Targeted Phase II Detailed Site Investigation

Honeycomb Drive, Eastern Creek NSW

Prepared for: The Next Generation (TNG) Pty Ltd

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v1. final
6th August, 2014

ADE CONSULTING GROUP
SOLUTIONS THROUGH INNOVATION

Prepared for:

The Next Generation (TNG) Pty Ltd

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Honeycomb Drive, Eastern Creek NSW

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LIST OF ABBREVIATIONS

ADE	A.D. Envirotech Australia Pty Ltd
ASS	Acid Sulphate Soils
BGS/L	Below ground surface/level
BR	Blind Replicate
BTEX	Benzene, toluene, ethyl-benzene, xylene
CN	Cyanide
COC	Chain of Custody
DQI	Data Quality Indicators
DQO	Data Quality Objectives
TDSI	Targeted Detailed Site Investigation
EPA	Environmental Protection Authority
HILs	Health Investigation Levels
LPI	Land Property Information
LTO	Land Titles Office
MGT	Eurofins I MGT Environmental Pty Ltd
NATA	National Association of Testing Authorities
NSW EPA	New South Wales Environmental Protection Authority
OEH	Office of Environment and Heritage
OPPs	Organophosphorous Pesticides
OCPs	Organochlorine Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PASS	Potential Acid Sulphate Soils
PASSA	Preliminary Acid Sulphate Soils Assessment
PCBs	Polychlorinated Biphenyls
PPILs	Provisional Phytotoxicity-based Investigation Levels
PSI	Preliminary Site Investigation
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
SCID	Stored Chemical Information Database
SMF	Synthetic Mineral Fibre
SWL	Standing Water Level
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
VHC	Volatile Halogenated Compounds
TNG	The Next Generation

EXECUTIVE SUMMARY

A.D. Envirotech Australia Pty Ltd (ADE) was engaged by TNG to undertake a Targeted Phase II Detailed Site Contamination Investigation (DSI) to assess the current level of contamination of the site at Honeycomb Drive, Eastern Creek NSW (hereafter referred to as the 'site'), prior to TNG taking possession of the site for the construction of an 'Energy from Waste Facility'.

The plant will allow for unsalvageable and uneconomic residue waste from the Genesis Material Processing Centre (MPC) and Waste Transfer Station (WTS) to be used for the generation of electrical power.

This report was completed in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites,* NSW EPA, September 2000. It follows on from ADE Report #*7438 Preliminary Site Investigation (PSI) Honeycomb Drive, Eastern Creek NSW.* As the PSI raised low risk concerns, a reduced number of sampling locations were selected in 'targeted' locations. As such, no maximum hotspot size can confidentially be determined.

Objectives

The objectives of the investigation were to:

- Provide information on the issues raised in the Phase I Preliminary Investigation;
- Discuss the site condition;
- Assess and describe the source, type, extent and level of contamination (if present) within the top 0.5 m of soil materials BGL, and within the two (2) soil stockpiles;
- Assess and describe the source, type, extent and level of contamination (if present) within the surface water and sediment within the creek which runs through the subject area;
- Determine the human health and environmental risk (if present); and
- Provide a preliminary waste classification in accordance with the adopted NSW EPA *Waste Classification* Guidelines.

The **Scope of Works** included the following:

Phase One: A review of available information of historical data and previous Phase I Preliminary Site Contamination Assessment.

Phase Two: The carrying out of a contaminated site investigation based on the findings of the Phase I Preliminary Site Contamination Assessment.

Phase Three: Submission of samples for analysis and the preparation of a Stage II Detailed Site Investigation Report (DSI).

Summary of Contamination Investigation

A total number of twenty five (25) discrete soil and sediment samples were collected from twenty five (25) sample points throughout the site including boreholes, stockpiles and creek beds (excluding QA/QC samples). Four (4) surface water samples were collected from four (4) sample points along the creek.

Criteria applied included the NEPM Schedule B(1) Health Based Investigation Levels (HIL) D, Ecological Screening Levels (commercial/industrial), NSW EPA *Waste Classification Guidelines Part 1: Classifying Waste* for off-site disposal and ANZECC Guidelines for Fresh and Marine Water Quality.

Summary of the sample results can be found below in **Table 1, Table 2** and **Table 3** below.

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Table 1. Summary of Soil Sampling Results

Analytes	Site Assessment Criteria (SAC)				Results		Conclusion		
	Maximum Values of Total Concentration Assigned for General Solid Waste CT1/CT2 (mg/kg)	Maximum Values of Total Concentration Assigned for General Solid Waste TCLP1 (mg/L)/ SCC1 (mg/kg)	Ecological Screening[6]/ Investigation Levels[6]/ (EILs / ESLs) (mg/kg)	Commercial / Industrial (HIL D) (mg/kg dry soil)	Maximum Total Concentration Detected (mg/kg)	95 % Upper Confidence Limit (UCL), (mg/kg)	General Solid Waste	Commercial / Industrial (HIL D)	Ecological Screening[6] / Investigation Levels[6]
Arsenic	100/400	5/500	160[5]	3000[5]	25.2	-	Acceptable	Acceptable	Acceptable
Cadmium	20/80	1/100	NA	900	ND	-	Acceptable	Acceptable	Acceptable
Chromium	100/400	5/1900	NA	3600	140	51.6	Acceptable	Acceptable	Acceptable
Copper	NA	NA	NA	240 000	86.4	-	Acceptable	Acceptable	Acceptable
Lead	100/400	5/1500	NA	1500	160	44.6	Acceptable	Acceptable	Acceptable
Mercury	4/16	0.2/50	NA	730	0.27	-	Acceptable	Acceptable	Acceptable
Nickel	40/160	2/1050	NA	6000	130	31.6	Acceptable	Acceptable	Acceptable
Zinc	NA	NA	NA	400 000	240	-	Acceptable	Acceptable	Acceptable
TRH Fraction $C_6 – C_{10}$	NA	NA/650	215	NA	ND	-	Acceptable	Acceptable	Acceptable
TRH Fraction C_{10}- C_{40}	NA	NA/10000	NA	NA	350	-	Acceptable	Acceptable	Acceptable
TRH Fraction C_{10}-C_{16}	NA	NA	170[3]	NA	ND	-	Acceptable	Acceptable	Acceptable
TRH Fraction C_{16}-C_{34}	NA	NA	1700[3]	NA	140	-	Acceptable	Acceptable	Acceptable
TRH Fraction C_{34}-C_{40}	NA	NA	3300[3]	NA	160	-	Acceptable	Acceptable	Acceptable
DDT + DDD + DDE	NA	NA	NA	3600	ND	-	Acceptable	Acceptable	Acceptable
DDT	NA	NA	640	NA	ND	-	Acceptable	Acceptable	Acceptable
Aldrin + Dieldrin	NA	NA	NA	45	ND	-	Acceptable	Acceptable	Acceptable
Chlordane	NA	NA	NA	530	ND	-	Acceptable	Acceptable	Acceptable
Endosulfan	60/240	3/108	NA	NA	ND	-	Acceptable	Acceptable	Acceptable
Benzene	10/40	0.5/18	75[3]	NA	NT	-	Acceptable	Acceptable	Acceptable
Toluene	288/1152	14.4/518	135[3]	NA	NT	-	Acceptable	Acceptable	Acceptable
Ethyl-benzene	600/2400	30/1080	165[3]	NA	NT	-	Acceptable	Acceptable	Acceptable
Xylenes (total)	1000/4000	50/1800	95[4]	NA	NT	-	Acceptable	Acceptable	Acceptable
Benzo(a)pyrene	0.8/3.2	0.04/10	1.4	NA	0.56	-	Acceptable	Acceptable	Acceptable
Carcinogenic PAHs (as BaP TEQ)[2]	NA	NA	NA	40	1.1	-	Acceptable	Acceptable	Acceptable
PAH total	NA	NA/200	NA	4000	7.3	-	Acceptable	Acceptable	Acceptable
Naphthalene	NA	NA	370	NA	ND	-	Acceptable	Acceptable	Acceptable
PCBs	NA	NA/<50	NA	7	ND	-	Acceptable	Acceptable	Acceptable
Phenol	NA	NA	NA	240 000	ND	-	Acceptable	Acceptable	Acceptable
Pentachlorophenal	NA	NA	NA	660	ND	-	Acceptable	Acceptable	Acceptable
Cresols	NA	NA	NA	25 000	ND	-	Acceptable	Acceptable	Acceptable

Notes to table

ND – Not detected/below Practical Quantitation Limit (PQL)

NA – Not Applicable

[1]Adjusted criteria due to sample composition

[2]Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their Toxic Equivalency Factor (TEFs) (potency relative to B(a)P). The B(a)P TEQ (Toxic Equivalency Quantity) is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF.

[3]Coarse soil texture was adopted

[4]Fine soil texture was adopted

[5] The arsenic is considered aged. Aged values are applicable to arsenic contamination present in soil for at least two years.

[6] Values provided for commercial/industrial land use.

Table 2. Summary of Sediment Sampling Results

	Site Assessment Criteria (SAC)			Results	Conclusion		
Analytes	**ANZECC Interim Sediment Quality Guidelines- Low[1] (Trigger value) (mg/kg)**	**ANZECC Interim Sediment Quality Guidelines- High[1] (mg/kg)**	**Ecological Screening[4]/ Investigation Levels[4]/ (EILs / ESLs) (mg/kg)**	**Maximum Total Concentration Detected (mg/kg)**	**ANZECC Interim Sediment Quality Guidelines- Low[1] (Trigger value) (mg/kg)**	**ANZECC Interim Sediment Quality Guidelines- High[1] (mg/kg)**	**Ecological Screening[6]/ Investigation Levels[6]/ (EILs / ESLs) (mg/kg)**
Arsenic	20	70	-	22	**Investigate**	Acceptable	N/A
Cadmium	1.5	10.0	-	ND	Acceptable	Acceptable	N/A
Chromium	80	370	-	37	Acceptable	Acceptable	N/A
Copper	65	270	-	27	Acceptable	Acceptable	N/A
Lead	50	220	-	31	Acceptable	Acceptable	N/A
Mercury	0.15	1.0	-	ND	Acceptable	Acceptable	N/A
Nickel	21	52	-	29	**Investigate**	Acceptable	N/A
Zinc	200	410	-	54	Acceptable	Acceptable	N/A
TRH $C_6 – C_{10}$	-	-	215	ND	N/A	N/A	Acceptable
TRH C_{10}- C_{40}	-	-	NA	ND	N/A	N/A	Acceptable
TRH C_{10}-C_{16}	-	-	170[3]	ND	N/A	N/A	Acceptable
TRH C_{16}-C_{34}	-	-	1700[3]	ND	N/A	N/A	Acceptable
TRH C_{34}-C_{40}	-	-	3300[3]	ND	N/A	N/A	Acceptable
Naphthalene	160	2100	-	ND	Acceptable	Acceptable	N/A
Benzo(a)pyrene	430	1600	-	ND	Acceptable	Acceptable	N/A
B(a)P TEQ[2]	-	-	-	7.8	Acceptable	Acceptable	N/A
Total PAH	4000	45000	-	<4.8	Acceptable	Acceptable	N/A

Notes to table

ND – Not detected/below Practical Quantitation Limit (PQL)

NA – Not Applicable

[1]ANZECC Guidelines for Water Quality, 2000

[2]Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their Toxic Equivalency Factor (TEFs) (potency relative to B(a)P). The B(a)P TEQ (Toxic Equivalency Quantity) is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF.

[3]Coarse soil texture was adopted

[4] Values provided for commercial/industrial land use.

Table 3. Summary of Surface Water Sampling Results

	Site Assessment Criteria (SAC)	Results	Conclusion
Analytes	**Adjusted ANZECC (2000) Guidelines for Fresh Water Quality[2]** **95% Species Protection** **(µg/L)**	**Maximum Total Concentration Detected** **(µg/L)**	**Adjusted ANZECC (2000) Guidelines for Fresh Water Quality[2]** **95% Species Protection** **(µg/L)**
Arsenic	13[f]	ND	Acceptable
Cadmium	2[5]	ND	Acceptable
Chromium	8.4[5e]	ND	Acceptable
Copper	12.6[5]	3	Acceptable
Lead	90.8[5]	ND	Acceptable
Mercury	0.06[b]	ND	Acceptable
Nickel	99[5]	2	Acceptable
Zinc	72[5d]	ND	Acceptable
TRH >C6 – C10	150[3]	ND	Acceptable
TRH >C10 – C16	600[4]	ND	Acceptable
TRH >C16 – C34		ND	Acceptable
TRH >C34 – C40		ND	Acceptable
Naphthalene	16	ND	Acceptable
Anthracene	0.01[a,b]	ND	Acceptable
Phenanthrene	0.6[a,b]	ND	Acceptable
Fluoranthene	1.0[a,b]	ND	Acceptable
Benzo(a)pyrene	0.1[a,b]	ND	Acceptable

Notes to Table:

1 - Circular on Target Values and Intervention Values for soil remediation, Ministry of Housing, Spatial Planning and Environment, 2000 (Netherlands).

2 -Trigger values adopted (level of protection: 95% of species for slightly-moderately disturbed systems), Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council, 2000.

a. In the absence of a high reliability concentration, the moderate or low reliability guideline concentration has been adopted.
b. Due to the potential for the chemical to bioaccumulate, a 99% percent protection level has been adopted.
c. As the two isomers m-Xylene and p-Xylene cannot be distinguished analytically, the lower threshold of 75 µg/l has been adopted.
d. Figure may not protect key species from chronic toxicity, ANZECC 2000.
e. As total concentration was reported for the analyte, the most stringent valence threshold was adopted.
f. As total Arsenic is provided in analytical results, the most stringent criteria of As III and As V has been adopted.
g. 99% protection recommended for 'slightly-moderately' disturbed systems.

3 - No current NSW DECCW adopted criteria. Recommended applicable criteria for screening purposes.

4 - Maximum of 600 µg/l for sum of TRH>C10-C40 (adapted from Netherlands Intervention Values[1]).

5 - Adjusted trigger value for 'Extremely Hard' water (>400 mg/L $CaCo_3$)

SOIL

A. NEPM Schedule B(1) HIL (D) guideline values

The area investigated, defined by the scope of works meets the NEPM Schedule B (1) HIL (D) guideline in soil with respect to heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), PAHs, OCPs/OPPs, Phenols and PCBs.

B. Ecological Screening Levels

All samples meet the NEPM B(1) Ecological Screening Level (Commercial and Industrial) assessment criteria in soil with regard to TRH, Naphthalene**,** Benzo(a)pyrene, Arsenic and DDT.

C. Asbestos

No asbestos was observed during the investigation works. Five samples were collected within areas of fill materials. None of the five (5) soil samples collected during the investigations contained asbestos.

D. Preliminary in Situ Waste Classification

The concentrations of metals (As, Cr, Cd, Hg, Cu, Pb, Ni and Zn), Benzo(a)pyrene, petroleum hydrocarbons (TRH), poly-aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs) and organophosphate pesticides (OPPs) in the soil samples collected meet the NSW EPA criteria assigned for General Solid Waste.

NOTE: This in situ preliminary waste classification is indicative only. The sampling frequency of further testing will be dependent on the projected volumes of soil to be removed and transported to an EPA licensed landfill.

SEDIMENT

A. ANZECC Guidelines for Fresh and Marine Water Quality – Sediment Guidelines

The sediment samples collected from the creek meet the ANZECC Guidelines for Sediment Quality with respect to PAH.

The sediment samples collected from the creek meet the ANZECC Guidelines for Sediment Quality with respect to heavy metals (cadmium, chromium, copper, lead , mercury and zinc).

One (1) sediment sample slightly exceeds the ANZECC Guidelines for ISQG-Low criteria of 20 (mg/kg) for Arsenic (As) and 21 (mg/kg) for Nickel (Ni). This sample was collected from SS-02 (refer to **Figure 2** for sample locations).

Elevated concentrations of As and Ni could be explained by the current state of the creek. It was observed that the creek was ephemeral in nature. At the time of the investigation, the water was not running, the water depth was no greater than 0.2 m and dry in many sections. As a result, this may increase concentrations of heavy metals in the creek sediment due to precipitation of heavy metals in water.

Furthermore, it is also possible that background ranges of As and Ni within the soil and rock located outside the site, upstream of the creek, may have caused a natural increase in the creek sediment concentrations of metals within the site.

It should be noted, during the field investigation works no aquatic animals or amphibians were observed in or around the creek.

Taking into account the above and based on the creeks size and capacity, the impact of the slightly increased concentrations of Arsenic and Nickel on water ecological health within the creek and greater river catchment is considered minimal and therefore does not warrant any further investigations and the results are deemed acceptable.

B. Ecological Screening Levels

All samples meet the NEPM B(1) Ecological Screening Level (Commercial and Industrial) assessment criteria in soil with regard to TRH.

SURFACE WATER

A. ANZECC Guidelines for Fresh Water Quality Guideline Values

Total Recoverable Hydrocarbons (TRH)

The concentrations of TRH fractions were observed below the adopted site assessment criteria.

Polycyclic Aromatic Hydrocarbons (PAHs)

The concentrations of Anthracene, Naphthalene, Phenanthrene, Fluoranthene and Benzo(a)pyrene were observed below the adopted site assessment criteria.

Dissolved Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn)

The concentration of dissolved metals As, Cd, Cu, Cr, Pb, Hg, Ni and Zn were observed below the adopted site assessment criteria.

OVERALL CONTAMINATION STATUS OF SITE

It is the opinion of ADE that no contamination of the site from potential contaminating practices undertaken both on and off site, had occurred prior to the time the investigation took place.

The concentrations of the potential contaminants within the soil, sediment and surface water samples collected were below the NEPM Schedule B (1) Health Based Investigation Levels (HIL) D, Ecological Screening Levels (commercial/industrial) and ANZECC Guidelines for Fresh and Marine Water Quality assessment criteria's.

Based on the findings of the detailed site investigation, the site is deemed suitable for commercial/industrial land use and the proposed development.

