Site Audit Report
0503-1613-01
0503-1613-02

185 & 195 Fifteenth Avenue
West Hoxton NSW

14 July 2016

51767-104548 (Rev 0)

JBS&G Australia Pty Ltd

www.jbsg.com.au

NSW Site Auditor Scheme
SITE AUDIT STATEMENT

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the Contaminated Land Management Act 1997 on 31st October 2012. For more information about completing this form, go to Part IV.

PART I: Site audit identification

Site audit statement no. **0503-1613-1**

This site audit is a ~~statutory audit~~/**non-statutory audit*** within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details (as accredited under the *Contaminated Land Management Act 1997*)

Name	**Andrew Lau**	Company	**JBS&G**		
Address	**Level 1, 50 Margaret Street**				
	SYDNEY	**NSW**		Postcode	**2000**
Phone	**02 8245 0300**	Fax	**02 8245 0399**		

Site Details

Address	**185 Fifteenth Ave**		
	West Hoxton NSW	Postcode	**2171**

Property description *(attach a list if several properties are included in the site audit)*

Lot 345 DP2475

Local Government Area	**Liverpool**		
Area of Site (eg. hectares)	**1.22 Ha**	Current zoning	**WSP SEPP Western Sydney Parklands**

To the best of my knowledge, the site ~~is~~/**is not*** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

Declaration/Order/Agreement/Proposal/Notice* no(s) **N/A**

** Select as appropriate*

Site audit commissioned by

Name	**Luke Wilson**	Company	**Hansen Yuncken c/- WSPT**
Address	**PO BOX 7002**		
	Alexandria NSW	Postcode	**2015**
Phone	**02 9770 7600**	Fax	**02 9779 7601**

Name and phone number of contact person (if different from above)

Purpose of site audit

☐ ~~A. To determine land use suitability (please specify intended use[s])~~

OR

☐ ~~B(i) To determine the nature and extent of contamination, and/or~~

☐ ~~B(ii) To determine the appropriateness of an **investigation/remedial action/management plan***, and/or~~

☑ B(iii) To determine if the land can be made suitable for a particular use or uses by implementation of a specified **remedial action plan/~~management plan~~*** (*please specify intended use[s]*)

Commercial/Industrial Use

Information sources for site audit

Consultancy(ies) which conducted the site investigation(s) and/or remediation:

Golder Associates, Douglas Partners, Zoic

Title(s) of report(s) reviewed

Preliminary Environmental Assessment, 185 Fifteenth Avenue, West Hoxton, Golder Associates, March 2015 (Golder 2015a).

Preliminary Environmental Site Assessment for Commercial Precinct, 195 Fifteenth Avenue, West Hoxton, Golder Associates, May 2015 (Golder 2015b).

Report on Detail Site (Contamination) Investigation, 185 Fifteenth Avenue, West Hoxton, Douglas Partners, July 2015 (DP 2015).

Phase 2 Environmental Site Assessment, Fifteenth Avenue, Business Hib, West Hoxton, NSW, ZOIC, 23 May 2016 (ZOIC 2016a).

Remediation Action Plan, 185-195 Fifteenth Avenue, West Hoxton, NSW, ZOIC, July 2016 (ZOIC 2016b).

Other information reviewed (including previous site audit reports and statements relating to the site) **NIL**

Site audit report

Title **Site Audit Report, 185 & 195 Fifteenth Ave West Hoxton NSW**

Report no. **JBS&G 51767-104548 (Rev 0)** Date **14 July 2016**

** Select as appropriate*

PART II: Auditor's findings

Please complete either Section A or Section B, **not** both. *(Strike out the irrelevant section.)*

Use Section A where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land use(s).

Use Section B where the audit is to determine the nature and extent of contamination and/or the appropriateness of an investigation or remedial action or management plan and/or whether the site can be made suitable for a specified land use or uses subject to the successful implementation of a remedial action or management plan.

