2340	57	3	8	V	3407	F	64
Devereux Martha	Lot 30, D.P. 2482	39	2	1¾	-	1046	-	147
Devereux Mary J.	Lot 29, D.P. 2482	26	1	31	-	994	-	184
Dodds L.	Lots 2–6 incl. Sec. 1, Hexham Isl.		1	35¾				
-	Lots 8, 9 & 10, Sec. 1, " "		1	2¾	B	424	N	653
-	Lots 5, 6 & 7, Sec. 5, " "		1	3½				
Dunlop F.C.	Lots 5 & 6, Sec. 10, " "			32¾	-	1138	-	90
Ebsworth A.	Lots 4 & 5, Sec. 4, " "			37½	-	444	-	525
Elkin W.W.	Lot 22, D.P. 2482	39	1	30	V	1037	F	193
Fox C.	Lot 7, Sec. 1, Hexham Isl.			14½	B	495	N	377
German H.E.	Lot 3, D.P. 2340	28	3	2	V	944	F	41
-	Pt. lot 4, D.P. 2340	15	2	29¾	-	1274	-	25
-	Lot 5, D.P. 2340	20	0	34	-	982	-	119
Griffiths E.	Lot 1, Sec. 1, Hexham Isl.			22½	B	525	N	810
					-	1905	-	870
Hall M.T.	Lot 3, Sec. 4, " "			18¾	-	464	-	361
Henderson J.	Por. 84	28	0	28	-	199	-	45
Higgins C.T.	Lot 7, Sec. 4, " "			18½	-	426	-	43
Hughes F.	Por. 92	33	2	31	-	31	-	725
					-	82	-	607
Israel J. — see Roby P.C. etc.								
Laycock S.B. & M.E.A. (J.Ts)	Pt. lot 20, D.P. 2482	30	2	16	V	1955	F	96
Lillyman N.	Lots 22, 23 & 24, Sec. 1, Hexham Isl.		1	7¾	B	456	N	207
Lintott J. Est. of	Lots 40 & 41, D.P. 10	40	0	0	V	86	F	131
-	Lot 41, D.P. 2482	27	2	35	-	1190	-	30
-	Lots 42 & 55, D.P. 2340	56	0	36½	-	1525	-	56
-	Lot 43, D.P. 2482	31	3	2¾	-	977	-	205
-	Lot 56, D.P. 2340	16	0	32	-	942	-	92