1 INTRODUCTION

1.1 General

A.D. Envirotech Australia Pty Ltd (ADE) was engaged by TNG to undertake a Targeted Stage II Detailed Site Investigation (DSI) to assess the levels of possible contamination prior to the commencement of TNG construction activities on the site at Honeycomb Drive, Eastern Creek NSW.

This report was completed in accordance with the *Guidelines for Consultants Reporting on Contaminated Sites,* NSW EPA, September 2000.

1.2 Objectives

The objectives of the investigation were to:

- Provide comprehensive information on the issues raised in the Phase I Preliminary Investigation;
- Discuss the site condition;
- Assess and describe the source, type, extent and level of contamination (if present);
- Determine the human health and environmental risk (if present); and
- Provide a preliminary waste classification in accordance with the NSW EPA *Waste Classification* Guidelines.

1.3 Scope of Work

The scope of work required to achieve the objectives of the investigation involved the following:

1.3.1 Phase One

- Completion of a specialised Safety, Health & Environment Work Method Statement (SH&EWMS);
- Review of preliminary site investigation; and
- Review of past and current activities on the site.

1.3.2 Phase Two

- Site Inspection by an experienced team of environmental scientists;
- Drilling of twenty one (21) boreholes covering the site in a grid and judgmental pattern;
- Soil sampling of material from the soil surface to a maximum depth of 0.5 m below ground level (BGL), at any changes in soil stratigraphy or within any areas of apparent contamination;
- Soil sampling of material from stockpiled materials;
- Sediment sampling within the creek bed at four (4) locations;
- Surface water sampling from four (4) locations within the creek; and
- Cold storage of all samples collected.

1.3.3. Phase Three

- Submission to a laboratory for analysis under chain of custody conditions;
- Laboratory analysis of soil samples for metals, TRH, PAH, OCPs, OPPs, PCBs, Phenols and Asbestos;
- Laboratory analysis of sediment samples for metals, TRH and PAH;
- Laboratory analysis of water samples for dissolved metals, TRH, PAH, EC, pH and $CaCO_3$; and
- Preparation of a Targeted Stage II DSI Report outlining the investigation methodology, interpretation of the site data (results), recommendations and conclusions.

1.4 Legislative Requirements

The investigation was conducted in accordance with:

- *ANZECC Water Quality Guidelines,* October 2000.
- *Guidelines for the NSW Site Auditor Scheme*, NSW DEC 2006.
- *Guidelines for Consultants Reporting on Contaminated Sites*, NSW EPA, 2000.
- *Assessment of Site Contamination, National Environment Protection (Assessment of Site Contamination) Measure, 2013.*
- Australian Standard AS 4482.1 *Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.*
- Australian Standard AS 4482.2 *Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances.*
- *Sampling Design Guidelines* - NSW EPA, 1995.
- *Waste Classification Guidelines Part 1: Classifying Waste,* DECC, 2009.
- *Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation* 2008, NSW DECCW 2009.
- *Guidelines for the Assessment and Management of Groundwater Contamination*, NSW DEC, 2007.
- *Guidelines on the Investigation Levels for Soil and Groundwater*, National Environmental Protection Measure (NEPM) 2013.

1.5 Whole Report

No one section or part of a section, of this report should be taken as giving an overall idea of this report. Each section must be read in conjunction with the whole of this report, including its appendices and attachments.

2 SITE IDENTIFICATION AND PHYSICAL SETTING

2.1 Site Location

The site is located at Honeycomb Drive as is shown by **Figure 1** below.

Figure 1. Aerial photograph of the subject site outlined in red (Aerial photograph from Urbis; accessed on 30.04.2014).

Figure 2 below illustrates the subject site and approximate representative sample locations

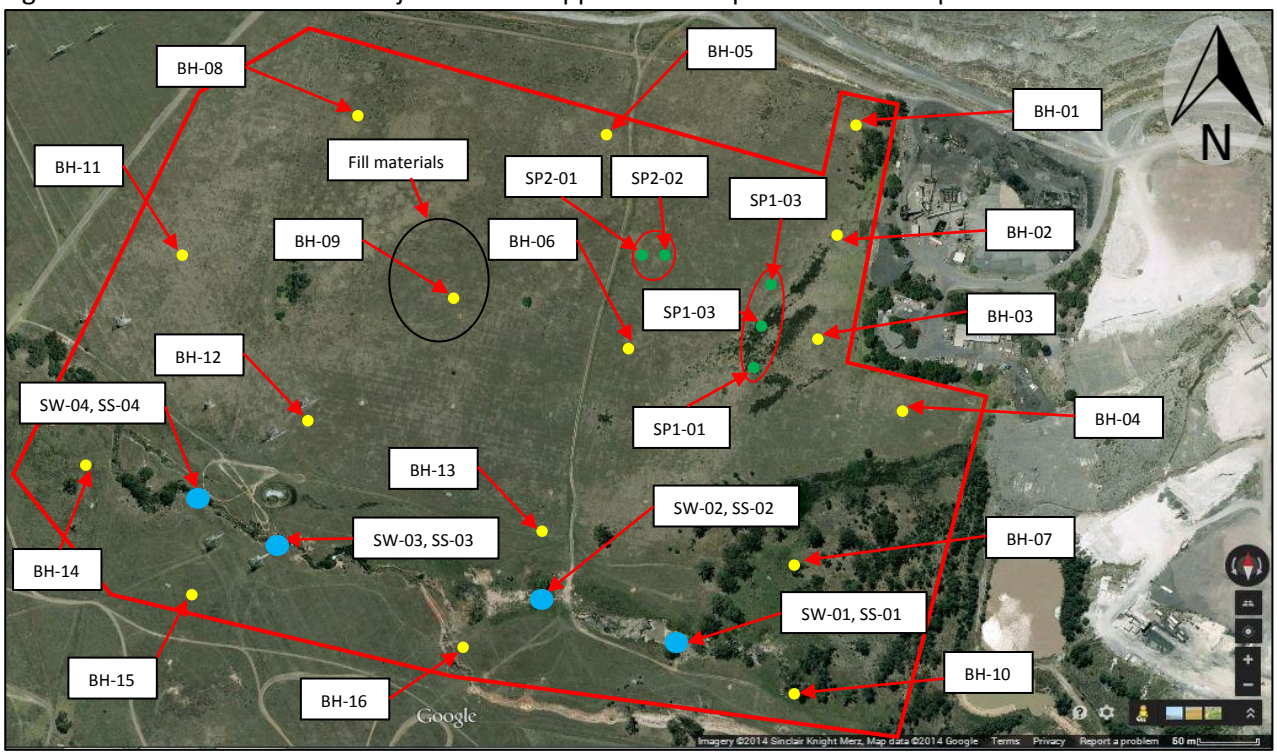

Figure 2. Aerial photograph of the subject site and approximate representative sample locations (Photograph adapted from www.maps.google.com.au, accessed 09.07.2014).

Bearings provided in this report are approximate only. For ease of representing locations in the report, the site is considered to be off Honeycomb Drive, a nominal east-west direction assumed. All references to points of the compass within the report are based on these approximate bearings.

2.2 Site Identification and Description

Site identification information is summarised in **table 4** below.

Table 4. Summary of Site Identification Details

Site Details	
Site address	Off Honeycomb Drive, Eastern Creek NSW
Title identification	Lots 2 and 3 of Deposited Plan (DP) 1145808
Property Lessee/Owner	Next Generation NSW Pty Ltd (TNG NSW)
Current site use	Pastural / grazing land
Investigation area	Approximately 15 ha

2.2.1 Study Area

For the purposes of this report, the study area encompassed the site located at Honeycomb Drive, Eastern Creek NSW (refer to **figure 1**).

2.2.2 Surrounding Land Use

The immediately surrounding area of the site consists of industrial properties. Genesis landfill facility is situated approximately 200 m north of the northern boundary. East of the site is an asphalt plant which has been functioning since at least 1978. Grazing land and electrical easement lines occur to the south and west of the site. More broadly the surrounding land use is predominantly as grazing land and commercial properties. The M4 Motorway is situated approximately 1 km to the north of the site.

2.2.3 Key Features Observed at the Site

Table 5 summarises the site observations that were recorded during the site inspection which was undertaken on the 26th May 2014.

Table 5. Summary of key site features**.**

Feature	Details
Entire site	The site was vacant at the time of inspection and was predominantly covered in vegetation, with some areas of bare soil. All vegetation appeared to be healthy with no visible signs of stress. The site was bordered to the north east by an asphalt manufacturing plant and adjacent overflow dam. A creek ran through the southern section of the site, originating from the base of the waste water dam and running in a westerly direction towards Eastern Creek. The creek was not flowing at the time of inspection and had been disconnected in areas due to the shallowness of the water level. The water appeared to be turbid, ordourless and free of non-aqueous phase liquids (NAPL). A number of items of rubbish were observed on the soil surface at approximately the centre of the site, in an area which contained dark soil materials inconsistent with the natural soil profile of the site. It was noted that the dark soil appeared to be fill materials. The site contained two (2) stockpiles of soil totaling approximately 1200 m^3. The stockpiled materials appeared to be consistent with the natural soils of the site and had not been imported. No concrete or bitumen slabs were observed. Bare soil, organic matter or vegetation covered the entire site. It should be noted, during the field investigation works no aquatic animals or amphibians were observed in or around the creek within the site.

General activities within the site area and adjacent areas that may have resulted in contamination include:

- Daily operations of the adjacent asphalt plant;
- The potential overflow from adjacent waste water dam;
- Contaminated fill materials imported to site;
- Deposition of airborne contaminants associated with the asphalt plant;
- Use of pesticides and fertilizers on vegetation and ground cover; and
- Deposition of dust and emissions from vehicle traffic on nearby major roadways.

2.2.4 Ground Cover and Vegetation

The entire site ground cover consisted of bare soil, organic matter or vegetation cover with no concrete or bitumen slabs present. All of the vegetation appeared to be healthy with minimal signs of stress.

2.2.5 Site Topography and Hydrology

The site is situated on the side of a valley at an elevation varying between 85 m and 50 m above mean sea level, topography is sloping from north to south towards the onsite creek, with some undulations in various directions. The closest permanent water body would be the dam situated south-east of the site adjacent the asphalt plant and a farm dam to the south-west of the site.

2.2.6 Hydrogeology

It was beyond the scope of work to study the groundwater flow direction. The local groundwater flow is likely to have a southerly direction towards the onsite creek before heading west towards Ropes Creek which flows in a northerly direction and enters South Creek, which also flows in a northerly direction and eventually enters the Hawkesbury River.
Surface water runoff is expected to progress down slope towards the onsite creek before progressing west towards Ropes creek.

Standing water level in surrounding monitoring wells is noted to be approximately 40 m below ground level. Given the location of these wells and the site topography it is expected the standing ground water level in areas of lower elevation such as adjacent to the water course, would be much closer to the surface.

A search for registered groundwater wells within a 2 km radius of the site was undertaken by ADE via the NSW Office of Water (NSW Groundwater works, NR Atlas website). Four (4) groundwater bores were found. No groundwater quality data with regard to contaminants of concern were available within the search area.

A number of groundwater monitoring wells were observed on the site, three (3) wells within metal casings were noted as well as six (6) PVC pipes protruding from the ground were noted. No available groundwater data has been provided by the client.

Table 6. List of groundwater bores within 1 km radius of site.

Bore ID	Use	Completion Date	SWL (mBTOC)	Total depth (m)
GW110311	Monitoring bore	08.07.2009	31.6 m	100 m
GW110313	Monitoring bore	08.07.2009	40.3 m	150 m
GW110312	Monitoring bore	08.07.2009	39.8 m	100 m
GW110314	Monitoring bore	08.07.2009	40.3 m	151 m

2.2.7 Local Geology and Soil

The site is located on a Blacktown Soil Landscape (bt) as indicated on the Penrith Soil Landscape Map, prepared by the Soil Conservation Services of NSW.

The topsoil (A1 Horizon) consists of a friable brownish-black loam with moderately pedal sub angular-blocky structure and rough-faced porous ped fabric. The pH ranges from slightly acidic (pH 5.5) to neutral (pH 7.0). Roots are common. Shale and charcoal fragments are sometimes present.

Beneath this layer occurs the A2 Horizon consisting of a hardsetting brown clay loam to silty clay loam with an apedal massive to weakly pedal structure and slowly porous earthy fabric. The pH varies from moderately acid (pH 5.0) to slightly acid (pH6.5). Platy ironstone gravel-sized shale fragments are common. Roots and charcoal fragments are absent.

The subsoils consist of two B horizons. The shallow subsoil consists of a strongly pedal, brown light to medium clay with a smooth-faced dense ped fabric. Soil texture often increases with depth as does red, yellow and grey clay mottling. The pH ranges from strongly acidic (pH 4.5) to slightly acidic (pH 6.5). Fine to coarse gravel-sized shale fragments are common, often occurring in stratified bands. Roots and charcoal fragments are rare.

The deep subsoil consists of a plastic light grey silty clay to heavy clay with moderately pedal polyhedral to sub-angular blocky structure and a smooth ped fabric. This material often occurs above a shale bedrock (C Horizon). The pH ranges from strongly acidic (pH 4.0) to moderately acidic (pH 5.5). Strongly weathered ironstone concretions and rock fragments are common. Roots and gravel-sized shale fragments are occasionally present. Charcoal fragments are rare.

Fill Materials

An area containing soil material inconsistent with local geology were observed to contain waste materials such as shredded paper, plastic etc across an area of approximately 500 - 2000 m^2. These materials were located along the tracks and paths throughout the centre of the site. The area appeared to be used as a dirt bike track.

2.2.8 Acid Sulphate Soils

A review of the National Acid Sulphate Soils Atlas showed that the site is within an area of no known occurrence of acid sulphate soils.

3 SITE HISTORY AND PREVIOUS INVESTIGATIONS

3.1 Historical Land and Title Search

The site history has been compiled from information gathered from the Land Titles Office (LTO), Land Property Information (LPI) and Council records.

The site comprises 2 and 3 of Deposited Plan (DP) 1145808 in the Local Government Area of Blacktown Council, Parish of Melville, County of Cumberland.

Table 7. Summary of LTO records for Lot 2 in Deposited Plan (DP) 1145808 (refer to **Appendix II – Land and Property Records)**.

Date	Transferred/Leased From	Transferred/Leased To	Transfer No.	Certificate reference
Unknown				
17.08.1819	Crown land	William Cox	Unknown	Vol 14726 Fol 222
Unknown	Unknown	Unknown	Unknown	Unknown
Vol 14726 Folio 222				
28.07.1983	Unknown	Leased to : Pioneer Concrete (N.S.W) Pty Ltd	T646462	Vol 14726 Fol 222
Vol 13544 Fol 125				
17.08.1819	Crown land	William Cox	Unknown	Vol 13544 Fol 125
06.02.1978	Unknown	Leased to : Ray Fitzpatrick Quarries Pty Ltd	13544125	Vol 13544 Fol 125
Lot 2 Deposited Plan 262213				
06.08.1987	Unknown	Report created	Unknown	Lot 2 DP 262213
23/12/1996	Variation of lease.	Unknown	2716424	Lot 2 DP 262213
12/9/2005	Transefer of lease	Unknown	20343	Lot 2 DP 262213
25/5/2006	DEPOSITED PLAN	Unknown	DP1097123	Lot 2 DP 262213
14/6/2006	Lease		AC54545	Lot 2 DP 262213
12/08/2008	Withdrawn – Deposited Plan		DP1127167	Lot 2 DP 262213
Lot 2 Deposited Plan 1145808				
18/12/2009	Deposited Plan		DP1145808	Lot 2 DP 1145808
12/08/2008	Withdrawn – Deposited Plan			

Table 7. Continued…

Date	Transferred/Leased From	Transferred/Leased To	Transfer No.	Certificate reference
Lot 3 Deposited Plan 1145808				
18/12/2009	Deposited Plan		DP1145808	Lot 3 DP 1145808

The information obtained from the LTO, LPI and Council Records indicates that the site has been in use as grazing land with a quarry and asphalt plant adjacent the site for greater than 40 years.

3.2 Aerial Photographs Review

A review of aerial photographs was conducted and is summarised in **Table 8** below. Aerial photographs from the years of 1930, 1951, 1961, 1972, 1982, 1991, 2000 and 2013 were examined (refer to **Appendix III - Aerial Photographs**).

Table 8. Summary of aerial photography.

Year	Type	Subject Site Description	Adjacent Site Description
1955	Black and White	The site is cleared pasture land, some areas of woodland are present. The watercourse running from east to west through the site is present. The quarry to the north is present with a surrounding foot print of disturbed land. Minimal roads associated with the site can be observed. A track along the south-western boundary is present and small site sheds and buildings can be located.	A quarry is present to the north of the site, a farm dam occurs to the south-west and grazing lands surround the site. Some clearing and ground disturbance is evident to the north of the quarry.
1978	Black and White	The site appears to have been cleared with the majority of the vegetation previously present removed. A road surrounds the northern and western boundary of the site. A power line easement can now be seen overhead the south-western boundary. Plant equipment, storage facilities, numerous small buildings and storage tanks are present within the quarry / asphalt plant directly to the east.	The quarry to the north of the site has deepened and expanded in all directions. A number of roads now lead to the quarry. An asphalt plant is present immediately adjacent the eastern boundary. A waste water dam is present associated with the asphalt plant is located adjacent the south-eastern corner of the site. There is significant evidence of land disturbance within the surrounding areas. The M4 is now present to the north of the quarry and there are areas of urban development to the north-west. The farm dam and grazing lands to the south and south-west appear unchanged from the previous photo.

Table 8. Continued…

Year	Type	Subject Site Description	Adjacent Site Description
1994	Colour	The site remains predominantly unchanged from the previous photo. The site appears to be remain for grazing purposes. Some evidence of dirt tracks can be seen. The creekline and small pocket of vegetation in the south-west corner appear unchanged.	Urban development is now present to the north and west of the site with large scale development of Erskine Park and Minchinbury. The depth of the Quarry appears deeper than the previous photo. An area to the west of the quarry has now been cleared. The asphalt plant to the east of the site appears largely unchanged from the previous photo. Archibold Road to the west of the site is now present.