Section A

☐ **I certify that, in my opinion, the site is SUITABLE for the following use(s)** *(tick all appropriate uses and strike out those not applicable)*:

- ☐ Residential, including substantial vegetable garden and poultry
- ☐ Residential, including substantial vegetable garden, excluding poultry
- ☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- ☐ Day care centre, preschool, primary school
- ☐ Residential with minimal opportunity for soil access, including units
- ☐ Secondary school
- ☐ Park, recreational open space, playing field
- ☐ Commercial/industrial
- ☐ Other (please specify)

subject to compliance with the following environmental management plan *(insert title, date and author of plan)* **in light of contamination remaining on the site:**

OR

☐ I certify that, in my opinion, the site is NOT SUITABLE for any use due to the risk of harm from contamination.

Overall comments

** Select as appropriate*

Section B

Purpose of the plan[1] which is the subject of the audit

I certify that, in my opinion:

☐ ~~**the nature and extent of the contamination HAS/HAS NOT* been appropriately determined**~~

AND/OR

☐ ~~**the investigation/remedial action plan/management plan* IS/IS NOT* appropriate for the purpose stated above**~~

AND/OR

☑ **the site CAN BE MADE SUITABLE for the following uses** *(tick all appropriate uses and strike out those not applicable)***:**

- ☐ ~~Residential, including substantial vegetable garden and poultry~~
- ☐ ~~Residential, including substantial vegetable garden, excluding poultry~~
- ☐ ~~Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~
- ☐ ~~Day care centre, preschool, primary school~~
- ☐ ~~Residential with minimal opportunity for soil access, including units~~
- ☐ ~~Secondary school~~
- ☐ ~~Park, recreational open space, playing field~~
- ☑ Commercial/industrial
- ☐ ~~Other (please specify) ……~~

if the site is remediated/managed* in accordance with the following remedial action plan/management plan* *(insert title, date and author of plan)*

Remediation Action Plan, 185-195 Fifteenth Avenue, West Hoxton, NSW, ZOIC, July 2016 (ZOIC 2016b).

subject to compliance with the following condition(s):

NIL

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

** Select as appropriate*

Overall comments

The site investigation activities are considered to have met generally met the requirements of the Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition) (DEC 2006). Where the investigations did not met the requirements, these have been acknowledged and appropriate data gap actions have been documented in the RAP prepared for the site (Zoic 2016b).

The investigations undertaken at the site have identified the need for remediation works in order to make the site suitable for the proposed uses. The RAP developed for the site (Zoic 2016b) documents the required actions to address the identified contamination issues and the proposed remediation works are considered to be: technically feasible; environmentally justifiable; and consistent with relevant laws, policies and guidelines, as per the requirements of DEC 2006.

An assessment of groundwater at the site identified the presence of petroleum-based impacts which appear to be associated with the former UST. However, there is no evidence that contamination has migrated, or will migrate, from the site and/or pose any unacceptable risks to either on-site or off-site receptors.

Following the implementation of the RAP (Zoic 2016b), a validation report must be prepared by a suitably qualified and experienced contaminated land consultant to demonstrate that the remedial works and data gap verification works were appropriately undertaken. A site auditor should review the remediation and validation works in order to confirm the suitability of the site prior to occupation for the proposed uses.

PART III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority under the *Contaminated Land Management Act 1997* (**Accreditation No. 0503**).

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Andrew Lau
14 July 2016

** Select as appropriate*

PART IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remedial action or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use(s) of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A or Section B of Part II, **not** both.

In **Section A** the auditor may conclude that the land is *suitable* for a specified use(s) OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further remediation or investigation of the site was needed to render the site fit for the specified use(s). Any **condition** imposed should be limited to implementation of an environmental management plan to help ensure the site remains safe for the specified use(s). The plan should be legally enforceable: for example a requirement of a notice under the *Contaminated Land Management Act 1997* (CLM Act) or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of the *Environmental Planning and Assessment Act 1979.*

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

In **Section B** the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or whether land can be made suitable for a particular land use or uses upon implementation of a remedial action or management plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

In **Part III** the auditor certifies his/her standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to:

EPA (NSW)
Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232
nswauditors@epa.nsw.gov.au

AND

the **local council** for the land which is the subject of the audit.