Owner	Land	Area A	R	P	Cert. of Title or Deed	Vol		Fol
Lintott J.P. Est. of	Lot 57, D.P. 2340	15	3	13¾	V	[illegible]982	F	117
-	Port 90 & 91	51	1	0	-	[illegible]110	-	99
McInnes J.S. & L. (J.Ts)	Lot 33, D.P. 3419, lot 34, D.P. 2340, & lot 35, D.P. 2482							
-	Lot 40, D.P. 2482	376	0	26¾	V	5772	F	235
-	Lots 50, 51 & 52A, D.P. 3419							
-	Pt. lot 52 & lots 53 & 54, D.P. 2340							
-	Lots 75 & 76, D.P. 3420							
McLean C. Est. of	Lot 9, D.P. 2340	22	2	31	V	[illegible]072	F	26
-	Pt. lots 15 & 16, D.P. 2340	18	0	0	-	[illegible]212	-	212
McLean C. Est. of, McLean P., J.E., & J. (T's in C)	Lots 65 & 69, D.P. 3420	49	0	28¾	-	[illegible]652	-	22-5
McLean Eva J.	Pt. por. 181 (South of lots 5-6, D.P. 2340)	9	2	16	-	[illegible]909	-	206
McLean John	Lots 1 & 2, D.P. 2340	53	0	14	-	[illegible]256	-	206
McLean Joseph E.	Lot 7, D.P. 2340	22	0	14	-	1069	-	72
-	Lot 8, D.P. 2340	23	0	10	-	1069	-	73
-	Lot 13, D.P. 2482 & lot 14, D.P. 2340	41	3	20¾	-	[illegible]018	-	244
Maher E.W.	Lots 27 & 28, D.P. 2482	67	3	1¾	-	[illegible]020	-	124
Maher S.T.	Lot 17, D.P. 2340 & lot 23, D.P. 2482	55	3	22¾	-	[illegible]227	-	89
-	Pt. lot 20, D.P. 2482	2	0	0	-	[illegible]953	-	21
-	Lot 25, D.P. 2482	31	3	33	-	982	-	88
-	Pt. lot 1, D.P. 10 (S.W. lot 25, D.P. 2482)		2	0	-	500	-	145
Mann J.	Lot 3, Sec. 7, Hexham Isl.			21¾	B	461	N	238
Minister of Public Instruction	Pt. lot 20, D.P. 2482	2	0	0	V	[illegible]028	F	73
-	Pt. por. 21 (Moschetto Island)	2	0	0	B	1144	N	701
Morris H.G.	Pt. lots 15 & 16, D.P. 2340	42	0	0	V	1214	F	164
Murison E.	Lots 11 & 12, D.P. 2340	49	2	38¾	-	982	-	45
Murison E., Tapner F.E. & Butler J.M. (T's in C)	Lot 10, D.P. 2340 & lot 11, D.P. 10 *	56	3	9 *	-	5929	-	50-2 *
Nicholson C.E.	Por. 61	9	3	0	B	426	N	434
Page W.T.	Port 70, 71 & 72	66	1	0	-	2097	-	95
Palmer J.	Lot 33, Sec. 4, Hexham Isl.			18	-	461	-	715
Peterson T.	Lot 36, D.P. 2482 & lot 45, D.P. 2340	66	1	27¾	V	1050	F	234
Rancland C.L. & T.M. (J.Ts)	Lot 18, D.P. 2340 & lot 24, D.P. 2482	52	0	36	-	5227	-	88
-	Pt. lot 19, D.P. 2340	22	3	38½	-	6728	-	79
Reed E. — see Campbell E. etc.								
Richardson M. (original grantee)	Por. 54	21	2	32	B	77	P	92
-	Por. 68	16	2	0	-	76	-	232
-	Por. 74	26	2	0	-	76	-	231
Ripley A.	Lot 32, Sec. 4, Hexham Isl.			18	B	1377	N	631
Ripley L.A.	Lots 29 & 30, Sec. 4, Hexham Isl.			36½	-	2093	-	851
Ripley N.	Lot 6, Sec. 4, Hexham Isl.			18½	-	850	-	385
Roby P.C. & Israel J. (T's in C)	Lot 74, D.P. 3420	28	1	16	V	5845	F	144-5
Rogers G.B.	Pt. lot 19, D.P. 2340	2	0	1½	-	6728	-	78
Sandeman D.S.	Lot 6, D.P. 2340	21	0	23	-	970	-	3
Sheadon A.	Lot 8, Sec. 5, Hexham Isl.			14½	B	436	N	287
Sheridan W.	Lot 9, Sec. 4, " "			18½	-	436	-	108
Soar A.M.	Lots 21 & 22, Sec. 4, Hexham Isl.			39¾	-	1973	-	667
Sutton C.D.	Lot 66, D.P. 3420	22	0	34¾	V	1264	F	243
Tapner F.E. — see Murison E. etc.								
Towns G.	Pt. por. 73	10	0	0	B	147	N	123
Tully G. (original grantee)	Por. 69	22	0	0	-	98	P	17
Walker J.H.	Pt. por. 181 — land in plan D380039 (lot 26)	14	1	30	B	5512	F	180
Whipps A.	Lot 1, Sec. 4, Hexham Isl.			18½	B	453	N	485
Wright H.	Lot 31, Sec. 4, " "			18¾				
-	Lots 2, 4 & 5, Sec. 7, " "		1	25½	-	432	-	638
-	Lots 7 & 8, Sec. 10, " "			31¾				



SCHEDULE OF OWNERS

(Excluding Crown land & land owned by the Minister for Public Works)