The site and adjacent areas appeared at the time of inspection as it appears in the 2013 aerial photograph.

3.3 Contaminated Land Register Search

A search of the sites listed by the EPA under the Contaminated Land Management Act 1997 revealed that no records have been issued against the site.

3.4 Section 149

The site is currently zoned under Zone E2 - Environmental Conservation and IN1 - General Industrial under the provisions of State Environmental Planning Policy (Western Sydney Employment Area) 2009. The Planning Certificate under Section 149 of the *Environmental Planning and Assessment Act 1979* (See **Appendix V – Section 149 Certificate**) provides the state and local environmental planning instruments which affect the site.

The following matters are prescribed by section 59 (2) of the Contaminated Land Management Act 1997 as additional matters to be specified in the planning certificate.

- The land is not within an investigation area or remediation site under Part 3 of the Contaminated Land Management Act 1997;
- The land is not subject to an investigation order or an remediation order within the meaning of the Contaminated Land Management Act 1997;
- The land is not subject to a voluntary investigation proposal (or voluntary remediation proposal) that is the subject of the Environmental Protection Authority's agreement under Section 19 or 26 of the Contaminated Land Management Act 1997; and
- The land is not subject to a site audit statement within the meaning of the Contaminated Land Management Act 1997.

3.5 WorkCover NSW

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by WorkCover NSW has located records pertaining to the above mentioned premises (Refer to Appendix IX – WorkCover Contaminated Goods Search). A licence to keep dangerous goods on site under three separate business names, Pioneer Construction Materials Pty Ltd, Pioneer Concrete (NSW) Pty Ltd and Ray Fitzpatrick Quarries Pty Ltd were returned. These licences were issued between 1957 and 2001. There appears to have been two (2) 15 000 L underground petroleum storage tanks located approximate 450 m north-east of the site. The dangerous goods licence application from 1999 indicates that the tanks have been removed. A visual inspection of the former location of the tanks revealed the presence of a confined space within the approximate area. Discussions with the client confirm that this is not an underground petroleum storage tank.

Given the distance from the proposed site, it is considered unlikely that there is potential contamination as a result of the former underground petroleum storage tanks located off site approximately 450 m north-east.

3.6 ADE Report: 7438 Honeycomb Drive, Eastern Creek NSW.PSI v1 final

A review of information relating to current and previous land uses was undertaken by ADE in report #7438 Honeycomb Drive, Eastern Creek NSW (2014). The Phase I report identified potential contamination types and contamination sources associated with activities reported to have occurred on and around the site. The report consisted of a desktop study and site inspection. The primary objective of the report was to identify past and present potentially contaminating activities, identify potential contamination types, discuss the site condition, provide an assessment of site contamination and assess the need for further investigations.

The findings of the Phase I Preliminary Site Investigation are as follows:

- The site has been utilised as grazing land as far back as records indicate.
- ADE has been advised that the site will be developed into an electricity generating facility.
- An asphalt plant and associated waste water overflow dam has been present adjacent the site since at least 1978.
- A quarry to the north of the site has been in operation since at least 1955.
- It is the opinion of ADE that due to the proximity of the asphalt plant, the potential overflow from adjacent waste water dam, the potential for contaminated fill and the potential for the deposition of airborne dust, there is the potential for contamination to be present on site.
- The potential contamination types that were identified for the site include: Asbestos Containing Materials, Heavy metals, BTEX, PAHs, TRHs, OCPs, OPPs, PCBs and Phenols.
- A Targeted Phase II Detailed Site Contamination Investigation around the boundary of the asphalt plant should be undertaken to determine whether contamination is present within the soil, and or surface water and river sediment within the boundaries of the site.

Should the Targeted Phase II DSI reveal the site is not contaminated, the site can be deemed suitable for the proposed development

4 DATA QUALITY OBJECTIVES

The targeted Phase II Detailed Site Contamination Investigation works were designed using a Data Quality Objectives (DQO) as defined by the US EPA and the NSW EPA in the "Guidelines for the NSW DEC Site Auditor Scheme" (2nd Edition), (NSW DEC, April 2006) and AS 4482.1(2005). The DQO process consists of a seven step planning approach to facilitate the development of qualitative and quantitative statements that specify the quality of the data required to support decision making within the scope of the investigation. This process utilises systematic planning and statistical hypothesis testing to differentiate between two or more clearly defined alternatives.

4.1 Statement of Problem

Objective:	Provide advice on the nature and extent of contamination (if any) at the site and determine the potential risk posed to human health and the environment.
Contamination Issue:	Potential contamination at the site is associated with the historical use of the site, the adjacent ashphalt plant, and other potentially contaminating activities.
Project Team:	TNG Project Manager: Ian Malouf ADE Managing Director: Ross Nefodov ADE Project Manager: Thomas Lobsey ADE Environmental Scientist/Engineer: Dylan Jones and Paige Edmunds
Conceptual Model	The **Site Conceptual Contamination Model** is included in **Section 5** of this report.
Resources & Project Timeframes	The ADE project team is listed above. The fieldworks and reporting components of the Phase II Detailed Site Investigation were completed in May/June 2014.
Community Concerns	The key community groups include: • Employees and commuters in adjacent areas; • TNG employees and subcontractors; • Local businesses and services
Regulatory Authorities & Local Government	NSW EPA, Blacktown City Council

4.2 Identification of Decision

Principle Study Question	• Are contaminant concentrations of the contaminants of concern (COC) (identified in **Section 5** of this report) on the site in excess of the NSW EPA -endorsed acceptance criteria? • *NEPM (2013) "Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater"* • *NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (2000)*; • *NSW EPA Sampling Design Guidelines (1995)*; and • *NSW EPA Waste Classifications Guidelines Part 1: Classifying Waste (2009)*.
Action Resolutions	Two alternative actions could result from the resolution of the principle study question: • If the concentrations of any contaminant on the site exceeds the acceptance criteria, the action may be to remove/remediate the contaminated soil or conduct further investigations; and • If the concentrations of any contaminants on the site do not exceed the acceptance criteria, no action will be taken.
Decision Statement	Define whether or not the average concentrations of the COC (identified in **Section 5** of this report) on the site exceed the acceptance criteria and require remediation. It is assumed that the site would be suitable for the proposed use if the soil contaminant concentrations meet the adopted guideline values.

4.3 Identification of Inputs to Decision

The main parameter inputs that were required to resolve the decision statement for the investigation were identified to be:

Soil Condition	• Use of field investigation techniques to identify previously undocumented areas of contamination within the site (i.e. bore holing); • Visual inspection of soil conditions and indicators of soil contamination (i.e. vegetation); and • Collection and analysis of representative soil samples from borehole locations.
Aesthetic Condition	Aesthetic impacts within soil and water resulting from the concentrations of contaminants (i.e. odour, discolouration, stained materials, NAPL, LNAPL).
Contaminant Extent	Identification of contaminant types and sources, distribution within the site and the surrounding areas (if applicable).
Toxicity	The toxicity of the contaminants of concern and their respective

Toxicity (continued)	environmental persistence.
Receptors	Identification of potential receptors (both on and off site).
Exposure Pathways	The assessment of exposure pathways including conceptual fate and transport modeling of potential contaminants.
Site Criteria	NSW EPA -endorsed acceptance criteria as outlined in **Section 7**.

4.4 Definition of Study Boundaries

A detailed description of the spatial and temporal boundaries of the problem, characteristics that define the population of interest and any practical considerations for the study:

Geographical Limit	The spatial boundary of the site is indicated in **Figure 1 and Figure 2**.
Investigation Limit	• The limit of the investigation extent was defined by the number of sampling locations (25). • The target investigation depth for contaminant soil samples was a maximum of 0.5 m BGL. • Soil, sediment and water sampling/testing was undertaken as outlined in the scope of work.
Constraints	• Time; and • Costs.
Receptors of Concern	The potential receptors of concern are outlined in **Section 5** of this report.

4.5 Development of Decision Rule

Definition of the statistical parameters, relative action levels and specification of the acceptance criteria for QA/QC validation results:

Statistical Parameters	ADE concluded that a 95% Upper Confidence Limit (UCL) of the arithmetic average concentrations of contaminants would be the most appropriate statistical parameter.
Relative Action Levels	The relative action levels for the decision were the *NEPM (2013) "Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater"*. If the maximum concentrations of the analytes tested are above their acceptance criteria, then the soil will be considered contaminated warranting further investigations and/or management and may be recommended to be disposed of at an EPA approved landfill. Alternatively if the 95% UCL of the arithmetic average concentrations of the analytes tested are below their acceptance criteria, then no action will be taken.

Acceptance Criteria for QA/QC	The assigned criteria for QA/QC samples to ensure the validity of results is outlined below:
	• Laboratory duplicate samples 95% • Laboratory blank samples 100% • Laboratory spike/surrogate recoveries 95% • Laboratory control (split) samples 75% • Blind replicate samples 75% • Rinsate samples 75% • Trip blank samples 95% • Spike BTEX samples 75%
	Subsequent to an overall completeness of 95%, the data collected through the course of the investigation will then be considered valid and acceptable.

4.6 Specification of Tolerable Limits on Decision Errors

Defines how the quality of the data collected by the Phase II Detailed Site Investigation is to be assessed. These criteria are summarised below:

Documentation & Data Completeness	• Site conditions properly described. • Sampling locations properly described and located. • Completion of field records, chain of custody documentation, laboratory test certificates from NATA-registered laboratories. • Samples are collected from all areas of potential environmental concern within the subject site. • Samples are tested for a selection of potential contaminants of concern. • A minimum of 95% completeness for the overall site investigation.
Data Comparability	• Use of appropriate techniques for the sampling, storage and transportation of samples. • Implementation of NATA certified laboratory using NEPM procedures. • Use of NATA certified check laboratory.

Data Representativeness	• Collection of representative samples from each sampling location. • Collection of representative samples from across the site. • Use of appropriate techniques for sampling, storage and transportation of samples
Precision for Sampling and Analysis	• Use of appropriately trained and qualified field personnel. • Use of appropriate laboratory quality analysis assessment (i.e. blind replicates, split samples). • Relative Percent Difference's (RPD's) to be less than 30% for inorganic and 50% for organic analytes. • Acceptable outputs of trip blank and spike samples. • Acceptable quality of rinsate sample results.
Accuracy for Sampling and Analysis	• Satisfy laboratory QC criteria of 95%. • Trip blanks and rinsate sample results returned with no contamination. • All laboratory duplicate samples within acceptable ranges. • All control results within acceptable ranges.
Types of Decision Errors	The planning team determined that the two decision errors were: i) deciding that material on site is contaminated when it truly is not, and ii) deciding that material on site is not contaminated when it truly is. The true state of nature for decision error (i) is that soil is not contaminated. The true state of nature for decision error (ii) is that soil is contaminated.

4.7 Data Collection Design

The organisation of the data collection and analysis design, for optimising the generation of data to satisfy the DQOs and the objective of the investigation has been achieved via the following:

Pre-approved Work Plan	The sampling, analysis and quality plan for the investigation at the site has been developed to assess the concentrations of contaminants present at the site through the implementation of the components outlined within AS 4482.1 (2005) and AS/NZS 5667.1 (1998).
Compliance with EPA Guidelines	• Use of appropriate techniques for the sampling, storage and transportation of samples. • Use of NATA certified laboratory using NEPM procedures. • Use of NATA certified check laboratory.

5 SITE INVESTIGATION DESIGN AND METHODOLOGY

The following outlines the fieldwork and laboratory testing undertaken for this targeted DSI. It will also identify the potential contamination types and receptors for the site.

5.1 Investigation Design

The objectives of the investigation were to:

- Provide comprehensive information on the issues raised in the Phase I Preliminary Investigation;
- Discuss the site condition;
- Assess and describe the source, type, extent and level of contamination (if present);
- Determine the human health and environmental risk (if present);
- Provide a preliminary waste classification in accordance with the adopted NSW EPA *Waste Classification* Guidelines; and
- Provide an assessment of site contamination.

5.2 Potential Contamination Types

The following potential types of contaminants for the site investigated in this DSI are summarised below in **Table 9**. These are based on the key features of the site. It should be noted that this list is not exhaustive in that it does not take into account all past historical uses of adjacent properties.

Table 9. Sources and Types of Contaminants that may be present on site.

Contamination Source	Location	Potential Contaminants
Fill Materials	Targeted to areas with soil profile not consistent with local geology	Asbestos Containing Materials, Heavy metals, PAHs, TRH, BTEX, OCPs, OPPs, PCBs, Phenols
Deposition of airborne dust	Entire site	Heavy metals, PAHs, TRH
Potential runoff and water from asphalt plant and adjacent dams	Border of site and asphalt plant	Metals, TRH, PAHs

5.3 Primary Transport Mechanisms

Primary transport mechanisms for the migration of potential contaminants on to the site or off the site include:

5.3.1 Drainage to (i) the immediate area

Overall the water flowing onto site would be expected to run in a southerly direction into the onsite creek which then runs off site in a westerly direction, eventually flows towards Ropes Creek. Ropes Creek flows in a northerly directions and enters South Creek, which also flows in a northerly direction and eventually enters the Hawkesbury.

Surface water running off the site is expected to flow down gradient in a southerly direction towards the onsite creek and flow in a westerly direction towards Ropes Creek.

5.3.2 Atmospheric transportation and deposition

Disturbance of potentially contaminating materials located adjacent and within the site may produce dust, containing elevated levels of contaminants. Pollutants may be emitted from a combination of point, mobile, or an area, from both local and distant sources. Contaminants (if present), may be deposited onto the site from adjacent areas/processes, including the asphalt plant, the M7 and M5 motorway and nearby landfill.

5.3.3 Downward migration and leaching via infiltration of rain water into the soil

Contaminants from the surrounding areas and adjacent road network may leach into the soil, and subsequently groundwater, via infiltration of rain water through surface soils.

5.3.4 Lateral migration via Groundwater

Contaminants from previous land use activities may have the capacity to migrate down gradient from the site via ground water. There is also the potential for the migration of contaminants onto the site in the groundwater from adjacent areas.

5.4 Potential Contamination Receptors

The main potential contamination receptors were considered to include:

- site visitors, contractors, and adjacent property owners/users, who may come into contact with contaminated soil or dust;
- groundwater; and
- downstream tributaries.

5.5 Site Conceptual Contamination Model

Table 10 below shows the potential contamination sources, their pathways and receptors.

Table 10. Site Conceptual Contamination Model.

Contamination Source	Pathway	Receptor
Fill Materials	Dust inhalation	• Adjacent land users • Users of the site • Downstream tributaries
	Dermal contact/ingestion	• Users of the site • Ecological communities
	Downward migration into soil	• Soil and groundwater • Vegetation • Ecological Communities • Downstream tributaries
Deposition of airborne dust	Dust inhalation	• Adjacent land users • Users of the site • Ecological communities
	Dermal contact/ingestion	• Adjacent land users • Users of the site • Ecological communities
	Downward migration into the soil	• Soil and groundwater • Vegetation • Ecological Communities • Downstream tributaries
Potential runoff and water from asphalt plant and adjacent dams	Dust inhalation	• Adjacent land users • Users of the site • Ecological communities
	Downward migration into soil	• Soil and groundwater • Ecological communities • Downstream tributaries
	Runoff / drainage	• Soil and groundwater • Downstream tributaries
	Dermal contact/ingestion	• Adjacent land users • Users of the site • Ecological communities

5.6 Field Investigation Procedures

The Field Investigation Procedures were developed in accordance with ADE Report *7773 Preliminary Site Investigation; Honeycomb Drive, Eastern Creek NSW (dated 2014).*

A total number of twenty nine (29) discrete soil, sediment and water samples were collected from twenty one (25) sample points throughout the site (excluding QA/QC samples).

Refer to Figure 2 for representative sample locations.

Field activities were supervised by experienced environmental scientists who directed sampling operations. Onsite investigations were conducted in relation to the scope outlined and subsequent correspondence with the client.

5.6.1 Pre–work Procedure

A services and utilities assessment was conducted by ADE. Utilities and services data was obtained from the following owners:

- Endeavour Energy
- Jemena
- SydneyWater

Before work commenced a specialised Safety, Health & Environment Work Method Statement (SH&EWMS) was developed specifically for the project.

5.6.2 Sampling Procedures

Sampling techniques were determined following assessment of access, location of underground utilities and/or health and safety requirements. The contamination assessment of the subsurface, sediment and surface water at the site was achieved by an investigation consisting of an exploratory drilling program and sediment and surface water sampling from the creek within the site.

5.6.3 Exploratory Soil Testing Program

The site investigation was designed based on a judgmental/grid sampling design with sampling locations chosen in areas where contamination is likely to occur. Background data and a site inspection identified any activities that may have generated contamination.

Decontamination:

ADE's standard decontamination procedures were undertaken beforehand drilling each of the boreholes and collecting the soil and water samples to avoid the possibility of cross-contamination.

The soil and water sampling equipment and items likely to come into contact with soil samples were thoroughly washed, followed by rinsing with phosphate-free detergent and deionised water before the collection of samples. Due care was taken with the disposal of any washings and residues from such cleaning operations.

Documentation:

A field observation log was kept by sampling personnel. Details recorded in the log included:

- Borehole and sample number;
- Soil profile notes;
- Sampling method;
- Sample identification;
- Sample description; and
- Sample point measurements.

A comprehensive master sample register was maintained. As samples were received, they were given a unique sequential number from the sample register into which details from the labels were entered.

Before packing and dispatch of samples for analysis, a Chain of Custody form was completed. This form recorded details of the individual samples being dispatched and the type of analysis required for each sample.

Sample Management:

Soil and sediment samples were collected using fresh gloves and placed in sterile glass jars with Teflon lined lids and then placed into a pre-cooled Esky. Additional samples for determination of the possible vertical extent of impact were also obtained.

Each sample jar was well protected by packaging material. Ice packs were inserted in the Esky to maintain the samples at approximately 4^0C. The original Chain of Custody form was enclosed in the Esky that was then sealed and dispatched to NATA accredited analytical laboratories.