.

** Select as appropriate*

NSW Site Auditor Scheme
SITE AUDIT STATEMENT

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the Contaminated Land Management Act 1997 on 31st October 2012. For more information about completing this form, go to Part IV.

PART I: Site audit identification

Site audit statement no. **0503-1613-2**

This site audit is a ~~statutory audit~~/**non-statutory audit*** within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details (as accredited under the *Contaminated Land Management Act 1997*)

Name	**Andrew Lau**	Company	**JBS&G**		
Address	**Level 1, 50 Margaret Street**				
	SYDNEY	**NSW**		Postcode	**2000**
Phone	**02 8245 0300**	Fax	**02 8245 0399**		

Site Details

Address	**195 Fifteenth Ave**		
	West Hoxton NSW	Postcode	**2171**

Property description *(attach a list if several properties are included in the site audit)*

Lot 2 DP307334, Lots 304-306 DP2475, Lot 346 DP2475

Local Government Area	**Liverpool**		
Area of Site (eg. hectares)	**7.68 Ha**	Current zoning	**WSP SEPP Western Sydney Parklands**

To the best of my knowledge, the site ~~is~~/**is not*** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

Declaration/Order/Agreement/Proposal/Notice* no(s) **N/A**

** Select as appropriate*

Site audit commissioned by

Name	**Luke Wilson**	Company	**Hansen Yuncken c/- WSPT**
Address	**PO BOX 7002**		
	Alexandria NSW	Postcode	**2015**
Phone	**02 9770 7600**	Fax	**02 9779 7601**

Name and phone number of contact person (if different from above)

Purpose of site audit

☐ ~~A. To determine land use suitability (please specify intended use[s])~~

OR

☐ ~~B(i) To determine the nature and extent of contamination, and/or~~

☐ ~~B(ii) To determine the appropriateness of an **investigation/remedial action/management plan***, and/or~~

☑ B(iii) To determine if the land can be made suitable for a particular use or uses by implementation of a specified **remedial action plan/~~management plan~~*** (*please specify intended use[s]*)

Commercial/Industrial Use, Parks Open Space, Childcare Use

Information sources for site audit

Consultancy(ies) which conducted the site investigation(s) and/or remediation:

Golder Associates, Douglas Partners, Zoic

Title(s) of report(s) reviewed

Preliminary Environmental Assessment, 185 Fifteenth Avenue, West Hoxton, Golder Associates, March 2015 (Golder 2015a).

Preliminary Environmental Site Assessment for Commercial Precinct, 195 Fifteenth Avenue, West Hoxton, Golder Associates, May 2015 (Golder 2015b).

Report on Detail Site (Contamination) Investigation, 185 Fifteenth Avenue, West Hoxton, Douglas Partners, July 2015 (DP 2015).

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Remediation Action Plan, 185-195 Fifteenth Avenue, West Hoxton, NSW, ZOIC, July 2016 (ZOIC 2016b).

Other information reviewed (including previous site audit reports and statements relating to the site) **NIL**

Site audit report

Title **Site Audit Report, 185 & 195 Fifteenth Ave West Hoxton NSW**

Report no. **JBS&G 51767-104548 (Rev 0)** Date **14 July 2016**

** Select as appropriate*

PART II: Auditor's findings

Please complete either Section A or Section B, **not** both. *(Strike out the irrelevant section.)*

Use Section A where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land use(s).

Use Section B where the audit is to determine the nature and extent of contamination and/or the appropriateness of an investigation or remedial action or management plan and/or whether the site can be made suitable for a specified land use or uses subject to the successful implementation of a remedial action or management plan.