Owner	Land	Area A.	R.	P.	Cert. of Title or Deed			
	Part lot 4, D.P 2340	15	1	27	V	1291	F	136
	Lot 21, D.P. 2482	34	2	32¾	-	1016	-	56
..1)	Lot 67 & pt. lot 71, D.P. 3420 ..	49	1	18¾	-	1242	-	106
	Lot 68, D.P. 3420	20	2	15½	-	1280	-	89
	Lot 9, Sec. 3, Hexham Island -			16	B	568	N	449
	Part portion 73	10	0	0	-	668	-	798
..im	Port 22A, 60, 62 & pt. 63	51	3	6	V	1772	F	196
	Por' 49-53 incl., 55, 56, 57, 64 & pt. 63	176	3	16	B	2021	N	171
	Por. 67	16	2	0	-	2021	-	172
	Por. 75	25	3	24	-	2021	-	173
	Port 80-83 incl., 85-89 incl., & lot 62, D.P. 3419	254	1	20½	V	5046	F	7
	Pt. lot 71, D.P. 3420	207	0	30½	-	5149	-	133
	Lot 44, D.P. 2482 & lots 58 & 59, D.P. 3419	85	3	32¾	-	1320	-	223
	Lots 60 & 61, D.P. 2340	47	2	8	-	4165	-	148
	Lots 17-21 incl. Sec 1, Hexham Isl.		1	34¾	B	424	N	527
..n E etc								
..of, (Ts in C)	Port 47 & 48	49	0	0	V	2805	F	90-1
	Lots 13-16 incl., Sec 1, Hexham Isl.		1	17¾				
	Lots 13-15 incl., Sec 2, - -		1	3½	B	832	N	552
	Lots 17-20 incl., Sec. 2, - -		1	23¾				
	Lots 11 & 12, Sec. 1, - -			28	-	425	-	729
(Ts in C)	Lot 2, Sec. 4, - -			18⅔	-	688	-	869
	Lots 37, 38 & 39, D.P. 2482	85	1	35	V	4820	F	173-4
	Lot 70, D.P. 3420	28	3	29	-	4982	-	212-3
	Lots 72 & 73, D.P. 3420	278	2	23	-	5074	-	92-3
	Lots 3 & 4, Sec. 3, Hexham Isl.			29	B	697	N	835
	Lot 10, Sec. 4, - -			18⅞				
(Ts in C)	Lots 46-49 incl., D.P. 2482 & Water Reserve	69	3	10⅞	V	1343	F	156
					-	6744	-	34
	Hexham Isl. (ex. res'n, lots sold, & roads)	abt 67 ac.			B	374	N	38
	Lots 31 & 32, D.P. 2340	57	3	8	V	3407	F	64
	Lot 30, D.P. 2482	39	2	1½	-	1046	-	147
	Lot 29, D.P. 2482	26	1	31	-	994	-	184
	Lots 2-6 incl. Sec. 1, Hexham Isl.		1	35¾				
	Lots 8, 9 & 10, Sec. 1. - -		1	2¾	B	424	N	659
	Lots 5, 6 & 7, Sec 5, - -		1	3½				
	Lots 5 & 6, Sec 10, - -			32¾	-	1138	-	90
	Lots 4 & 5, Sec. 4, - -			37½	-	444	-	525
	Lot 22, D.P. 2482	39	1	30	V	1037	F	193
	Lot 7, Sec. 1, Hexham Isl.			14½	B	495	N	377
	Lot 3, D.P. 2340	28	3	2	V	944	F	41
	Pt. lot 4, D.P. 2340	15	2	29¾	-	1274	-	25
	Lot 5, D.P. 2340	20	0	34	-	982	-	119
	Lot 1, Sec 1, Hexham Isl.			22½	B	525	N	810
					-	1905	-	870
	Lot 3, Sec 4, - -			18⅔	-	464	-	361
	Por. 84	28	0	28	-	199	-	45
	Lot 7, Sec. 4 - -			18⅔	-	426	-	43
	Por. 92	33	2	31	-	31	-	725
					-	82	-	607
..tc.								
..Ts)	Pt. lot 20, D.P. 2482	30	2	16	V	1955	F	96
	Lots 22, 23 & 24, Sec. 1, Hexham Isl.		1	7¾	B	456	N	207
	Lots 40 & 41, D.P. 10	40	0	0	V	86	F	131
	Lot 41, D.P. 2482	27	2	35	-	1190	-	38
	Lots 42 & 55, D.P. 2340	56	0	36⅔	-	1525	-	56
	Lot 43, D.P. 2482	31	3	2½	-	977	-	205
	Lot 56, D.P. 2340	16	0	32	-	942	-	92