Using the methods as outlined below, stratigraphical information was obtained along with the samples in order to assess the shallow geological and hydrogeological conditions at the site in accordance with *AS 1726-1993 'Australian Standard Geotechnical Site Investigations'* (Refer to **Appendix VIII - Borehole Logs**).

Water samples for analysis of TRH and PAH were collected in 1 L glass jars. Water samples for analysis of filtered metals were stored in 500 mL plastic bottles with a nitric acid preservative. Each sample was well protected by packaging material. Ice packs were inserted in a cooler box to maintain the samples at approximately 4^0C. The original Chain of Custody form was enclosed in the Esky that was then sealed and dispatched to NATA accredited analytical laboratories.

The methodology for collection of samples included the following:

a) Borehole Drilling Procedure

This method was utilised throughout the site. Soils were collected by drilling boreholes using a Tanaka Hand Drill. Samples were collected from 0.0-0.2 m BGL with a visual assessment to 0.5 m BGL. A PID reader was used as to screen soil samples for BTEX (Refer to Appendix XI – Calibration Certificates).

b) Surface sampling

Asbestos samples were collected by hand and/or with a decontaminated steel trowel as per the predetermined sample locations. Samples were then placed in bags and submitted to ADE's NATA Accredited Lab for analytical testing.

c) Grab sampling

Grab sampling methodology was used to collect sediment samples. Samples were placed in glass UV resistant jars with teflon lined lids and stored in a chilled cooler box at approximately 4^0C prior to submission to a NATA Accredited Lab.

d) Surface Water Sampling

Surface water samples were collected by semi-emerging a 1L UV resistant glass bottle into the creek water and allowing it to gradually fill. Samples for analysis of distilled metals were field filtered using a 45 micron filter and preserved with nitric acid.

5.6.4. Laboratory Analysis

All samples collected were submitted to Eurofins I MGT and ADE's in house Environmental and OH&S Laboratory for testing, two NATA Accredited laboratories for the analytical techniques required by this DSI.

6 SAMPLING AND ANALYTICAL PROGRAM

Samples were analysed according to a suite of contaminants relevant to the sample type and location. Based on recommendations in ADE Report *7407 Preliminary Site Investigation, Honeycomb Drive, Eastern Creek NSW (dated 2014)* and in correspondence with TNG, the following sampling and analytical program was formulated for the DSI.

- Boreholes were excavated to a maximum depth of 0.5 m below ground level (BGL).
- Surface samples were collected based on a judgmental pattern throughout the site.

A total of forty eight (48) samples (including blind replicates, trip blank, trip spike, rinsate, split replicates and asbestos samples) were submitted to both Eurofins I MGT and ADE's in house Environmental and OH&S Laboratory for testing. All copies of the completed Chain of Custody forms were retained on the Central Filing System and the originals were sent to the analytical laboratories together with the samples.

The selected samples were tested for a range of analytes including:

- Metals - Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni) and Zinc (Zn);
- Total Recoverable Hydrocarbons (TRH);
- Polyaromatic Hydrocarbons (PAHs);
- Organochlorine Pesticides (OCPs);
- Organophosphorous Pesticides (OPPs);
- PCBs;
- Phenols; and
- Asbestos.

The sampling and analytical program is outlined below in **Table 11.**

Refer to **Appendix VII – Analytical Reports** for the analytical methods used by Eurofins I MGT and Environmental OH&S Laboratory (a subsidiary of ADE).

Table 11. Sampling and Analytical Program for Site Investigation

Date	Sample ID	Location *(refer to figure 2 for sample locations)*	Depth (m)	Sample Type	Analysis
25.06.14	7773-BH-01A	BH-01	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-02A	BH-02	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-03A	BH-03	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-04A	BH-04	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-05A	BH-05	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-06A	BH-06	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-07A	BH-07	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-08A	BH-08	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-09A	BH-09	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-10A	BH-10	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-10A	BH-11	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-10A	BH-12	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-10A	BH-13	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-10A	BH-14	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-10A	BH-15	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BH-10A	BH-16	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-SP1-01A	SP1-01	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, PCBs, Phenols, BTEX (PID)
25.06.14	7773-ASB1	SP1-01	0.0-0.2	Soil	Asbestos
25.06.14	7773-SP1-02A	SP1-02	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, PCBs, Phenols, BTEX (PID)
25.06.14	7773-ASB2	SP1-02	0.0-0.2	Soil	Asbestos
25.06.14	7773-SP1-03A	SP1-03	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, PCBs, Phenols, BTEX (PID)
25.06.14	7773-ASB3	SP1-03	0.0-0.2	Soil	Asbestos
25.06.14	7773-SP2-01A	SP2-01	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, PCBs, Phenols, BTEX (PID)
25.06.14	7773-ASB4	SP2-01	0.0-0.2	Soil	Asbestos
25.06.14	7773-SP2-02A	SP2-02	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, PCBs, Phenols, BTEX (PID)
25.06.14	7773-ASB5	SP2-02	0.0-0.2	Soil	Asbestos
25.06.14	7773-SS-01	SS-01	0.0-0.2	Sediment	Metals, TRH, PAH
25.06.14	7773-SS-02	SS-02	0.0-0.2	Sediment	Metals, TRH, PAH
25.06.14	7773-SS-03	SS-03	0.0-0.2	Sediment	Metals, TRH, PAH
25.06.14	7773-SS-04	SS-04	0.0-0.2	Sediment	Metals, TRH, PAH
25.06.14	7773-BR1	BH-08	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-BR2	BH-16	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-SP1	BH-16	0.0-0.2	Soil	Metals, TRH, PAH, OCPs, OPPs, BTEX (PID)
25.06.14	7773-SW-01	SW-01	Surface	Water	Metals, TRH, PAH
25.06.14	7773-SW-02	SW-02	Surface	Water	Metals, TRH, PAH
25.06.14	7773-SW-03	SW-03	Surface	Water	Metals, TRH, PAH
25.06.14	7773-SW-04	SW-04	Surface	Water	Metals, TRH, PAH

Table 11. Continued…

Date	Sample ID	Location *(refer to figure 2 for sample locations)*	Depth (m)	Sample Type	Analysis
25.06.14	7773-SW-BR1	SW-04	Surface	Water	Metals, TRH, PAH
25.06.14	7773-Rinsate1	-	-	Water	Metals, TRH, PAH
25.06.14	7773-VOC1-Spike	-	-	40ml vial	BTEX
25.06.14	7773-VOC1-Blank	-	-	40ml vial	BTEX
25.06.14	7773-VOC2-Spike	-	-	40ml vial	BTEX
25.06.14	7773-VOC2-Blank	-	-	40ml vial	BTEX
21.07.14	7773-SW01-A	SW-03	Surface	Water	$CaCO_3$
21.07.14	7773-SW01-B	SW-03	Surface	Water	$CaCO_3$
21.07.14	7773-SW02-A	SW-04	Surface	Water	$CaCO_3$
21.07.14	7773-SW02-B	SW-04	Surface	Water	$CaCO_3$

7 ASSESSMENT CRITERIA

7.1 Soil Assessment Criteria

The criteria specified in the following publications were used for the site assessment:

- *Guidelines for the NSW Site Auditor Scheme*, NSW DEC 2006, 2nd Edition;
- *Assessment of Site Contamination, National Environment Protection (Assessment of Site Contamination) Measure, 2013;*
- *Identification and investigation of acid sulfate soils and acidic landscapes* - WA DEC 2013; and
- *ANZECC Water Quality Guidelines, October 2000.*

The report applies the relevant Investigation Levels to identify contaminants and/or areas of contamination that potentially pose a risk to human or environmental health.

The NEPM (2013) guidelines criteria for Health Based Investigation Levels (HILs) for soils are based on the current and/or proposed land use for the site.

The NEPM (2013) guidelines stipulate HILs for four land use types:

A 'Standard' residential with garden/accessible soil (home-grown produce contributing less than 10% of vegetable and fruit and fruit intake, no poultry): this category includes children's day-care centres, kindergartens, preschools and primary schools.

B Residential with minimal opportunities for soil access: includes dwellings with fully and permanently paved yard space such as high rise apartments and flats.

C Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. This does not include undeveloped open space where the potential for exposure is lower and where site-specific assessment may be more appropriate.

D Commercial/industrial: includes premises such as shops and offices as well as factories and industrial sites.

The NEPM (2013) Ecological Screening Level (Commercial and Industrial) threshold concentrations have been adopted in relation to the assessment of petroleum hydrocarbons (TRH/BTEX). Ecological Investigation Level (Commercial and Industrial) threshold concentrations have also been adopted in relation to the assessment of Naphthalene.

The ANZECC (2000) sediment guidelines and NEPM (2013) Ecological Screening Level (Commercial and Industrial) threshold concentrations have been adopted for sediment samples in relation to heavy metals and PAH using the ISQG-Low and ISQG-High trigger values. For site assessment criteria values refer to **Table 12** and **Table 13**.

The ANZECC (2000) Guidelines for Fresh and Marine Water Quality have been adopted with a 95% species protection trigger value threshold for freshwater in relation to heavy metals (filtered), TRH and PAH. For site assessment criteria values refer to **Table 14.** Adjusted trigger values for specific metals (Cadmium, Copper, Chromium, Lead, Nickel and Zinc) were adopted after taking into consideration of the hardness of the water. All of the water samples contained concentrations of $CaCO_3$ above 400 mg/L, categorising them as 'Extremely Hard'.

A contaminant concentration in soil will be deemed acceptable if:

- All samples meet the specified acceptance criteria; or
- The 95 % upper confidence limit (UCL) average concentration of each contaminant is below the acceptance criteria; and
- No individual exceedance is greater than 2.5 times the acceptance criteria.

If a location is found to have more than 2.5 times a contaminant's acceptable limit, then it will be classified as a "hot-spot", requiring further assessment, remediation, removal or management.

If the calculated 95% UCL of the arithmetic average concentration of the contaminant is above their acceptance criteria, then the soil will be considered contaminated, requiring further assessment, remediation, removal or management.

If the 95 % UCL of the arithmetic average concentrations is below the acceptance criteria, and no concentrations are at a "hotspot" level (not two and a half times the health based investigation level criteria), slight elevations above the acceptance criteria may be considered to pose an insignificant human health risk since most of the site will be covered by concrete and road-base.

Table 12. Site Assessment Criteria for soil contamination, mg/kg (unless otherwise specified)

Substances	Health Investigation Levels (HILs)				Ecological Screening[2,5]/ Investigation Levels[2,5] (ESLs / EILs)
	Residential A	Residential B	Residential C	Commercial / Industrial D	
METALS/METALLOIDS					
Arsenic (total)	100	500	300	**3000**	**160[4]**
Barium					
Beryllium	60	90	90	**500**	
Cadmium	20	150	90	**900**	
Chromium (VI)					
Chromium (Total)*[7]	100	500	300	**3600**	
Cobalt	100	600	300	**4000**	
Copper	6000	30000	17000	**240000**	
Lead	300	1200	600	**1500**	
Manganese	3800	14000	19000	**60000**	
Methyl mercury	10	30	13	**180**	
Mercury (inorganic)	40	120	80	**730**	
Nickel	400	1200	1200	**6000**	
Vanadium					
Zinc	7400	60000	30000	**400000**	
Aldrin + Dieldrin	6	10	10	**45**	
Chlordane	50	90	70	**530**	
DDT + DDD + DDE	240	600	400	**3600**	
DDT	-	-	-	**-**	**640**
Heptachlor	6	10	10	**50**	
Polycyclic aromatic hydrocarbons (PAHs)	300	400	300	**4000**	
Benzo(a)pyrene					**1.4**
Carcinogenic PAHs (as BaP TEQ)[2]	3	4	3	**40**	
Phenols	3000	45000	40000	**240000**	
Pentachlorophenal	100	130	120	**660**	
Cresols	400	4700	4000	**25 000**	
PCBs (Total)	1	1	1	**7**	
PETROLEUM HYDROCARBONS[2]					
Benzene					**75**
Toluene					**135**
Ethyl Benzene					**165**
Xylene					**95**
Naphthalene					**370**
Carcinogenic PAHs (as BaP TEQ)[3]	3	4	3	**40**	**-**
TPH: $C_6 – C_{10}$					**215**
TPH: C_{10}-C_{16}					**170**
TPH: C_{16}- C_{34}					**1700**
TPH: $C_{34} – C_{40}$					**3300**

1 Human exposure settings based on land use have been established for HILs (see Taylor and Langley 1998). These are:

- **A.** 'Standard' residential with garden/accessible soil (home-grown produce contributing less than 10% of vegetable and fruit intake; no poultry): this category includes children's day-care centres, kindergartens, preschools and primary schools.
- **B.** Residential with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
- **C.** Public open space such as parks, playgrounds, playing fields (e.g. ovals) secondary schools and footpaths. This does not include undeveloped public open space where potential for exposure is lower and where a site-specific assessment may be more appropriate.
- **D.** Commercial/Industrial: includes premises such as shops and offices as well as factories and industrial sites. (For details on derivation of HILs for human exposure settings based on land use see Schedule B(7A).

2 Values provided are for commercial / industrial land use.

3 Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their Toxic Equivalency Factor (TEFs) (potency relative to B(a)P). The B(a)P TEQ (Toxic Equivalency Quantity) is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF.

4 The arsenic is considered aged. Aged values are applicable to arsenic contamination present in soil for at least two years.

5 Ecological Screening Level for Commercial / Industrial land use

Table 13. Site Assessment Criteria for sediment contamination.

	Site Assessment Criteria (SAC)		
Analytes	**ANZECC Interim Sediment Quality Guidelines-Low[1] (Trigger value) (mg/kg)**	**ANZECC Interim Sediment Quality Guidelines-High[1] (mg/kg)**	**Ecological Screening[4]/ Investigation Levels[4]/ (EILs / ESLs) (mg/kg)**
Arsenic	20	70	-
Cadmium	1.5	10.0	-
Chromium	80	370	-
Copper	65	270	-
Lead	50	220	-
Mercury	0.15	1.0	-
Nickel	21	52	-
Zinc	200	410	-
TRH $C_6 – C_{10}$	-	-	215
TRH C_{10}- C_{40}	-	-	NA
TRH C_{10}-C_{16}	-	-	170[3]
TRH C_{16}-C_{34}	-	-	1700[3]
TRH C_{34}-C_{40}	-	-	3300[3]
Naphthalene	160	2100	-
Benzo(a)pyrene	430	1600	-
B(a)P TEQ[2]	-	-	-
Total PAH	4000	45000	-

Notes to table

ND – Not detected/below Practical Quantitation Limit (PQL)

NA – Not Applicable

[1]ANZECC Guidelines for Water Quality, 2000

[2]Carcinogenic PAHs: HIL is based on the 8 carcinogenic PAHs and their Toxic Equivalency Factor (TEFs) (potency relative to B(a)P). The B(a)P TEQ (Toxic Equivalency Quantity) is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF.

[3]Coarse soil texture was adopted

[4] Values provided for commercial/industrial land use.

Table 14. Site Assessment Criteria for surface water contamination.

	Site Assessment Criteria (SAC)
Analytes	**Adjusted ANZECC (2000) Guidelines for Fresh Water Quality[2]** **95% Species Protection** **(µg/L)**
Arsenic	13[f]
Cadmium	2[5]
Chromium	8.4[5e]
Copper	12.6[5]
Lead	90.8[5]
Mercury	0.06[b]
Nickel	99[5]
Zinc	72[5d]
TRH >C6 – C10	150[3]
TRH >C10 – C16	600[4]
TRH >C16 – C34	
TRH >C34 – C40	
Naphthalene	16
Anthracene	0.01[a,b]
Phenanthrene	0.6[a,b]
Fluoranthene	1.0[a,b]
Benzo(a)pyrene	0.1[a,b]

Notes to Table:

1 - Circular on Target Values and Intervention Values for soil remediation, Ministry of Housing, Spatial Planning and Environment, 2000 (Netherlands).

2 -Trigger values adopted (level of protection: 95% of species for slightly-moderately disturbed systems), Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment and Conservation Council, 2000.

a. In the absence of a high reliability concentration, the moderate or low reliability guideline concentration has been adopted.
b. Due to the potential for the chemical to bioaccumulate, a 99% percent protection level has been adopted.
c. As the two isomers m-Xylene and p-Xylene cannot be distinguished analytically, the lower threshold of 75 µg/l has been adopted.
d. Figure may not protect key species from chronic toxicity, ANZECC 2000.
e. As total concentration was reported for the analyte, the most stringent valence threshold was adopted.
f. As total Arsenic is provided in analytical results, the most stringent criteria of As III and As V has been adopted.
g. 99% protection recommended for 'slightly-moderately' disturbed systems.

3 - No current NSW DECCW adopted criteria. Recommended applicable criteria for screening purposes.

4 - Maximum of 600 µg/l for sum of TRH>C10-C40 (adapted from Netherlands Intervention Values[1]).

5 - Adjusted trigger value for 'Extremely Hard' water (>400 mg/L $CaCo_3$)

8 RESULTS and DISCUSSION

8.1 Field Observations

The following observations with regard to contamination on the site were recorded:

- Vegetation appeared healthy with minimal signs of stress or discolouration at the time of inspection;
- An area of presumed fill materials was observed which contained plastic rubbish;
- Surface water appeared to be turbid, ordourless and free of non-aqueous phase liquids (NAPL); and
- The site was inspected thoroughly, however due to the presence of vegetation across a large proportion of the site; visual inspection was prohibited in many areas. During the construction/development phase of the site, if unexpected finds, such as physical contamination (building debris, asbestos ect) are encountered, further investigation works by an appropriately trained occupational hygienist should be undertaken.

8.2 Soil - Site Contamination (HILs) and Preliminary Waste Classification

Soil - Site Contamination (HILs) and Preliminary Waste Classificatio*n, t*op 0.5 m of material below ground level and two stockpiles*.*

The details of the analysis results are presented in **Appendix VI - Results Tables**.

8.2.1 Heavy Metals

Twenty one (21) samples were analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). All samples yielded concentrations below the HIL (D) guideline criteria and meet the Preliminary NSW EPA criteria assigned for General Solid Waste.