Section A

☐ **I certify that, in my opinion, the site is SUITABLE for the following use(s)** *(tick all appropriate uses and strike out those not applicable)*:

- ☐ Residential, including substantial vegetable garden and poultry
- ☐ Residential, including substantial vegetable garden, excluding poultry
- ☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- ☐ Day care centre, preschool, primary school
- ☐ Residential with minimal opportunity for soil access, including units
- ☐ Secondary school
- ☐ Park, recreational open space, playing field
- ☐ Commercial/industrial
- ☐ Other (please specify)

subject to compliance with the following environmental management plan *(insert title, date and author of plan)* **in light of contamination remaining on the site:**

OR

☐ I certify that, in my opinion, the site is NOT SUITABLE for any use due to the risk of harm from contamination.

Overall comments

** Select as appropriate*

Section B

Purpose of the plan[1] which is the subject of the audit

I certify that, in my opinion:

☐ ~~**the nature and extent of the contamination HAS/HAS NOT* been appropriately determined**~~

AND/OR

☐ ~~**the investigation/remedial action plan/management plan* IS/IS NOT* appropriate for the purpose stated above**~~

AND/OR

☑ **the site CAN BE MADE SUITABLE for the following uses** *(tick all appropriate uses and strike out those not applicable)***:**

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- ☐ ~~Secondary school~~
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- ☑ Commercial/industrial
- ☐ ~~Other (please specify) ……~~

if the site is remediated/managed* in accordance with the following remedial action plan/management plan* *(insert title, date and author of plan)*

Remediation Action Plan, 185-195 Fifteenth Avenue, West Hoxton, NSW, ZOIC, July 2016 (ZOIC 2016b).

subject to compliance with the following condition(s):

NIL

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

** Select as appropriate*

Overall comments

The site investigation activities are considered to have met generally met the requirements of the Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition) (DEC 2006). Where the investigations did not met the requirements, these have been acknowledged and appropriate data gap actions have been documented in the RAP prepared for the site (Zoic 2016b).

The investigations undertaken at the site have identified the need for remediation works in order to make the site suitable for the proposed uses. The RAP developed for the site (Zoic 2016b) documents the required actions to address the identified contamination issues and the proposed remediation works are considered to be: technically feasible; environmentally justifiable; and consistent with relevant laws, policies and guidelines, as per the requirements of DEC 2006.

An assessment of groundwater at the neighbouring site (185 Fifteenth Avenue) identified the presence of petroleum-based impacts which appear to be associated with the former UST. However, there is no evidence that contamination has migrated, or will migrate, onto the site and/or pose any unacceptable risks to either on-site or off-site receptors.

Following the implementation of the RAP (Zoic 2016b), a validation report must be prepared by a suitably qualified and experienced contaminated land consultant to demonstrate that the remedial works and data gap verification works were appropriately undertaken. A site auditor should review the remediation and validation works in order to confirm the suitability of the site prior to occupation for the proposed uses.

PART III: Auditor's declaration

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I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Andrew Lau
14 July 2016

** Select as appropriate*

PART IV: Explanatory notes

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How to complete this form

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Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remedial action or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use(s) of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A or Section B of Part II, **not** both.

In **Section A** the auditor may conclude that the land is *suitable* for a specified use(s) OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further remediation or investigation of the site was needed to render the site fit for the specified use(s). Any **condition** imposed should be limited to implementation of an environmental management plan to help ensure the site remains safe for the specified use(s). The plan should be legally enforceable: for example a requirement of a notice under the *Contaminated Land Management Act 1997* (CLM Act) or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of the *Environmental Planning and Assessment Act 1979.*

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

In **Section B** the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or whether land can be made suitable for a particular land use or uses upon implementation of a remedial action or management plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

In **Part III** the auditor certifies his/her standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to:

EPA (NSW)
Contaminated Sites Section
PO Box A290, SYDNEY SOUTH NSW 1232
nswauditors@epa.nsw.gov.au

AND

the **local council** for the land which is the subject of the audit.

.