Owner	Land	Area A.	R.	P.	Cert. of Title or Deed			
Llatott J.P. Est. of	Lot 57, D.P. 2340	15	3	13⅞	V	982	F	117
-	Port 90 & 91	51	1	0	-	6110	-	99
M^cInnes J.S. & L (J.T's)	Lot 33, D.P. 3419, lot 34, D.P. 2340, & lot 35, D.P. 2482							
-	Lot 40, D.P. 2482							
-	Lots 50, 51 & 52A, D.P. 3419	376	0	26¾	V	5772	F	235
-	Pt. lot 52 & lots 53 & 54, D.P. 2340							
-	Lots 75 & 76, D.P. 3420							
M^cLeon C. Est. of	Lot 9, D.P. 2340	22	2	31	V	3072	F	26
-	Pt lots 15 & 16, D.P. 2340	18	0	0	-	1212	-	212
M^cLeon C. Est. of, M^cLeon P., J.E., & J. (Ts. in C.)	Lots 65 & 69, D.P. 3420	49	0	28¼	-	2652	-	22-5
M^cLeon Eva J.	Pt. por. 181 (South of lots 5-8; D.P. 2340)	9	2	16	-	3909	-	204
M^cLeon John	Lots 1 & 2, D.P. 2340	53	0	14	-	6266	-	206
M^cLeon Joseph E.	Lot 7, D.P. 2340	22	0	14	-	3069	-	72
-	Lot 8, D.P. 2340	23	0	10	-	3069	-	73
-	Lot 13, D.P. 2482 & lot 14, D.P. 2340	41	1	20½	-	1018	-	244
Maher E.W.	Lots 27 & 28, D.P. 2482	67	3	1¼	-	1020	-	124
Maher S.T.	Lot 17, D.P. 2340 & lot 23, D.P. 2482	55	3	22¼	-	5227	-	89
-	Pt. lot 20, D.P. 2482	2	0	0	-	1953	-	21
-	Lot 25, D.P. 2482	31	3	33	-	982	-	88
-	Pt. lot 1, D.P. 10 (S.W. lot 25, D.P. 2482)		2	0	-	500	-	145
Mann J.	Lot 3, Sec. 7, Hexham Isl.			21½	B	461	N	238
Minister of Public Instruction	Pt. lot 20, D.P. 2482	2	0	0	V	1028	F	73
-	Pt. por. 21 (Moscheto Island)	2	0	0	B	1144	N	701
Morris H.G.	Pt. lots 15 & 16, D.P. 2340	42	0	0	V	1214	F	164
Murison E.	Lots 11 & 12, D.P. 2340	40	2	38¼	-	982	-	45
Murison E., Tapner F.E. & Butler J.M. (Ts. in C.)	Lot 10, D.P. 2340 & lot 11, D.P. 10 *	56	3	9 *	-	5929	-	50-2 *
Nicholson C.E.	Por. 61	9	3	0	B	426	N	434
Page W.T.	Port 70, 71 & 72	66	1	0	-	2097	-	95
Palmer J.	Lot 33, Sec 4, Hexham Isl.			18	-	461	-	715
Peterson T.	Lot 36, D.P. 2482 & lot 45, D.P. 2340	66	1	27¼	V	1050	F	234
Rancloud C.L. & T.M. (J.T's)	Lot 18, D.P. 2340 & lot 24, D.P. 2482	52	0	36	-	5227	-	88
-	Pt. lot 19, D.P. 2340	22	3	38½	-	6728	-	79
Reed E. — see Campbell E. etc								
Richardson M. (original grantee)	Por. 54	21	2	32	S	77	P	92
-	Por. 68	16	2	0	-	76	-	232
-	Por. 74	26	2	0	-	76	-	231
Ripley A.	Lot 32, Sec 4, Hexham Isl.			18	B	1377	N	631
Ripley L.A.	Lots 29 & 30, Sec. 4, Hexham Isl.			36½	-	2093	-	851
Ripley N.	Lot 6, Sec. 4, Hexham Isl.			18¾	-	850	-	385
Roby P.C. & Israel J. (Ts. in C)	Lot 74, D.P. 3420	28	1	16	V	5845	F	144-5
Rogers G.B.	Pt. lot 19, D.P. 2340	2	0	1½	-	6728	-	78
Sandeman D.S.	Lot 6, D.P. 2340	21	0	23	-	970	-	3
Sheddon A.	Lot 8, Sec. 5, Hexham Isl.			14½	B	436	N	287
Sheridon W.	Lot 9, Sec. 4, - -			18¾	-	436	-	108
Soar A.M.	Lots 21 & 22, Sec. 4, Hexham Isl.			39½	-	1973	-	667
Sutton C.D.	Lot 66, D.P. 3420	22	0	34½	V	1264	F	243
Tapner F.E. — see Murison E. etc.								
Towns G.	Pt. por. 73	10	0	0	B	147	N	123
Tully G. (original grantee)	Por. 69	22	0	0	S	98	P	17
Walker J.H.	Pt. por. 181 — land in plan D380039 (lot 26)	16	1	30	V	5512	F	180
Whipps A.	Lot 1, Sec. 4, Hexham Isl.			18½	B	453	N	485
Wright H.	Lot 31, Sec 4, - -			18¾				
-	Lots 2, 4 & 5, Sec. 7, - -		1	25½	-	432	-	638
-	Lots 1 & 8, Sec. 10, - -			31¼				