8.2.2 Polycyclic Aromatic Hydrocarbons (PAHs)

Twenty one (21) samples were analysed for PAHs. All samples yielded concentrations below the HIL (D) guideline criteria and the Preliminary NSW EPA Waste Classification guidelines criteria for General Solid Waste.

8.2.3 Total Recoverable Hydrocarbons (TRH)

Twenty one (21) samples were analysed for TRH. All samples yielded concentrations below the Preliminary NSW EPA waste classification guidelines criteria for disposal as general solid waste.

8.2.4 Organochlorine Pesticides (OCPs) and Organophosphorous Pesticides (OPPs)

Twenty one (21) samples were analysed for OCPs and OPPs. All samples yielded concentrations below the HIL (D) guideline criteria and Preliminary NSW EPA waste classification guidelines criteria for disposal as general solid waste.

8.2.5 Polychlorinated Biphenyl (PCBs)

Five (5) samples were analysed for PCBs. All samples yielded concentrations below the HIL (D) guideline criteria.

8.2.6 Phenols

Five (5) samples were analysed for Phenols. All samples yielded concentrations below the HIL (D) guideline criteria.

8.2.7 BTEX

Twenty one (21) samples were field screened for BTEX using a PID reader. BTEX was not detected in any of the samples screened and therefore did not warrant chemical analysis.

NOTE: This in situ preliminary waste classification is indicative only. The sampling frequency of further testing will be dependent on the projected volumes of soil to be removed and transported to an EPA licensed landfill.

8.3 Soil – Ecological Screening / Investigation Levels

Soil – Ecological Screening / Investigation Levels, top 0.5 m of material below ground level and two stockpiles.

The details of the analysis results are presented in **Appendix VI - Results Tables.**

8.3.1 Total Recoverable Hydrocarbons (TRH)

Twenty one (21) samples were analysed for TRH. All samples showed the concentrations of TRH below the Ecological Screening Levels for Commercial and Industrial land use.

8.3.2 Naphthalene, Arsenic and DDT

Twenty one (21) samples were analysed for Napthalene, Arsenic and DDT. All samples showed the concentrations below the Ecological Screening /Investigation Levels for Commercial and Industrial land use.

8.4 Asbestos

No asbestos was observed across the site during the investigation works. It should be noted, during the investigation works, vegetation cover was present across a large proportion of the site and prohibited visual inspection in many areas. During the construction/development phase of the site, if presumed asbestos materials are encountered, further investigation works by an appropriately trained occupational hygienist should be undertaken.

Five (5) samples were collected and analysed for asbestos. **Table 15** below represents the results of this analysis.

Table 15. Analysis results of asbestos samples

Laboratory Sample No.	Analyte	Matrix	Sample size	Identification Results	Sample Location
7773-Asb1	Asbestos	Soil	45 g	No asbestos detected	SP1-01, 0.0 – 0.2 m bgl
7773-Asb2	Asbestos	Soil	40 g	No asbestos detected	SP1-02, 0.0 – 0.2 m bgl
7773-Asb3	Asbestos	Soil	52 g	No asbestos detected	SP1-03, 0.0 – 0.2 m bgl
7773-Asb4	Asbestos	Soil	62 g	No asbestos detected	SP2-01, 0.0 – 0.2 m bgl
7773-Asb5	Asbestos	Soil	45 g	No asbestos detected	SP2-02, 0.0 – 0.2 m bgl

8.5 Sediment – ANZECC Guidelines for Fresh and Marine Water – Sediment Guidelines

The details of the analysis results are presented in **Appendix VI - Results Tables.**

8.5.1 Heavy Metals

Four (4) sediment samples were analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). One (1) sediment sample slightly exceeded the ANZECC Guidelines for ISQG-Low criteria of 20 (mg/kg) and 21 (mg/kg) for Arsenic (As) and Nickel (Ni), respectively. This sample was collected from SS-02 (refer to **Figure 2**). All of the sediment samples were below the ISQG-High criteria.

Elevated concentrations of As and Ni could be explained by the current state of the creek. It was observed that the creek was ephemeral in nature. At the time of the investigation, the water was not running, the water depth was no greater than 0.2 m and dry in many sections. As a result, this may increase concentrations of heavy metals in the creek sediment due to precipitation of heavy metals in water.

Furthermore, it is also possible that background ranges of Arsenic and Nickel within the soil and rock located outside the site, upstream of the creek, may have caused a natural increase in the creek sediment concentrations of metals within the site.

8.5.2 Poly Aromatic Hydrocarbons (PAH)

Four (4) sediment samples were analysed for PAH. All of the samples returned values below the threshold criteria.

8.6 Sediment – Ecological Screening / Investigation Levels

The details of the analysis results are presented in **Appendix VI - Results Tables.**

8.6.1 Total Recoverable Hydrocarbons (TRH)

Four (4) sediment samples were analysed for TRH. All of the samples returned values below the threshold criteria.

8.7 Surface Water – ANZECC Guidelines for Fresh and Marine Water (95% Species Protection)

The details of the analysis results are presented in **Appendix VI - Results Tables.**

8.7.1 Heavy Metals

Four (4) surface water samples were analysed for heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc). All of the samples returned values below the adjusted threshold criteria for 'Extremely Hard' water.

8.7.2 Total Recoverable Hydrocarbons (TRH)

Four (4) surface water samples were analysed for TRH. All of the samples returned values below the threshold criteria.

8.7.3 Poly Aromatic Hydrocarbons (PAH)

Four (4) surface water samples were analysed for PAH. All of the samples returned values below the threshold criteria.

9 DATA QUALITY ASSESSMENT

In order to carry out the assessment of the data acquired in the course of the investigation, the US EPA Guidelines were used.

The Guidelines provide general strategy on assessing data quality criteria and performance specifications for decision making. The following is the output from most of the steps of the Data Quality Assessment (DQA) Process provided in the Guidelines. The sub-steps recommended are given in *italic.*

9.1 Data Review

Quality control reports from the laboratories subcontracted for sample analyses were reviewed. The data included laboratory blank samples, duplicate samples, control samples, spiked samples and method blanks.

The review of the QA/QC program was conducted in accordance with the items recommended by the NSW EPA to be included in the consultants' reports. Some additional recommendations from the US EPA methodology referred to by AS 4482.1 were also followed.

9.1.1 COC

Australian Standard AS 4482.1 defines the Chain-Of-Custody (COC) documentation as the link in the transfer of samples between the time of collection and arrival at the laboratory.

The COC utilised by ADE included the items recommended by the Standard:

a) name of person transferred the samples
b) name of person who received the samples
c) date the samples were collected
d) date the samples were received at the laboratory
e) name and contact details of client.

The Sample Receipt Advice documentation was also supplied by Eurofins I MGT, where time of samples received was specified.

9.1.2 Record Of Holding Times

The objective was to ascertain the validity of the analysis results based on the holding time of the samples from the time of collection to the time of analysis.

The technical holding time criteria for soil samples are as follows:

- Metals: 6 months (NEPM 2013)
- TRH: 14 days (NEPM 2013)

It is recommended to preserve soil samples at 4 ^{0}C $\pm$ 2 ^{0}C until analysis

Evaluation:

Holding times provided by Eurofins I MGT and ADEs in-house Environmental and OH&S Laboratories met the recommended criteria. All of the soil samples were analysed within 4-5 days from the time of collection (refer to **Appendix VII – Analytical Reports**).

9.1.3 Analytical Methods Used

Refer to **Appendix VII – Analytical Results** for the specification of analytical methods used by the laboratories.

9.1.4 Laboratory Accreditation For Analytical Methods Used

Refer to **Appendix VII – Analytical Results** for the details of laboratory accreditations for analytical methods used.

9.1.5 Percent Recoveries Of Spikes And Surrogates

According to the US EPA methodology, it is recommended to consider the following actions based on the spike recovery results for inorganic analytes:

- If the spike recovery is >125% and the reported sample results are less than the Practical Quantitation Limit (< PQL), the data is acceptable for use,
- If the spike recovery is >125% or <75% and the sample results are > PQL, qualify the data for these samples as "estimated",
- If the spike recovery falls within the range of 30-74% and the sample results are < PQL, qualify the data for these samples as "estimated and may be inaccurate or imprecise",
- If spike recovery results fall <30% and the sample results are < PQL, qualify the data for these samples as "unusable".

Environmental and OH&S Laboratory limit of 70-130% for inorganics / metals, and 60-140% for organics was used in order to validate matrix spikes and laboratory control samples. The laboratory limit of 50-150% was implemented in order to validate surrogate recoveries for organic analytes. These criteria, generally, conform to the USEPA recommended standards.

Analysis of spikes and surrogates showed 294 valid values and 0 invalid values.

9.1.6 Laboratory Duplicate Results

Duplicate sample determinations were provided by the laboratories to demonstrate acceptable method precision at the time of analysis. Duplicates are, generally, analysed at a frequency of 1 for every 10 samples. AS 4482.1 provides an acceptable range of the Relative Percent Difference (RPD) values up to 50% for quality control samples.

Analysis of laboratory duplicates showed 311 valid values and 0 invalid values of RPD. Refer to the quality results section of the reports provided in **Appendix VII – Analytical Reports**.

9.1.7 Laboratory Blank Results

The assessment of blank analysis results was to determine the existence and magnitude of contamination resulting from laboratory activities.

The assessment of blank analysis results was carried out in order to determine the existence and magnitude of contamination resulting from laboratory activities. No contaminants were found in the blanks analysed by the laboratory.

Analysis of laboratory blanks showed 265 valid values and 0 invalid values. Refer to the quality results section of the reports provided in **Appendix VII – Analytical Reports.**

9.1.8 Instrument Detection Limits / Method Detection Limits / Matrix Or Practical Quantification Limits

The smallest amount of a substance that can be detected by EOH&S and Eurofins I MGT Laboratories above the noise in a procedure and within a stated confidence level is the detection limit. Current practice identifies several detection limits. These are the instrument detection limit (IDL), the lower level detection (LLD), the method detection limit (MDL) and the practical quantitation limit (PQL).

The relationship among these levels is approximately IDL : LLD : MDL : PQL = 1 : 2 : 4 : 10. Refer to **Appendix VII** for the list of PQLs provided by EOH&S and Eurofins I MGT Laboratories. When dilution of a sample is involved in the sample preparation, the method detection limit is adjusted by the dilution factor.

9.1.9 Blind Replicate Samples

Three (3) blind replicate (two (2) soil and one (1) water) samples were collected to determine the variability of the sampling process. Samples were collected simultaneously from the same source and under identical conditions as the original sample.

Australian Standard 4482.1 specifies the typical RPD values for blind replicate samples to be 30% - 50%. Combining the AS acceptance criteria with the recommendations of the USEPA methodology, the control limits described below were used.

1. A control limit of 50% for the RPD for original and blind replicate sample values greater than or equal to 5x the Detection Limit (DL),

2. A control limit of ± the DL if either the sample or duplicate value is less than 5x the DL.

3. If both samples values are less than the DL, the RPD is not calculated.

The tables below represent the Relative Percent Difference (RPD) values for the original and blind replicate samples collected during the soil and water investigations. Where condition 2 or 3 was applicable, an estimated level of agreement between the results was provided and, where appropriate, an RPD value calculated.

Table 16. Comparison of original sample 7773-BH08-A and blind replicate 7773-BR1 soil samples analysed by EOH&S Laboratory, mg/kg.

Analyte	DL	7773-BH03-A, mg/kg	7773-BR1, mg/kg	RPD %	Level of Agreement	Validation result
Arsenic	2	3.8	7.4	N/A	LLA	N
Cadmium	0.3	<0.3	<0.3	N/A	GLA	V
Chromium	5	20	30	N/A	LLA	N
Copper	5	15	16	5.19	GLA	V
Lead	10	28	38	N/A	GLA	V
Mercury	0.2	<0.2	<0.2	N/A	GLA	V
Nickel	10	18	24.8	N/A	GLA	V
Zinc	5	39	47.3	19.24	GLA	V
Benzo(a)pyrene	0.3	<0.3	<0.3	N/A	GLA	V
Total PAH	4.8	<4.8	<4.8	N/A	GLA	V
TRH C_6-C_{10}	35	<35	<35	N/A	GLA	V
TRH C_{10}-C_{16}	50	<50	<50	N/A	GLA	V
TRH C_{16}-C_{34}	100	<100	<100	N/A	GLA	V
TRH C_{34}-C_{40}	100	<100	<100	N/A	GLA	V

N/A – Not Applicable (Refer to 9.1.9) GLA – good level of agreement V – valid result LLA – low level of agreement N – not valid result

Analysis results of the blind rep sample showed 14 analytes to be valid and 2 to be invalid.

Table 17. Comparison of original sample 7773-BH16-A and blind replicate 7773-BR2 soil samples analysed by EOH&S Laboratory, mg/kg.

Analyte	DL	7773-BH16-A, mg/kg	7773-BR2, mg/kg	RPD %	Level of Agreement	Validation result
Arsenic	2	25.2	9.7	N/A	LLA	N
Cadmium	0.3	<0.3	<0.3	N/A	GLA	V
Chromium	5	21	30.5	N/A	LLA	N
Copper	5	21	21.1	N/A	GLA	V
Lead	10	28	26	N/A	GLA	V
Mercury	0.2	<0.2	<0.2	N/A	GLA	V
Nickel	10	26.8	31.7	N/A	GLA	V
Zinc	5	39.7	28.7	32.16	GLA	V
Benzo(a)pyrene	0.3	<0.3	<0.3	N/A	GLA	V
Total PAH	4.8	<4.8	<4.8	N/A	GLA	V
TRH C_6-C_{10}	35	<35	<35	N/A	GLA	V
TRH C_{10}-C_{16}	50	<50	<50	N/A	GLA	V
TRH C_{16}-C_{34}	100	<100	<100	N/A	GLA	V
TRH C_{34}-C_{40}	100	<100	<100	N/A	GLA	V

N/A – Not Applicable (Refer to 9.1.9) GLA – good level of agreement V – valid result LLA – low level of agreement N – not valid result

Analysis results of the blind rep sample showed 14 analytes to be valid and 2 to be invalid.

Table 18. Comparison of original sample 7773-SW-04 and blind replicate 7773-SW-BR1 water samples analysed by EOH&S Laboratory, mg/kg.

Analyte	DL	7773-SW-04 µg/L	7773-SW-BR1, µg/L	RPD %	Level of Agreement	Validation result
Arsenic (filtered)	1	<1	<1	N/A	GLA	V
Cadmium (filtered)	0.1	<0.1	<0.1	N/A	GLA	V
Chromium (filtered)	1	<1	<1	N/A	GLA	V
Copper (filtered)	1	3	4	N/A	GLA	V
Lead (filtered)	1	<1	<1	N/A	GLA	V
Mercury (filtered)	0.1	<0.1	<0.1	N/A	GLA	V
Nickel (filtered)	1	2	2	N/A	GLA	V
Zinc (filtered)	5	<5	<5	N/A	GLA	V
Benzo(a)pyrene	0.3	<0.3	<0.3	N/A	GLA	V
Total PAH	4.8	<4.8	<4.8	N/A	GLA	V
TRH C_{10}-C_{16}	50	<50	<50	N/A	GLA	V
TRH C_{16}-C_{34}	100	<100	<100	N/A	GLA	V
TRH C_{34}-C_{40}	100	<100	<100	N/A	GLA	V

N/A – Not Applicable (Refer to 9.1.9) GLA – good level of agreement V – valid result LLA – low level of agreement N – not valid result

Analysis results of the blind rep sample showed 13 analytes to be valid (RPD) and none to be invalid.

9.1.10 Field Rinsate Samples

One rinsate sample collected during the decontamination of the sampling equipment was analysed. The purpose of this analysis was to determine whether the decontamination procedures were performed correctly and to assess the possibility of cross-contamination during the sampling procedures.

The rinsate sample 7773-Rinsate1 collected on 25.06.2014 during the decontamination of augers, trowels and water sampling equipment showed no presence of contaminants above the detection limit.

Analysis results of the rinsate sample showed 13 analytes to be valid (<DL) and none to be invalid. Refer to **Table 19** below.

Table 19. Analysis of rinsate sample 7773-Rinsate1, µg/L.

Analyte	7773-Rinsate1, µg/L	Validation result
TRH C10-C16	<50	V
TRH C16-C34	<100	V
TRH C34-C40	<100	V
Benzo(a)pyrene	<0.1	V
Total PAHs	<4.8	V
Arsenic	<0.001	V
Cadmium	<0.0001	V
Chromium	<0.001	V
Copper	<0.001	V
Mercury	<0.0001	V
Nickel	<0.001	V
Lead	<0.001	V
Zinc	<0.005	V

V – valid result, N – not valid result

9.1.11 Trip Blank Samples

Two (2) trip blank samples were prepared prior to the sampling events and were stored with the investigative samples throughout the sampling event. One (1) trip blank was stored with the soil samples and one (1) with the water samples. The sample was then packaged for shipment with the other samples and submitted for analysis. Trip blanks are used to determine if samples were contaminated during storage and/or transportation back to the laboratory (a measure of sample handling variability resulting in positive bias in contaminant concentration).

The trip blank samples showed 10 valid values and 0 invalid values.

9.1.12 Spike BTEX Sample

Two (2) spiked BTEX samples were analysed in order to estimate the loss of volatile compounds during the storage, handling and transportation of samples collected in the field.

The samples were prepared by Environmental and OH&S Laboratory prior to the field work. The samples were stored, handled, and transported in exactly the same way as the field samples. One (1) spike BTEX sample was stored with the soil samples and one (1) spike BTEX sample was stored with the water samples. The percent recoveries for BTEX are given in Table 20and Table 21 below.

Table 20. Analysis results of spiked BTEX sample 7773-VOC-Spike1 analysed by Environmental and OH&S Laboratory, µg/L.

Analyte	Acceptable range, %	7773-VOC-Spike1 Spiked Concentration, µg/L	7773-VOC-Spike1 Recovered Concentration, %	Validation result
Benzene	60 - 140	40	112	V
Toluene	60 - 140	40	106	V
Ethyl Benzene	60 - 140	40	108	V
m, p- Xylene(s)	60 - 140	40	108	V
o-Xylene	60 - 140	40	111	V

V – valid result, N – not valid result

The results for 5 analytes were reported. All results showed valid values.