** Select as appropriate*

0503-1613-02-01
0503-1613-02

185 & 195 Fifteenth Avenue
West Hoxton NSW

14 July 2016

51767-104548 (Rev 0)
JBS&G Australia Pty Ltd Australia Pty Ltd

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Appendices

Abbreviations

Term	Definition
As	Arsenic
AST	Aboveground Storage Tank
Cd	Cadmium
Cr	Chromium
Cu	Copper
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
B(a)P	Benzo(a) pyrene
DO	Dissolved oxygen
DP&E	NSW Department of Planning and Environment
DQO	Data Quality Objectives
EC	Electrical conductivity
EH	Redox potential
EPA	New South Wales Environment Protection Authority
Hg	Mercury
HIL	Health Based Investigation Level
LOR	Limit of Reporting
MAH	Monocyclic Aromatic Hydrocarbon
Ni	Nickel
OCP	Organochlorine Pesticide
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PIL	(Provisional) Phytotoxicity Based Investigation Level
PCB	Polychlorinated Biphenyls
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percentage Difference
SAR	Site Audit Report
SAS	Site Audit Statement
TPH	Total Petroleum Hydrocarbons
UST	Underground Storage Tank
Zn	Zinc

1. Introduction

1.1 Introduction and Background

Andrew Lau, of JBS&G Australia Pty Ltd (JBS&G), was engaged by Hansen Yuncken on behalf of Western Sydney Parklands Trust (WSPT, the client) on 3rd May 2016 to conduct a site audit at 185 and 195 Fifteenth Avenue, West Hoxton NW ('the site'), which is proposed to be redeveloped as the Fifteenth Avenue Business Hub (FABH).

The site has been identified as comprising Lot 345 in DP 2475; and Lot 304 in DP 2475, Lot 305 in DP 2475, Lot 306 in DP 2475, Lot 346 in DP 2475 and Lot 2 in DP 307334, encompassing a total area of 8.9 hectares. The extent of the site area has been highlighted in the site layout plans presented in **Appendix C**. In addition, relevant and current title plans delineating the boundary and area of each Lot has also been included in **Appendix F**.

The site forms part of the proposed FABH development and is the subject of a State Significant Development (SSD) Application (SSD 14 6407) currently with the NSW Department of Planning Major Projects Assessments. In accordance with the SSD application, the proposed landuse as part of the redevelopment of the site is to include:

- Proposed retail outlets including large format retail, fast food outlets, service station, central carpark and childcare facility, in addition to internal roads and landscaped areas for the area comprising Lot 345, Lot 346 and Lot 2, (i.e, the southern lots fronting Fifteenth Avenue); and
- Proposed subdivision for Lot 304, Lot 305 and Lot 306 (i.e, the northern lots). The future use of this area is not known at the time of the preparation of this audit report.

For the purposes of this audit and based on the proposed redevelopment proposal for the site, two separate Site Audit Statements (SAS) will be prepared, as follows:

- SAS 0503-1613-1, for 185 Fifteenth Avenue (Lot 345) – Commercial / Industrial; and
- SAS 0503-1613-2, for 195 Fifteenth Avenue (Lot 2, Lot 304, Lot 305, Lot 306 and Lot 346) – Residential with garden / accessible soils, including childcare centre, and commercial/industrial use.

The majority of the site, particularly the northern lots, have been predominantly used for market gardening and rural activities. Historical information indicates that the southern lots were also used for a variety of residential, farming and rural activities (including construction of a dam). Historical activities associated with commercial purposes were reported for Lot 345 only, which was used as a bus depot from 1957 to 2015. A series of environmental works were undertaken at the site in 2015 and 2016, with a Remediation Action Plan (RAP) prepared for the site in 2016.

Andrew Lau is a Site Auditor accredited by the NSW Environment Protection Authority (EPA) under the Contaminated Land Management Act 1997 (CLM Act 1997) (Accreditation Number 0503). The audit was completed with the assistance of Rita Sirianni and Sahani Gunatunge, JBS&G's experienced audit assistants.