§ Resumed for Harbour Improvements Gaz. of 18th. May 1918

* C.T. vol. 5929 fol. 50-52 exclude 100 ft. reservation within the said lots 10 & 11, but area of 56a. 3r. 9p. includes the area of the 100 ft reservation within lot 11

Total Area to be resumed — About 5590 acres.

Note:— Parts of the lands shown hereon are affected by easements for pipelines in favour of the Hunter District Water Board

5882-3070

4

F. L. Mathews
PRINCIPAL SURVEYOR
20. 4. 54

Ms. 5882 Mdr.

Appendix D

OEH CLM and POEO Act Notices Database Information

Environment Protection Licence

Licence - 11781

Licence Details	
Number:	11781
Anniversary Date:	01-October
	10-Jun-2016

Licensee
INCITEC PIVOT LIMITED
PO BOX 148
MAYFIELD NSW 2304

Licence Type
Premises

Premises
INCITEC PIVOT
HERON ROAD
KOORAGANG NSW 2304

Scheduled Activity
Chemical production

Fee Based Activity	Scale
Agricultural fertiliser (phosphate) production	> 20000 - 50000 T produced

Region
North East - Hunter
Ground Floor, NSW Govt Offices, 117 Bull Street
NEWCASTLE WEST NSW 2302
Phone: 02 49086800
Fax: 02 49086810
PO Box 488G NEWCASTLE
NSW 2300

Environment Protection Licence

Licence - 11781

Information about this licence

Dictionary

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

Responsibilities of licensee

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

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

Variation of licence conditions

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

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

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

Duration of licence

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

Licence review

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

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

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

The EPA publication "A Guide to Licensing" contains information about how to calculate your licence fees.

The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

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

Transfer of licence

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

Public register and access to monitoring data

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

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

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

This licence is issued to:

INCITEC PIVOT LIMITED
PO BOX 148
MAYFIELD NSW 2304

subject to the conditions which follow.

1 Administrative conditions

A1 What the licence authorises and regulates

A1.1 Not applicable.

A1.2 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

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

Scheduled Activity
Chemical production

Fee Based Activity	Scale
Agricultural fertiliser (phosphate) production	> 20000 - 50000 T produced

A1.3 Not applicable.