Table 21. Analysis results of spiked VOC sample 7773-VOC-Spike2 analysed by Environmental and OH&S Laboratory, µg/L.

Analyte	Acceptable range, %	7773-VOC-Spike2 Spiked Concentration, µg/L	7773-VOC-Spike2 Recovered Concentration, %	Validation result
Benzene	60 - 140	40	112	V
Toluene	60 - 140	40	108	V
Ethyl Benzene	60 - 140	40	109	V
m, p- Xylene(s)	60 - 140	40	108	V
o-Xylene	60 - 140	40	110	V

V – valid result, N – not valid result

The results for 5 analytes were reported. All results showed valid values.

9.1.13 Laboratory Split Sample

Split samples were analysed to measure the variability between laboratories.

Two (2) split soil samples were submitted for analysis at Eurofins I MGT. These were compared to the original samples analysed by Environmental and OH&S Laboratory.

Table 22. Comparison of Split soil sample 7773-SP1 analysed by Eurofins I MGT and soil sample 7773-BH05-A analysed by Environmental and OH&S Laboratory, mg/kg.

Analyte	EOH&S's DL	7773-BH16-A, mg/kg	MGT's DL	7773 - SP1	RPD	Level of Agreement	Validation result
Arsenic	2	25.2	2	9.4	N/A	LLA	N
Cadmium	0.3	<0.3	0.4	<0.4	N/A	GLA	V*
Chromium	5	21	5	23	N/A	GLA	V
Copper	5	21	5	21	N/A	GLA	V
Lead	10	28	5	13	N/A	LLA	N
Mercury	0.2	<0.2	0.05	<0.05	N/A	GLA	V
Nickel	10	26.8	5	23	N/A	GLA	V
Zinc	5	39.7	5	42	5.6	GLA	V

Table 22 Continued…

Analyte	EOH&S's DL	7773-BH16-A, mg/kg	MGT's DL	7773 - SP1	RPD	Level of Agreement	Validation result
Benzo(a)pyrene	0.3	<0.3	0.5	<0.5	N/A	GLA	V*
Total PAH	4.8	<4.8	0.5	<0.5	N/A	N/A	V*
TRH C6-C10	35	<35	20	<20	N/A	GLA	V*
TRH C10-C16	50	<50	50	<50	N/A	GLA	V*
TRH C16-C34	100	<100	100	<100	N/A	GLA	V*
TRH C34-C40	100	<100	100	<100	N/A	GLA	V*

N/A – Not Applicable (Refer to 9.1.9) GLA – good level of agreement V – valid result LLA – low level of agreement N – not valid result

V* - Deemed acceptable, as values for both samples analysed by Eurofins I MGT and EOH&S Laboratory are below laboratory detection limits.

The assessment variability of the split samples showed 12 valid values and 2 invalid values.

9.2 QA/QC Data Evaluation

The qualitative and quantitative descriptors, so called Data Quality Indicators (DQIs), were used in interpreting the degree of acceptability of the data acquired in the course of the investigation.

Precision	Precision is a measure of agreement among replicate measurements of the same property, made under prescribed similar conditions. Review of laboratory and field duplicate measurements showed acceptable levels of precision.
Accuracy	Accuracy is a measure of the closeness of an individual measurement to the true value. Accuracy is determined by analysing a reference material of known pollutant concentration or by re-analysing a sample to which a material of known concentration or amount of pollutant has been added. Accuracy was also evaluated by reviewing the values of percentage recoveries reported in spike samples.
Representativeness	Representativeness is a measure of the degree to which data accurately and precisely represent a characteristic of a population parameter at a sampling point or for a process condition or environmental condition. It was verified that each point in space had an equal probability of being selected for sampling. The site investigation revealed that soil samples collected were representative of the stratiographic formations from which they were collected. It appears that measurements of the population of interest were made in such a manner that the resulting data appropriately reflect the environment investigated.
Comparability	Comparability is the qualitative term that expresses the ability to fairly compare sample test results taken from the same site at different times. ADE's field personnel assigned for the project had considerable experience in

	the environmental investigations of contaminated sites. Training records of the personnel are kept in the Quality Assurance Manual ADE-QAM-III. Sampling and measurements in the field were performed by the same personnel during the field stage of the investigation. Standard ADE's environmental investigation procedures were used by the personnel in the field. No deviations from the sampling procedures were observed by the site supervisor during the fieldwork. Therefore, none or negligent bias in the data collection was expected. The spatial and temporal changes on the site during this period did not have significant influence in order to bias the data due to the environmental dynamics. Units in which the data was measured in the field and the laboratory analysis had the same metrics.
Completeness	*Documentation Completeness* In the author's opinion, the documentation used in the course of the investigation, including: • Field observation logs, • Chain of Custodies, • Orders, • Laboratory accreditation, and • Laboratory reports. were completed to satisfactory standards. *Data Completeness* Please see the following table, providing a summary of the data validity.

The principle DQIs are precision, accuracy, representativeness, comparability, and completeness referred to by the acronym PARCC. Precision and accuracy are the quantitative measures, representativeness and comparability are qualitative, and completeness is a combination of both quantitative and qualitative measures.

In the following, **Table 23** summarises the DQO reconciliation.

Table 23. Summary of DQO reconciliation.

QA/QC Item	DQO Criteria	Valid Data	Not Valid Data	Completeness	Conclusion
Laboratory duplicate samples	95 %	311	0	100%	Acceptable
Laboratory blank samples	100 %	265	0	100%	Acceptable
Laboratory spike/surrogate recoveries	95 %	294	0	100%	Acceptable
Laboratory control (split) sample	75%	12	2	85.7%	Acceptable
Blind replicate samples	75 %	41	4	91.1%	Acceptable
Rinsate sample	75 %	13	0	100%	Acceptable
Trip blank sample	95 %	10	0	100%	Acceptable
Spike BTEX	75 %	10	0	100%	Acceptable
Total:					
Overall Completeness:	**95 %**	**956**	**6**	**99.4**	**Acceptable**

The ratio of the valid data to the total number of the analyses conducted in the QA/QC program yielded 99.4%. As such, the data collected in the course of the investigation meets the target result for the completeness of the QA/QC program stated in the DQOs (95%).

10 CONCLUSIONS

Based on the data and evidence collected from the Phase II DSI the following conclusions can be made:

10.1 Site History Appraisal and Site Inspection

- The site has been exposed to a prolonged period of potentially contaminating activities due to its close proximity to commercial/industrial infrastructure and major road;
- The site inspection revealed healthy vegetation showing minimal signs of discolouration or stress; and
- Fill materials were observed within the site.

10.2 Soil Contamination Investigation

Soil contamination investigation - top 0.5 m of material below ground level and two stockpiles.

10.2.1 NEPM Schedule B(1) HIL (D) guideline values

The samples collected from the site meet the NEPM Schedule B(1) HIL (D) guideline criteria with regards to heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), PAHs, OCPs/OPPs, Phenols and PCBs.

10.2.2 NEPM Schedule B(1) Ecological Screening / Investigation Levels

TRH

All samples showed concentrations of TRH below the assessment criteria for commercial/industrial land use (*NEPM Schedule B(1) Ecological Screening/Investigation Levels (2013)*).

Naphthalene, Arsenic and DDT

All samples showed concentrations of Naphthalene, Arsenic and DDT were below the assessment criteria for commercial/industrial land use (*NEPM Schedule B(1) Ecological Screening/Investigation Levels (2013)*).

10.2.3 Asbestos

No asbestos was observed on the site during the investigation works. None of the five (5) soil samples collected during the investigation were found to contain asbestos.

10.3 Sediment

10.3.1 ANZECC Guidelines for Fresh and Marine Water – Sediment Guidelines

Polycyclic Aromatic Hydrocarbons (PAH)

The concentrations of PAH were observed below the site assessment criteria.

Heavy Metals (As, Ca, Cd, Cu, Pb, Hg, Ni and Zn)

The concentration of metals Cd, Cr, Cu, Pb, Hg and Zn were observed below the site assessment criteria. All of the samples were observed below the ISQG-High criteria.

The concentrations of Arsenic (As) and Nickel (Ni) were detected slightly above the ISQG-Low trigger value in one (1) of the four (4) sediment samples.

Elevated concentrations of As and Ni could be explained by the current state of the creek. It was observed that the creek was ephemeral in nature. At the time of the investigation, the water was not running, the water depth was no greater than 0.2 m and dry in many sections. As a result, this may increase concentrations of heavy metals in the creek sediment due to precipitation of heavy metals in water.

Furthermore, it is also possible that background ranges of As and Ni within the soil and rock located outside the site, upstream of the creek, may have caused a natural increase in the creek sediment concentrations of metals within the site.

It should be noted, during the field investigation works no aquatic animals or amphibians were observed in or around the creek.

Taking into account the above and based on the creeks size and capacity, the impact of the slightly increased concentrations of Arsenic and Nickel on water ecological health within the creek and greater river catchment is considered minimal and therefore does not warrant any further investigations and the results are deemed acceptable.

10.3.2 Ecological Screening / Investigation Levels

Total Recoverable Hydrocarbons

The concentrations of TRH were observed below the adopted site assessment criteria.

10.4 Surface Water

10.4.1 ANZECC Guidelines for Fresh and Marine Water

Total Recoverable Hydrocarbons (TRH)

The concentrations of TRH fractions were observed below the adopted site assessment criteria.

Polycyclic Aromatic Hydrocarbons (PAHs)

The concentrations of Anthracene, Naphthalene, Phenanthrene, Fluoranthene and Benzo(a)pyrene were observed below the adopted site assessment criteria.

Dissolved Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn)

The concentration of metals As, Cu, Cd, Cr, Pb, Hg, Ni and Zn were observed below the adopted site assessment criteria.

10.5 Preliminary Waste Classification

With exception to the area where asbestos materials were identified, the concentrations of metals (As, Cd, Cr, Hg, Pb, Cu, Ni and Zn), Benzo(a)pyrene, petroleum hydrocarbons (TRH), poly-aromatic

hydrocarbons (PAHs), organochlorine pesticides (OCPs) and organophosphate pesticides (OPPs) in the soil samples collected meet the NSW EPA criteria assigned for *General Solid Waste*.

NOTE: This in situ preliminary waste classification is indicative only. The sampling frequency of further testing will be dependent on the projected volumes of soil to be removed and transported to an EPA licensed landfill.

10.6 Contamination Status of the Site

It is the opinion of ADE that no contamination of the site from potential contaminating practices undertaken both on and off site, had occurred prior to the time the investigation took place.

The concentrations of the potential contaminants within the soil, sediment and surface water samples collected were below the NEPM Schedule B (1) Health Based Investigation Levels (HIL) D, Ecological Screening Levels (commercial/industrial) and ANZECC Guideline s for Fresh and Marine Water Quality assessment criteria's.

Based on the findings of the detailed site investigation, the site is deemed suitable for commercial/industrial land use and the proposed development.

11 LIMITATIONS

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based on information provided by the client. The advice herein relates only to this project and all results, and conclusions made should be reviewed by a competent and experienced person with experience in environmental investigations, before being used for any other purpose. A.D. Envirotech Australia Pty Ltd (ADE) accepts no liability for use or interpretation by any person or body outside the consent authority. This report should not be reproduced or amended in any away without prior approval by the client or ADE and should not be relied upon by any other party, who should make their own independent enquiries.

The extent of sampling of soils and subsequent analysis has been necessarily limited and has been targeted towards areas where contamination is considered to be most likely based on the knowledge of the site history and visual observation. This approach maximises the probability of identifying contaminants, however, it may not identify contamination which occurs in unexpected locations or from unexpected sources.

Further, soils rock and aquifer conditions are often variable, resulting in non-homogenous contaminant distributions across a site. Contaminant concentrations have been identified at chosen sample locations, however, conditions between samples locations can only be inferred on the basis of the estimated geological and hydrogeological conditions and the nature and extent of indentified contamination. Boundaries between zones of variable contamination are often indistinct and have been interpreted based on available information and the application of professional judgement. The accuracy with which the subsurface conditions have been characterised depends on the frequency and methods of sampling and the uniformity of subsurface conditions and is therefore limited by the scope of works undertaken.

This report does not provide a complete assessment of the environmental status of the site and it is limited to the scope defined herein. Groundwater contamination was not included in the scope of the investigation as it was understood that the proposed activities on site shall not have any effect on local groundwater.

Should information become available regarding conditions at the site including previously unknown sources of contamination, ADE reserves the right to review the report in the context of the additional information.

ADE's professional opinions are based upon its professional judgement, experience, training and results from analytical data. In some cases further testing and analysis may be required, thus producing different results and/or opinions. ADE has limited investigation to the scope agreed upon with its client.

ADE has used a degree of care and skill ordinarily exercised in similar investigations by reputable member of the Environmental Industry within Australia. No other warranty, expressed or implied, is made or intended.

12 REFERENCES

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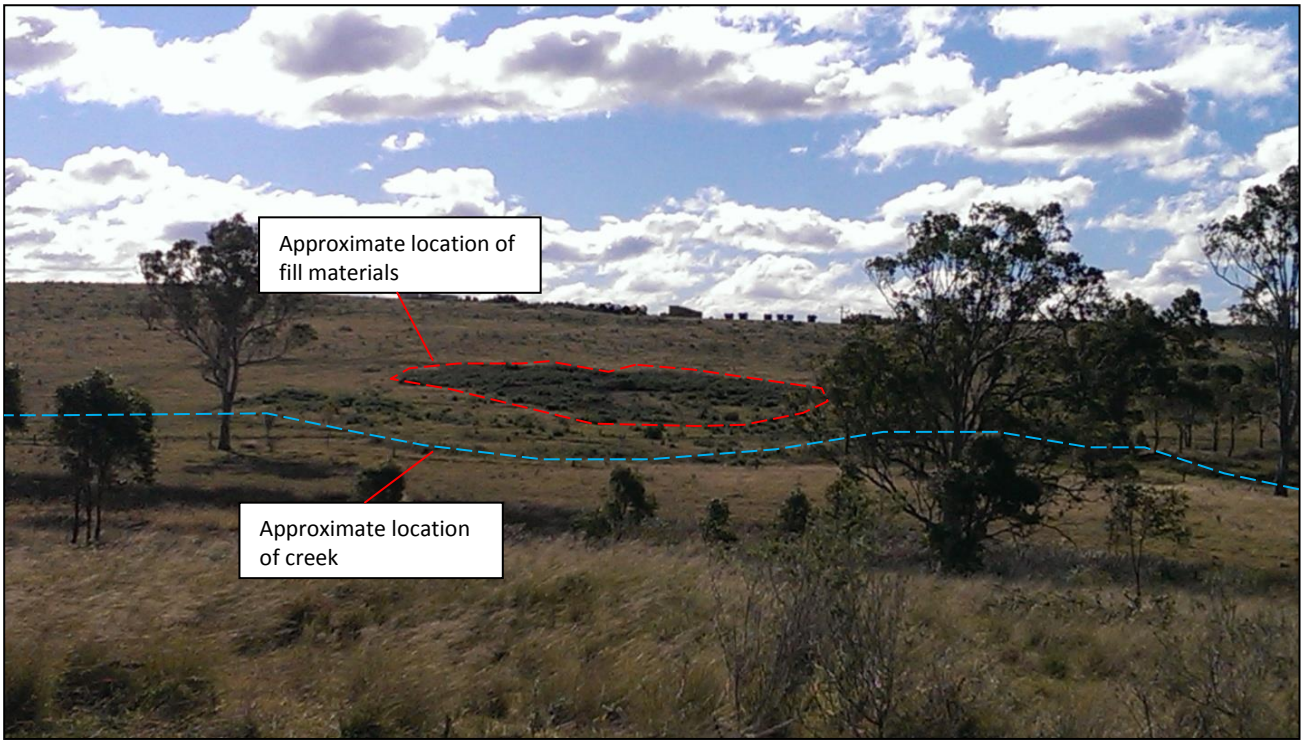
APPENDIX I PHOTOGRAPHS



Photograph 1. Location of subject area, showing key features (facing north).

Photograph 2. Typical soil profile observed within the top 0.5m BGL throughout the site.

Photograph 3. Soil stockpiles, included within the scope of soil investigations (facing south east).

Photograph 4. Subject site, fill materials

Photograph 5. Location of surface water sample SW-03.

Photograph 6. Location of surface water sample SW-04.