A2 Premises to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
INCITEC PIVOT
HERON ROAD
KOORAGANG
NSW
2304
LOT 5 DP262783

A3 Other activities

A3.1 Not applicable.

A4 Information supplied to the EPA

A4.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:
(a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
(b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

2 Discharges to air and water and applications to land

P1 Location of monitoring/discharge points and areas

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

Air

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Description of Location
3	Phosphate rock milling stack	Phosphate rock milling stack	Phosphate Rock Milling Stack as shown on Plan 10 0307 attached to LIF dated 7/4/00
4	Superphosphate drier stack	Superphosphate drier stack	Superphosphate drier stack as shown on Plan 10 0307 attached to LIF dated 7/4/00
5	Acidulation and granulation plant stack	Acidulation and granulation plant stack	Acidulation and Granulation Plant Stack as shown on Plan 10 0307 attached to LIF dated 7/4/00
6	Conditioning plant stack	Conditioning plant stack	Conditioning plant stack as shown on Plan 10 0307 attached to LIF dated 7/4/00

P1.2 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

P1.3 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

Water and land

EPA identification no.	Type of monitoring point	Type of discharge point	Description of location
1	Stormwater North, event activated automatic sampler		North catchment area fertilizer manufacturing and blending. Point 16 on map attached to LAF 22 Oct 2002.
2	Stormwater South, event activated automatic sampler		South drain south catchment area fertilizer manufacturing and blending, phosphate rock crushing. Point 17 on map supplied with LAF dated 22 Oct 2002.
7	Stormwater Central, event activated automatic sampler		Central catchment area fertilizer manufacturing and blending 'New Discharge Point' shown on map provided 19 November 2007.

3 Limit conditions

L1 Pollution of waters

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

L2 Load limits

L2.1 The actual load of an assessable pollutant discharged from the premises during the reporting period must not exceed the load limit specified for the assessable pollutant in the table below.

Note: An assessable pollutant is a pollutant which affects the licence fee payable for the licence.

L2.2 The actual load of an assessable pollutant must be calculated in accordance with the relevant load calculation protocol.

Assessable Pollutant	Load limit (kg)
Coarse Particulates (Air)	104
Fine Particulates (Air)	10400
Fluoride (Air)	1310

L3 Concentration limits

L3.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L3.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L3.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.

Air

POINT 3

Pollutant	Units of measure	100 percentile concentration limit
Fluoride	milligrams per cubic metre	50
Total Solid Particles	milligrams per cubic metre	250

POINT 4

Pollutant	Units of measure	100 percentile concentration limit
Fluoride	milligrams per cubic metre	50

POINT 5

Pollutant	Units of measure	100 percentile concentration limit
Fluoride	milligrams per cubic metre	50
Total Solid Particles	milligrams per cubic metre	100

POINT 6

Pollutant	Units of measure	100 percentile concentration limit
Fluoride	milligrams per litre	50
Total Solid Particles	milligrams per cubic metre	100

L4 Volume and mass limits

L4.1 Not applicable.

L5 Waste

L5.1 Not applicable.

L6 Noise Limits

L6.1 Not applicable.

L7 Potentially offensive odours

L7.1 No condition of this licence identifies a potentially offensive odour for the purposes of section 129 of the Protection of the Environment Operations Act 1997.

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

4 Operating conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

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

O2 Maintenance of plant and equipment

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

O3 Dust

O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

O3.2 For the purpose of controlling wind blown dust emissions, the surface of the phosphate rock storage stockpile must, at all times be sealed with a crusting agent approved in writing by the EPA.

5 Monitoring and recording conditions

M1 Monitoring records

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

M1.2 All records required to be kept by this licence must be:
(a) in a legible form, or in a form that can readily be reduced to a legible form;
(b) kept for at least 4 years after the monitoring or event to which they relate took place; and
(c) produced in a legible form to any authorised officer of the EPA who asks to see them.