APPENDIX II LAND AND PROPERTY RECORDS

Land and Property Information Division

ABN: 84 104 377 806
GPO BOX 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

TITLE SEARCH

Title Reference: 3/1145808

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      LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH
      ------------------------------------------------------------


FOLIO: 3/1145808
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           SEARCH DATE       TIME              EDITION NO    DATE
           -----------       ----              ----------    ----
           16/4/2014        10:41 AM               2       11/11/2011


LAND
----
LOT 3 IN DEPOSITED PLAN 1145808
   AT EASTERN CREEK
   LOCAL GOVERNMENT AREA BLACKTOWN
   PARISH OF MELVILLE   COUNTY OF CUMBERLAND
   TITLE DIAGRAM DP1145808

FIRST SCHEDULE
--------------
ACN 114 843 453 PTY LIMITED

SECOND SCHEDULE (4 NOTIFICATIONS)
---------------
1   RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2   AE435918  MORTGAGE TO DENARKE PTY LIMITED
3   DP1145808 RIGHT OF CARRIAGEWAY 30 METRE(S) WIDE APPURTENANT TO
              THE LAND ABOVE DESCRIBED
4   AG615110  MORTGAGE TO WESTPAC BANKING CORPORATION

NOTATIONS
---------
UNREGISTERED DEALINGS: NIL

        ***  END OF SEARCH  ***


                                PRINTED ON 16/4/2014
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TITLE SEARCH

Title Reference: 2/1145808

```
      LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH
      ------------------------------------------------------------


FOLIO: 2/1145808
------

           SEARCH DATE       TIME              EDITION NO    DATE
           -----------       ----              ----------    ----
           16/4/2014        10:40 AM               5       2/12/2013


LAND
----
LOT 2 IN DEPOSITED PLAN 1145808
   AT EASTERN CREEK
   LOCAL GOVERNMENT AREA BLACKTOWN
   PARISH OF MELVILLE   COUNTY OF CUMBERLAND
   TITLE DIAGRAM DP1145808

FIRST SCHEDULE
--------------
ACN 114 843 453 PTY LIMITED

SECOND SCHEDULE (11 NOTIFICATIONS)
---------------
1   RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2   DP262213  RIGHT OF CARRIAGEWAY AFFECTING THE PART(S) SHOWN SO
              BURDENED IN THE TITLE DIAGRAM
3   DP262213  EASEMENT FOR SERVICES AFFECTING THE PART(S) SHOWN SO
              BURDENED IN THE TITLE DIAGRAM
4   AE435918  MORTGAGE TO DENARKE PTY LIMITED
5   DP1145808 RIGHT OF CARRIAGEWAY 21 METRE(S) WIDE AND VARIABLE
              APPURTENANT TO THE LAND ABOVE DESCRIBED
6   DP1145808 RIGHT OF CARRIAGEWAY & EASEMENT FOR SERVICES 21.5
              METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURDENED
              IN THE TITLE DIAGRAM
7   DP1145808 EASEMENT FOR SERVICES 2.5 WIDE, 5 WIDE AND VARIABLE
              AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE
              DIAGRAM
8   DP1145808 RIGHT OF CARRIAGEWAY 23 WIDE & 30 WIDE AFFECTING THE
              PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
9   DP1145808 RIGHT OF CARRIAGEWAY 30 METRE(S) WIDE AFFECTING THE
              PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
10  AG367113  RIGHT OF ACCESS 25 WIDE AND VARIABLE AFFECTING THE
              SITE DESIGNATED (A) IN PLAN WITH AG367113
11  AG615110  MORTGAGE TO WESTPAC BANKING CORPORATION

NOTATIONS
---------
UNREGISTERED DEALINGS: NIL

        ***  END OF SEARCH  ***


                                        PRINTED ON 16/4/2014
```

** 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 Division

ABN: 84 104 377 806
GPO BOX 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORY OF TITLE TRANSACTION

Title Reference: 2/1145808

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
16/4/2014 10:41AM

FOLIO: 2/1145808

First Title(s): OLD SYSTEM
Prior Title(s): 2/262213

Recorded	Number	Type of Instrument	C.T. Issue
18/12/2009	DP1145808	DEPOSITED PLAN	FOLIO CREATED EDITION 1
6/1/2011	AF977130	MORTGAGE	EDITION 2
17/8/2011	AG367113	TRANSFER GRANTING EASEMENT	EDITION 3
11/11/2011	AG615110	MORTGAGE	EDITION 4
2/12/2013	AI184150	DISCHARGE OF MORTGAGE	EDITION 5

*** END OF SEARCH ***

PRINTED ON 16/4/2014

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Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORY OF TITLE TRANSACTION

Title Reference: 3/1145808

```
LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH
-----------------------------------------------------------------

                                        SEARCH DATE
                                        -----------
                                        16/4/2014 10:40AM

 FOLIO: 3/1145808
 ------

        First Title(s): OLD SYSTEM
        Prior Title(s): 2/262213

 Recorded    Number     Type of Instrument              C.T. Issue
 --------    ------     ------------------              ----------
18/12/2009   DP1145808  DEPOSITED PLAN                  FOLIO CREATED
                                                        EDITION 1

11/11/2011   AG615110   MORTGAGE                        EDITION 2


                   ***  END OF SEARCH  ***


                                PRINTED ON 16/4/2014
```

Land and Property Information Division

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GPO BOX 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORY OF TITLE TRANSACTION

Title Reference: 2/262213

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
30/4/2014 2:36PM

FOLIO: 2/262213

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 14726 FOL 222

Recorded	Number	Type of Instrument	C.T. Issue
5/6/1987		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
6/8/1987		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
21/5/1996		AMENDMENT: LOCAL GOVT AREA	
23/12/1996	2716424	VARIATION OF LEASE	EDITION 1
19/6/1998	5067558	DEPARTMENTAL DEALING	
9/11/2004	AB78884	REQUEST	EDITION 2
23/12/2004	AB183817	CAVEAT	
16/3/2005	AB222195	MORTGAGE	EDITION 3
12/9/2005	AB760521	WITHDRAWAL OF CAVEAT	
12/9/2005	AB760522	DISCHARGE OF MORTGAGE	
12/9/2005	AB760523	TRANSFER	
12/9/2005	AB760524	MORTGAGE	
12/9/2005	AB760525	MORTGAGE	EDITION 4
25/5/2006	DP1097123	DEPOSITED PLAN	
26/5/2006	AC224767	SUB-MORTGAGE	
26/5/2006	AC224768	SUB-MORTGAGE	
14/6/2006	AC54545	LEASE	
14/6/2006	AC54546	LEASE	
14/6/2006	AC54547	LEASE	
14/6/2006	AC54548	LEASE	
14/6/2006	AC54549	LEASE	EDITION 5
29/12/2006	DP1106086	DEPOSITED PLAN	
3/1/2007	AC762291	TRANSFER GRANTING EASEMENT	EDITION 6
12/8/2008	DP1127167	WITHDRAWN - DEPOSITED PLAN	

END OF PAGE 1 - CONTINUED OVER

PRINTED ON 30/4/2014

Land and Property Information Division

ABN: 84 104 377 806
GPO BOX 15
Sydney NSW 2001
DX 17 SYDNEY Telephone: 1300 052 637

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
30/4/2014 2:36PM

FOLIO: 2/262213 PAGE 2

Recorded	Number	Type of Instrument	C.T. Issue
9/1/2009	AE435914	DISCHARGE OF MORTGAGE	
9/1/2009	AE435915	DISCHARGE OF MORTGAGE	
9/1/2009	AE435918	MORTGAGE	EDITION 7
18/12/2009	DP1145808	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

PRINTED ON 30/4/2014

Req:R418740 /Doc:CT 13544-125 CT /Rev:12-Jan-2011 /Sts:OK.SC /Prt:30-Apr-2014 14:51 /Pgs:ALL /Seq:1 of 2
Ref: /Src:X

13544125

CERTIFICATE OF TITLE

NEW SOUTH WALES

PROPERTY ACT, 1900

Appln. No.52818

Vol. 13544 Fol. 125

EDITION ISSUED

6 2 1978

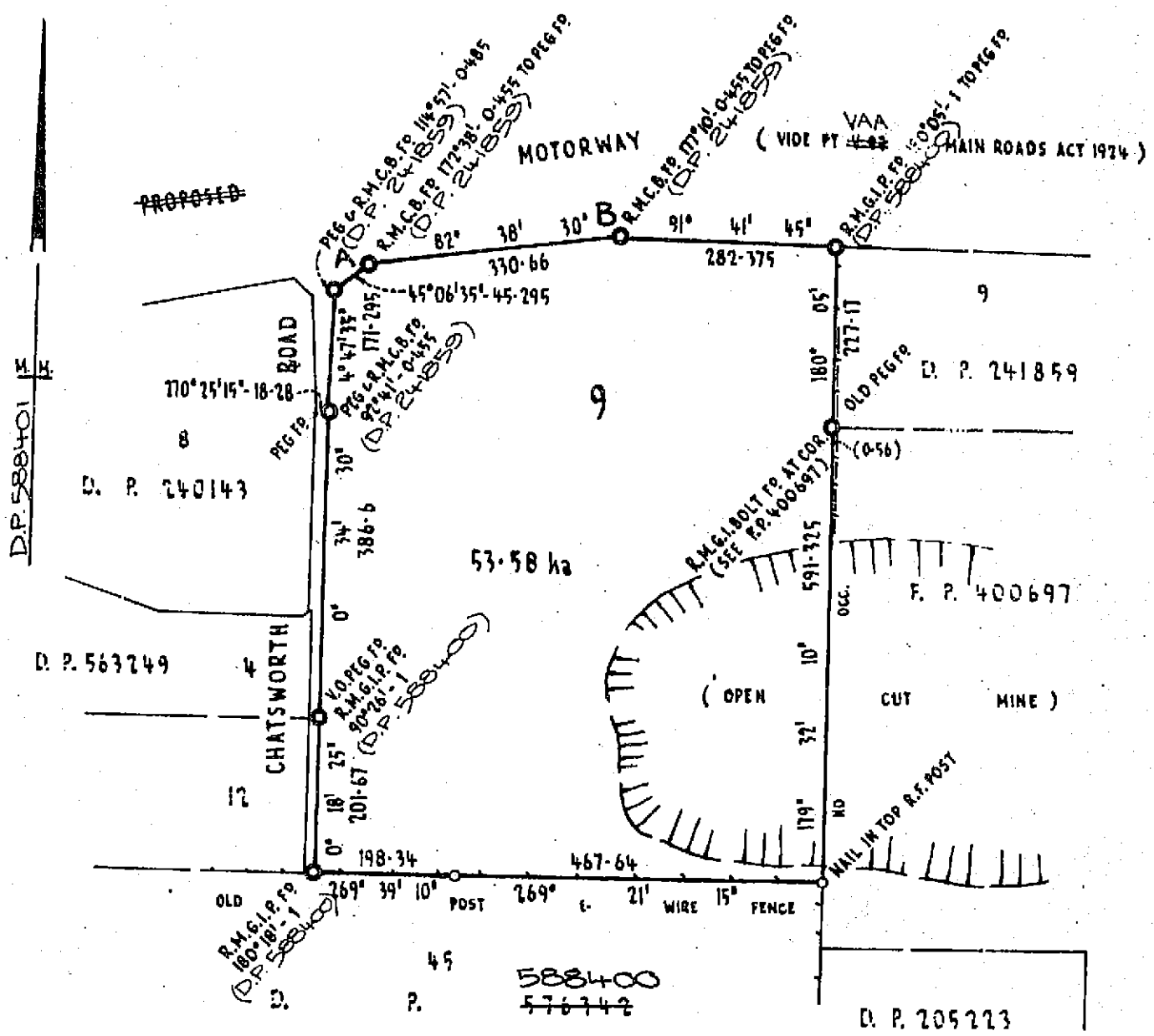
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Registrar General.

CANCELLED

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 9 in Deposited Plan 588401 at Ropes Creek in the Municipality of Blacktown Parish of Melville and County of Cumberland being part of Portion 14 granted to William Cox (Junior) on 17-8-1819.

FIRST SCHEDULE

RAY FITZPATRICK PTY. LIMITED.

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
2. Book 2603 No.79 Lease to Ray Fitzpatrick Quarries Pty.Limited. Date of expiry 14-2-1979.

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE LAND TITLES OFFICE.

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

Req:R418740 /Doc:CT 13544-125 CT /Rev:12-Jan-2011 /Sts:OK.SC /Prt:30-Apr-2014 14:51 /Pgs:ALL /Seq:2 of 2
Ref: /Src:X

CT. 10-9.
DP 262213

Vol. 13544 Fol. 125

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General

NEW CERTIFICATE(S) OF TITLE ISSUING ON DP 262213
NO DEALING TO BE REGISTERED WITHOUT REFERENCE TO DEALINGS BRANCH.

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		
	DP262213	30.3.1982	Interests created pursuant to Section 88B Conveyancing Act, 1919,					
			by the registration of Deposited Plan 262213	30.3.1982				

This Deed is cancelled as to whole
New Certificates of Title have issued on 22-4-1982
for lots in Deposited Plan No 262213 as follows:
Lots 2 to 5 Vol. 14716 Fol. 222 to 225 respectively.

REGISTRAR GENERAL

(Page 2 of 2 pages)

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

CERTIFICATE OF TITLE

NEW SOUTH WALES

PROPERTY ACT, 1900

Appln. Nos.52818 & 52819

Prior Titles Vol.13544 Fol.125
Vol.13548 Fol. 70
Vol.13507 Fol.223

Vol. 14726 Fol. 222

EDITION ISSUED

23 4 1982

14726 Fol. 222

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.

CANCELLED

Registrar General.

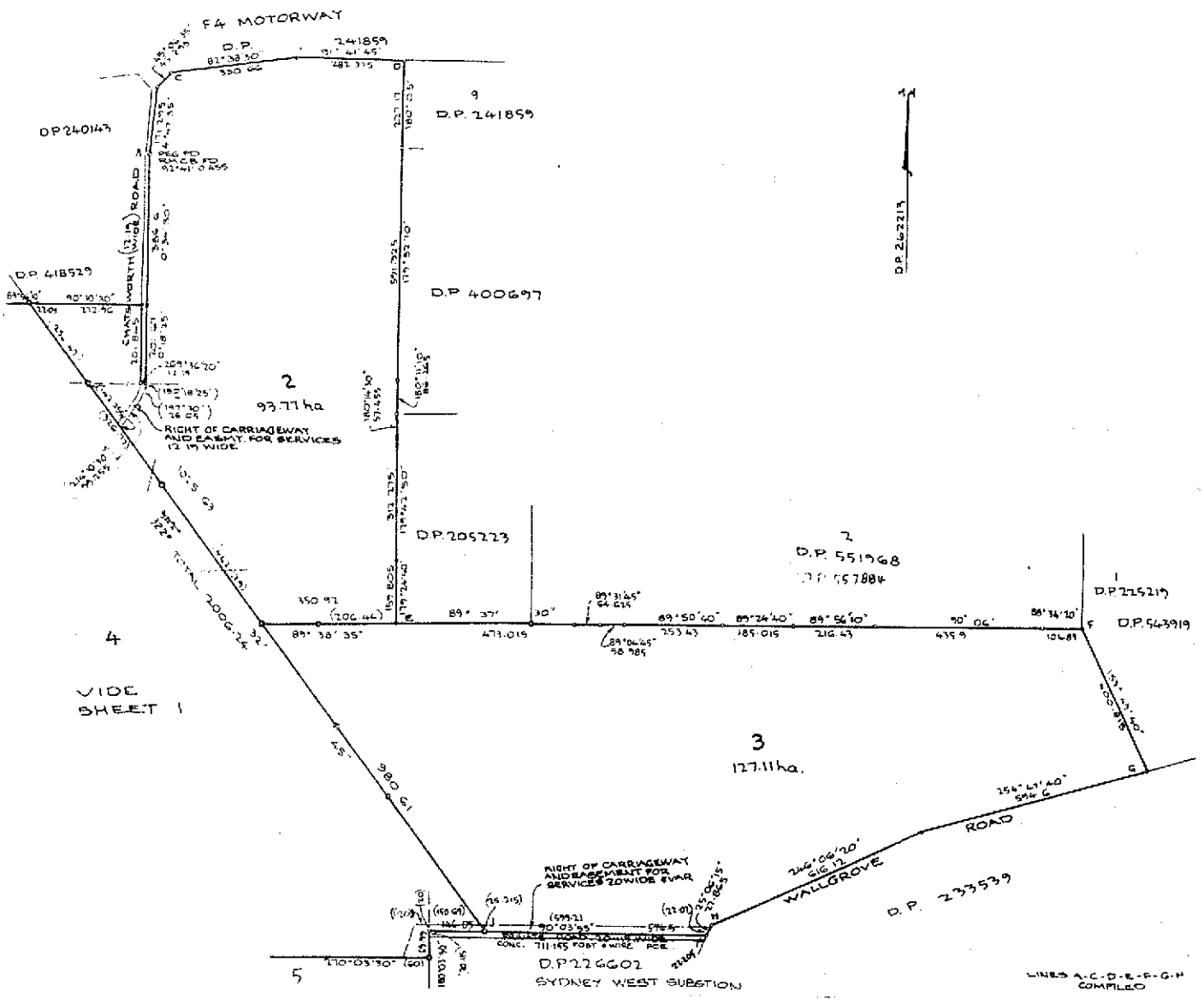
SEE AUTO FOLIO

(Page 1) Vol. .....

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 2 in Deposited Plan 262213 at Ropes Creek in the City of Blacktown Parish of Melville and County of Cumberland being part of Portion 14 granted to William Cox (Junior) on 17-8-1819 and part of Portion 45 granted to John Thomas Campbell on 17-8-1819.

FIRST SCHEDULE

RAY FITZPATRICK PTY. LIMITED.

SECOND SCHEDULE

GRY 1. Reservations and conditions, if any, contained in the Crown Grants above referred to.
RC(SB) 2. DP262213 Right of carriageway affecting the part of the land above described shown so burdened in the plan hereon.
EG(SB) 3. DP262213 Easement for services affecting the part of the land above described shown so burdened in the plan hereon.

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

Vol. 14726 Fol. 222

94137C 4.81 D. West, Government Printer

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	Registrar General

SECOND SCHEDULE (continued)

	PARTICULARS	Registrar General	CANCELLATION
L	T646462 Lease to Pioneer Concrete (N.S.W.) Pty. Limited. Expires 31-12-2004. Registered 28-7-1983		

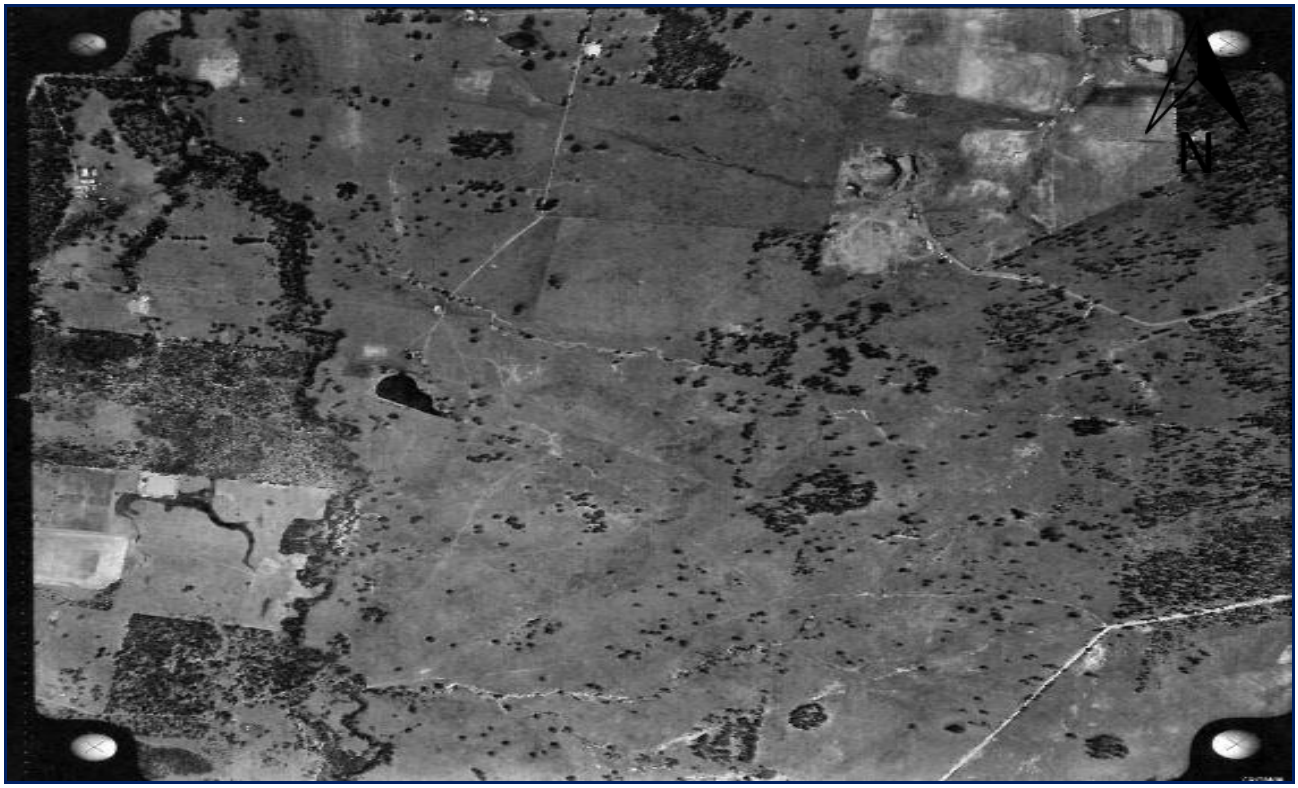
NOTATIONS AND UNREGISTERED DEALINGS

C.T. 7.7.83
T646462 Lse
3 cert

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

Req:R359816 /Doc:CT 14726-222 CT /Rev:07-Mar-2011 /Sts:OK.SC /Prt:16-Apr-2014 10:41 /Pgs:ALL /Seq:2 of 2
Ref: /Src:X

APPENDIX III AERIAL PHOTOGRAPHS



Aerial Photograph 1. Aerial photograph of the site, dated 1955. Sourced from Department of Environment and Primary Industries records, accessed on the 15.04.14

Aerial Photograph 2. Close up aerial photograph of the site, dated 1945. Sourced from Department of Environment and Primary Industries records, accessed on the 15.04.14

Aerial Photograph 3. Aerial photograph of the site, dated 1978. Sourced from Department of Environment and Primary Industries records, accessed on the 15.04.14

Aerial Photograph 4. Close up aerial photograph of the site, dated 1978. Sourced from Department of Environment and Primary Industries records, accessed on the 15.04.14

Aerial Photograph 5. Close up aerial photograph of the site, dated 1978. Sourced from Department of Environment and Primary Industries records, accessed on the 15.04.14

Aerial Photograph 6. Close up of aerial photograph of the site, dated 1994. Sourced from Department of Environment and Primary Industries records, accessed on the 15.04.14

Aerial Photograph 7. Close up aerial photograph of the site, dated 1994. Sourced from Department of Environment and Primary Industries records, accessed on the 15.04.14

Aerial Photograph 8. Aerial photograph of the site, dated 1994. Sourced from Department of Environment and Primary Industries records, accessed on the 15.04.14

Aerial Photograph 9. Close up aerial photograph of the site, dated 2013. Sourced from maps.six.nsw.gov.au o the 15.04.2014

APPENDIX IV CONTAMINATED LAND SEARCH

Healthy Environment, Healthy Community, Healthy Business

You are here: Home > Contaminated land > Record of notices

Search results

Your search for:LGA: Blacktown City Council

Matched 7 notices relating to 2 sites.

Search Again

Refine Search

Suburb	Address	Site Name	Notices related to this site
Kings Park	21 Tattersall Road	Former Dow Corning Sealants Factory	1 current and 4 former
Seven Hills	27 Powers Road	Ma-Refine Oils Seven Hills	2 current

Page 1 of 1

16 April 2014

APPENDIX V SECTION 149 CERTIFICATE

Blacktown City Council

PLANNING CERTIFICATE UNDER SECTION 149

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

RECEIVED
14 APR 2014

Applicant DIAL A DUMP PTY LTD
VIA SAI GLOBAL PROPERTY
PO BOX A2151
SYDNEY SOUTH NSW 1235

Property LOT 1 DP 1145808 OFF ARCHBOLD RD
LOT 2 DP 1145808

ARCHBOLD ROAD,

Suburb EASTERN CREEK Parish of Melville

NOTE: **The land the subject of this Certificate is known to be located in the suburb of Eastern Creek. For all correspondence and property transactions this suburb name is to be used.**

PART A
PRESCRIBED INFORMATION PROVIDED PURSUANT TO SECTION 149(2) OF THE *ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 (EP&A Act 1979)*

NOTE: The following information is provided pursuant to Section 149(2) of the EP&A Act 1979, as prescribed by Schedule 4 of the *Environmental Planning and Assessment Regulation 2000*, and is applicable as of the date of this certificate.

1. NAMES OF RELEVANT PLANNING INSTRUMENTS AND DEVELOPMENT CONTROL PLANS

1.1 Environmental Planning Instruments

As at the date of this certificate the abovementioned land is not affected by Blacktown Local Environmental Plan 1988.

1.2 Development Control Plans

As at the date of this certificate the abovementioned land is not affected by Blacktown Development Control Plan 2006.

1.3 Relevant State Environmental Planning Policies (SEPPs), including draft policies, or Regional Environmental Plans deemed to be SEPPs

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

This policy sets out a method for determining the number of storeys in a building, to prevent possible confusion arising from the interpretation of various environmental planning instruments.

State Environmental Planning Policy No. 19 - Bushland in Urban Areas

This policy protects and preserves bushland within certain urban areas, as part of the natural heritage or for recreational, educational and scientific purposes. The policy is designed to protect bushland in public open space zones and reservations, and to ensure that bush preservation is given a high priority when local environmental plans for urban development are prepared.

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

This policy states the Government's intention to ensure that urban consolidation objectives are met in all urban areas throughout the State. The policy focuses on the redevelopment of urban land that is no longer required for the purpose it is currently zoned or used and encourages local councils to pursue their own urban consolidation strategies to help implement the aims and objectives of the policy. Councils will continue to be responsible for the majority of rezonings. The policy sets out guidelines for the Minister to follow when considering whether to initiate a regional environmental plan (REP) to make particular sites available for consolidated urban redevelopment. Where a site is rezoned by an REP, the Minister will be the consent authority.

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

This policy provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA). The Policy does not change the role of Councils as consent authorities, land zoning, or the designated development provisions of the Environmental Planning and Assessment Act 1979.

State Environmental Planning Policy No. 55 - Remediation of Land

This policy provides state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

State Environmental Planning Policy No. 62 - Sustainable Aquaculture

This policy encourages the sustainable expansion of the industry in NSW. The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

State Environmental Planning Policy No. 64 - Advertising and Signage

This policy aims to ensure that outdoor advertising is compatible with the desired amenity and visual character of an area, provides effective communication in suitable locations and is of high quality design and finish. The SEPP was amended in August 2007 to permit and regulate outdoor advertising in transport corridors (e.g. freeways, tollways and rail corridors). The amended SEPP also aims to ensure that public benefits may be derived from advertising along and adjacent to transport corridors.

State Environmental Planning Policy - Affordable Rental Housing 2009

This policy establishes a consistent planning regime for the provision of affordable rental housing. The policy provides incentives for new affordable rental housing, facilitates the retention of existing affordable rentals, and expands the role of not-for-profit providers. It also aims to support local centres by providing housing for workers close to places of work, and facilitate development of housing for the homeless and other disadvantaged people.

State Environmental Planning Policy - Exempt and Complying Development Codes

This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt and complying development codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent; and, in the General Housing Code, types of complying development that may be carried out in accordance with a complying development certificate as defined in the Environmental Planning and Assessment Act 1979.

State Environmental Planning Policy - Major Development 2005

The SEPP facilitates the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant sites for the benefit of the State. Schedule 3 of the SEPP identifies State significant sites and provides planning provisions for those sites. Note: This SEPP was formerly known as State Environmental Planning Policy (Major Projects) 2005.

State Environmental Planning Policy - Western Sydney Employment Area 2009

This State Environmental Planning Policy promotes economic development and the creation of employment in the Western Sydney Employment Area by providing for development, including major warehousing, distribution, freight transport, industrial, high technology and research facilities. The policy provides for coordinated planning, development and rezoning of land for employment or environmental conservation purposes.

State Environmental Planning Policy - Infrastructure 2007

This policy provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

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

This policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The policy establishes appropriate planning controls to encourage ecologically sustainable development.

State Environmental Planning Policy - Temporary Structures 2007

This policy provides for the erection of temporary structures and the use of places of public entertainment, while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

Sydney Regional Environmental Plan No. 9 - Extractive Industry Sydney Region

This plan aims to protect the viability of extractive resources in the Sydney Metropolitan Area by ensuring consideration is given to the impact of encroaching development.

2. ZONING AND LAND USE UNDER RELEVANT ENVIRONMENTAL PLANNING INSTRUMENTS

(a) The abovementioned land is subject to the provisions of State Environmental Planning Policy (Western Sydney Employment Area) 2009 and is zoned:

E2 - ENVIRONMENTAL CONSERVATION
IN1 - GENERAL INDUSTRIAL

(b) The land does not include or comprise a critical habitat. Critical habitat refers to habitat that is critical to the survival of endangered species, populations or ecological communities. Areas of critical habitat are declared under Part 3 of the Threatened Species Conservation Act 1995 and Part 7A of the Fisheries Management Act 1994.

(c) The land is not within a conservation area.

(d) This land does not contain an item of environmental heritage under the protection of Blacktown Local Environmental Plan 1988.

3. COMPLYING DEVELOPMENT

Complying Development under the *General Housing Code* of the Codes SEPP may be carried out on the land.

Complying Development under the *Rural Housing Code* of the Codes SEPP may be carried out on the land.

Complying Development under the *Housing Alterations Code* of the Codes SEPP may be carried out on the land.

Complying Development under the *General Development Code* of the Codes SEPP may be carried out on the land.

Complying Development under the *Commercial and Industrial Alterations Code* of the Codes SEPP may be carried out on the land.

Complying Development under the *Commercial and Industrial (New Buildings and Additions) Code* of the Codes SEPP may be carried out on the land.

Complying Development under the *Subdivisions Code* of the Codes SEPP may be carried out on the land.

Complying Development under the *Demolition Code* of the Codes SEPP may be carried out on the land.

Complying Development under the *Fire Safety Code* of the Codes SEPP may be carried out on the land.

Note: Despite the above provisions, if only part of a lot is subject to an exclusion or exemption under Clause 1.17A or Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 then complying development may be carried out on that part of the lot that is not affected by the exclusion or exemption.

Disclaimer: This information only addresses matters raised in Clauses 1.17A and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008. It is your responsibility to ensure that you comply with the general requirements of the State Environmental Planning Policy (Exempt and Complying Codes) 2008. Failure to comply with these provisions may mean that a Complying Development Certificate issued under the provisions of State Environmental Planning Policy (Exempt and Complying Codes) 2008 is invalid.

4. COASTAL PROTECTION

The land is not affected by the operation of Sections 38 or 39 of the *Coastal Protection Act, 1979*.

5. MINE SUBSIDENCE

The land has not been proclaimed to be a mine subsidence district within the meaning of Section 15 of the *Mine Subsidence Compensation Act, 1961*.

6. ROAD WIDENING AND ROAD REALIGNMENT

Blacktown Local Environmental Plan 1988 and Blacktown Development Control Plan 2006 nominate preferred road patterns throughout the City.

The land is not affected by road widening/road realignment under Division 2 of Part 3 of the Roads Act 1993 and/or environmental planning instrument.

The land is affected by a road pattern.

7. COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

Council has not adopted any policies to restrict the development of the land by reason of the likelihood of landslip, bushfire, tidal inundation, subsidence or the occurrence of acid sulphate soils. Although the Council has not adopted a specific policy to restrict development on bush fire prone land, it is bound by statewide bush fire legislation that may restrict development. In this regard, refer to point 11 below.

Council has adopted a policy on contaminated land which may restrict the development of this land. The land contamination policy applies when zoning or land use changes are proposed on land which has previously been used for certain purposes or has the potential to be affected by such purposes undertaken on nearby lands. Council's records may not be sufficient to determine all previous uses on the land, or determine activities that may have taken place on this land. Consideration of Council's policy and the application of provisions under the relevant State legislation and guidelines is necessary.

7A. FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

There are currently no mainstream or backwater flood-related development controls adopted by Council that apply to the land subject to this Certificate.

8. LAND RESERVED FOR ACQUISITION

Clauses 17, 17A and 18 of Blacktown Local Environmental Plan 1988 provide for the acquisition of certain land zoned 5(a), 5(b), 5(c), 6(a) or 6(c) by a public authority.

9. CONTRIBUTIONS PLANS

Council currently levies contributions under Section 94 of the EP&A Act 1979 for facilities and services. The further development of the subject land may incur such contribution.

This property is affected by Draft Section 94 Contributions Plan No 18 - Eastern Creek Stage 3.

9A. BIODIVERSITY CERTIFIED LAND

The land has not been granted biodiversity certification within the meaning of the Threatened Species Conservation Act 1995.

10. BIOBANKING AGREEMENTS

Council has not been notified of the existence of a biodiversity agreement under the Threatened Species Conservation Act 1995.

11. BUSH FIRE PRONE LAND

The *Rural Fires and Environmental Assessment Legislation Amendment Act 2002*, which came into force on 1 August 2002, introduced development provisions for bush fire prone land as shown on a Bush Fire Prone Land Map. "Bush fire prone land" is land that has been designated by the Commissioner of the NSW Rural Fire Service as being bush fire prone due to characteristics of vegetation and topography. The land the subject of this certificate has been identified on Council's Bush Fire Prone Land Map as being:

clear of any bush fire prone land

On land that is bush fire prone, certain development may require further consideration under Section 79BA or Section 91 of the EP&A Act 1979 and under Section 100B of the *Rural Fires Act 1997*.

12. PROPERTY VEGETATION PLANS

Land to which this Certificate applies is not subject to a Property Vegetation Plan under the provisions of the *Native Vegetation Act 2003*.

13. ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Land to which this Certificate applies is not the subject of an order made under the *Trees (Disputes Between Neighbours) Act 2006*.

14. DIRECTIONS UNDER PART 3A

Land to which this Certificate applies is not subject to the above.

15. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

Land to which this Certificate applies is not subject to the above.

16. SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

Land to which this Certificate applies is not subject to the above.

17. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

Land to which this Certificate applies is not subject to the above.

18. MATTERS ARISING UNDER THE CONTAMINATED LAND MANAGEMENT ACT 1997 AND CONTAMINATED LAND MANAGEMENT AMENDMENT ACT 2008

(a) The land to which this certificate relates has not been declared to be significantly contaminated land at the date when the certificate was issued.

(b) The land to which the certificate relates is not subject to a management order at the date when the certificate was issued.

(c) The land to which this certificate relates is not the subject of an approved voluntary management proposal at the date when the certificate was issued.

(d) The land to which this certificate relates is not subject to an ongoing maintenance order as at the date when the certificate was issued.

(e) The land to which this certificate relates is not the subject of a site audit statement provided to the Council.

PART B
ADDITIONAL INFORMATION PROVIDED PURSUANT TO SECTION 149(5) OF THE *ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979 (EP&A Act 1979)*

NOTE: When information pursuant to section 149(5) is requested the Council is under no obligation to furnish any of the information supplied herein pursuant to that section. Council draws your attention to section 149(6) which states that a Council shall not incur any liability in respect of any advice provided in good faith pursuant to sub-section (5). The absence of any reference to any matter affecting the land shall not imply that the land is not affected by any matter not referred to in this Certificate.

This advice is provided in accordance with Section 149(5) and 149(6) of the EP&A Act 1979:

The land is affected by a tree preservation control under Blacktown Local Environmental Plan 1988. A person shall not ringbark, cut down, lop, top, remove, injure or wilfully destroy any tree, or cause any tree to be ringbarked, cut down, topped, lopped, injured or wilfully destroyed, except with the consent of the Council.

The provisions of any covenant, agreement or instrument applying to this land purporting to restrict or prohibit certain development may be inconsistent with the provisions of a Regional Environmental Plan, State Environmental Planning Policy or Blacktown Local Environmental Plan 1988, in which case the provisions of any such covenant, agreement or instrument may be overridden.

The *Threatened Species Conservation Act 1995* provides for the conservation of threatened species, populations and ecological communities of animals and plants. The *Threatened Species Conservation Act* amended the *Environmental Planning and Assessment Act 1979* to require, amongst other things, that:-

(a) a critical habitat (as defined in the *Threatened Species Conservation Act 1995)* be identified in environmental planning instruments;

(b) consent authorities and determining authorities must, when considering proposed development or an activity, assess whether it is likely to significantly affect threatened species, populations and ecological communities, or their habitats, and, if a significant effect is likely, to require the preparation of a species impact statement in accordance with the requirements of the *Threatened Species Conservation Act 1995;*

(c) consent authorities and determining authorities must, when considering proposed development or an activity, have regard to the relevant recovery plans and threat abatement plans; and

(d) a regime for concurrence and consultation between consent authorities and determining authorities and the Minister administering the *Threatened Species Conservation Act 1995* or the Director-General of the National Parks and Wildlife be instructed to aid the assessment process under the *Environmental Planning & Assessment Act 1979.*