M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
(a) the date(s) on which the sample was taken;
(b) the time(s) at which the sample was collected;
(c) the point at which the sample was taken; and
(d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

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

POINT 1

Pollutant	Units of measure	Frequency	Sampling Method
Nitrogen (total)	milligrams per litre	Monthly during discharge	Grab sample
Phosphate	milligrams per litre	Monthly during discharge	Grab sample
Total suspended solids	milligrams per litre	Monthly during discharge	Grab sample
Zinc	milligrams per litre	Monthly during discharge	Grab sample
pH	pH	Monthly during discharge	Grab sample

POINT 2

Pollutant	Units of measure	Frequency	Sampling Method
Nitrogen (total)	milligrams per litre	Monthly during discharge	Grab sample
Phosphate	milligrams per litre	Monthly during discharge	Grab sample
Total suspended solids	milligrams per litre	Monthly during discharge	Grab sample
Zinc	milligrams per litre	Monthly during discharge	Grab sample
pH	pH	Monthly during discharge	Grab sample

POINT 3

Pollutant	Units of measure	Frequency	Sampling Method
Fluoride	milligrams per cubic metre	Yearly	TM-9
Total Solid Particles	milligrams per cubic metre	Yearly	TM-15

POINT 4

Pollutant	Units of measure	Frequency	Sampling Method
Fluoride	milligrams per cubic metre	Yearly	TM-9

POINT 5

Pollutant	Units of measure	Frequency	Sampling Method
Fluoride	milligrams per cubic metre	Yearly	TM-9
Total Solid Particles	milligrams per cubic metre	Yearly	TM-15

POINT 6

Pollutant	Units of measure	Frequency	Sampling Method
Fluoride	milligrams per cubic metre	Yearly	TM-9
Total Solid Particles	milligrams per cubic metre	Yearly	TM-15

POINT 7

Pollutant	Units of measure	Frequency	Sampling Method
Nitrogen (total)	milligrams per litre	Monthly during discharge	Grab sample
Phosphorus (total)	milligrams per litre	Monthly during discharge	Grab sample
Total suspended solids	milligrams per litre	Monthly during discharge	Grab sample
Zinc	milligrams per litre	Monthly during discharge	Grab sample
pH	pH	Monthly during discharge	Grab sample

M3 Testing methods - concentration limits

M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:

(a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or

(b) if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or

(c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

Note: The Protection of the Environment Operations (Clean Air) Regulation 2002 requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

Note: Testing methods - load limit

Note: Clause 18 (1), (1A) and (2) of the Protection of the Environment Operations (General) Regulation 1998 requires that monitoring of actual loads of assessable pollutants listed in L2.1 must be carried out in accordance with the testing method set out in the relevant load calculation protocol for the fee-based activity classification listed in condition A1.2.

M4 Recording of pollution complaints

M4.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M4.2 The record must include details of the following:
(a) the date and time of the complaint;
(b) the method by which the complaint was made;
(c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
(d) the nature of the complaint;
(e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
(f) if no action was taken by the licensee, the reasons why no action was taken.

M4.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M4.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M5 Telephone complaints line

M5.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M5.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M5.3 Conditions M5.1 and M5.2 do not apply until 3 months after:
(a) the date of the issue of this licence or
(b) if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.

M6 Requirement to monitor volume or mass

M6.1 Not applicable.

6 Reporting conditions

R1 Annual return documents

What documents must an Annual Return contain?

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
(a) a Statement of Compliance; and
(b) a Monitoring and Complaints Summary.
A copy of the form in which the Annual Return must be supplied to the EPA accompanies this licence. Before the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

Period covered by Annual Return

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

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

R1.3 Where this licence is transferred from the licensee to a new licensee:
(a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
(b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

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

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
(a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
(b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

Deadline for Annual Return

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

Notification where actual load can not be calculated

R1.6 Where the licensee is unable to complete a part of the Annual Return by the due date because the licensee was unable to calculate the actual load of a pollutant due to circumstances beyond the licensee's control, the licensee must notify the EPA in writing as soon as practicable, and in any event not later than the due date. The notification must specify:

(a) the assessable pollutants for which the actual load could not be calculated; and
(b) the relevant circumstances that were beyond the control of the licensee.

Licensee must retain copy of Annual Return

R1.7 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

Certifying of Statement of Compliance and signing of Monitoring and Complaints Summary

R1.8 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
(a) the licence holder; or
(b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

R1.9 A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

R2 Notification of environmental harm

Note: The licensee or its employees must notify the EPA of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

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

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

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
(a) where this licence applies to premises, an event has occurred at the premises; or
(b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,

and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

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

R3.3 The request may require a report which includes any or all of the following information:
(a) the cause, time and duration of the event;
(b) the type, volume and concentration of every pollutant discharged as a result of the event;
(c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
(d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
(e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
(f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
(g) any other relevant matters.

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

General conditions

G1 Copy of licence kept at the premises

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

Pollution studies and reduction programs

U1 Not applicable.

Special conditions

E1 Not applicable.

Dictionary

General Dictionary

In this licence, unless the contrary is indicated, the terms below have the following meanings:

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991

Environment Protection Licence

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EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 1998.
flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 1998
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
Noise	Means “sound pressure levels”
Noise sensitive locations	Means buildings used as residence, hospital, school, child care centre, places of public worship and nursing homes. A noise sensitive location includes the land within 30 metres of the building
NSW Industrial Noise Policy	Means the document titled “NSW Industrial Noise Policy” published by the Environment Protection Authority in January 2000
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence

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reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non-putrescible), special waste or hazardous waste

Mr Shane Trengove

Environment Protection Authority

(By Delegation)

Date of this edition - 04-Nov-2010

End Notes

1	Licence varied by notice 1040706, issued on 17-Sep-2004, which came into effect on 12-Oct-2004.

End Notes

2	Licence varied by notice 1080089, issued on 21-Nov-2007, which came into effect on 21-Nov-2007.
3	Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
4	Licence varied by notice 1103074, issued on 18-Nov-2009, which came into effect on 18-Nov-2009.
5	Licence varied by notice 1113371, issued on 21-Apr-2010, which came into effect on 21-Apr-2010.
6	Licence fee period changed by notice 1119917 approved on .
7	Licence varied by correction to Scheduled Activity name, issued on 04-Nov-2010, which came into effect on 04-Nov-2010.

Appendix E

Heritage Database Information

Click on the BACK button of your browser to return to the search.

Statutory Listed Items

Information and items listed in the State Heritage Inventory come from a number of sources. This means that there may be several entries for the same heritage item in the database. For clarity, the search results have been divided into two sections.

- **Section 1**. contains items listed by the **Heritage Council** under the NSW Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 136 of the NSW Heritage Act. This information is provided by the Heritage Branch.
- **Section 2**. contains items listed by **Local Councils & Shires and State Government Agencies**. This section may also contain additional information on some of the items listed in the first section.

Section 1. Items listed under the NSW Heritage Act.

Click on an item name to view the full details.
The search results can be re-sorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Listed Under Heritage Act

There were no records in this section matching your search criteria.

Section 2. Items listed by Local Government and State agencies.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Information Source (sort)
131 Radar Igloo (Building)	200 Kooragang Street	Kooragang	Newcastle	LGOV
Palm	Greenleaf Road	Kooragang	Newcastle	LGOV
School Master's House	200 Kooragang Street	Kooragang	Newcastle	LGOV
Tongues Tree Fig	Kooragang Nature Reserve	Kooragang	Newcastle	LGOV

There were **4** records in this section matching your search criteria.

There was a total of **4** records matching your search criteria.

Key:
LGA = Local Government Area
GAZ= NSW Government Gazette (statutory listings prior to 1997), HGA = Heritage Grant Application, HS = Heritage Study, LGOV = Local Government, SGOV = State Government Agency.

Note: The Heritage Branch seeks to keep the State Heritage Inventory (SHI) up to date, however the latest listings in Local and Regional Environmental Plans (LEPs and REPs) may not yet be included. Always check with the relevant Local Council or Shire for the most recent listings.

Appendices F to J have not been included in the printed version of this report. They are available electronically on the accompanying CDs or by request should they be required.

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