No previous SAS or Site Audit Reports (SAR) are known to exist for the site.

1.2 Objectives of the Site Audit

The objective of this site audit were to:

- Independently review a series of environmental investigation reports and subsequent RAP; and
- Prepare a SAR and issue two separate SAS's providing an opinion as to whether the remediation and validation processes outlined in the RAP (ZOIC 2016b) were considered

appropriate to make the site suitable for the proposed future landuses (as detailed above in **Section 1.1**).

In accordance with the requirements of the CLM Act 1997, the site audit was undertaken with consideration to:

- The provisions of the CLM Act, Regulations and subsequent amendments;
- The provisions of any environmental planning instruments applying to the site; and
- Relevant guidelines made or approved by the EPA (**Appendix A**).

1.3 Type of Audit

Since the site audit is not being undertaken in response to a legal requirement imposed by a consent authority or the EPA, the site audit has been conducted as a non-statutory audit.

The audit reference numbers are 0503-1613-01 (185 Fifteenth Avenue) and 0503-1613-02 (195 Fifteenth Avenue). A single SAR has been written covering both properties, however, separate SAS's have been produced, with individual audit numbers provided to each property as required by relevant guidance, due to the different landuses relating to the different properties.

1.4 Documents Reviewed

The following documentation was reviewed as part of the site audit:

- *Preliminary Environmental Assessment, 185 Fifteenth Avenue, West Hoxton*, Golder Associates, March 2015 (Golder 2015a).
- *Preliminary Environmental Site Assessment for Commercial Precinct, 195 Fifteenth Avenue, West Hoxton*, Golder Associates, May 2015 (Golder 2015b).
- *Report on Detail Site (Contamination) Investigation, 185 Fifteenth Avenue, West Hoxton*, Douglas Partners, July 2015 (DP 2015).
- *Phase 2 Environmental Site Assessment, Fifteenth Avenue, Business Hib, West Hoxton, NSW*, ZOIC, 23 May 2016 (ZOIC 2016a).
- *Remediation Action Plan, 185-195 Fifteenth Avenue, West Hoxton, NSW*, ZOIC, July 2016 (ZOIC 2016b).

Additional correspondence relating to the site audit is provided in **Appendix B**.

1.5 Site Inspections

Table 1.1: Summary of Audit Inspections

Date	Attendance	Purpose
26 May 2016	Sahani Gunatunge (JBS&G)	Site inspection

1.6 Chronology of Site Assessment Works

The process of the assessment and audits undertaken at the site has been chronologically listed in **Table 1.2**.

Table 1.2: Summary of Investigation and Audit Works Undertaken at the Site

Date	Purpose
March and May 2015	Completion of preliminary environmental assessments (Golder 2015a and Golder 2015b) for the site. The preliminary assessment included a review of current and historical title information; review of aerial photographs; review of Council, WorkCover NSW and EPA records; review of groundwater bore information; review of topographical, soil and geological maps; detailed site inspection and interview with relevant personnel. The preliminary contamination assessment concluded additional site assessment was recommended to assist in examining the extent of preliminary impacts identified and identifying any additional contamination issues at the site.
April to July 2015	Completion of a detail site contamination investigation (DSI) at 185 Fifteenth Avenue, identified as Lot 345 in DP 2475. The DSI included a detailed site inspection, soil boring; installation of groundwater monitoring wells; and soil and groundwater sampling and analysis. During these works a Hazardous Materials Building Survey (HMBS) of the existing site buildings was also completed. Findings of the investigation were reported in DP 2015.
May 2016	Completion of a Phase 2 Environmental Site Assessment (ESA) at 195 Fifteenth Avenue, identified as Lot 304 in DP 2475, Lot 305 in DP 2475, Lot 306 in DP 2475, Lot 346 in DP 2475 and Lot 2 in DP 307334. The Phase 2 ESA included a review of the Golder 2015b report; review of EPA records and groundwater bore information; detail site inspection; installation of 50 testpits with soil sampling and analysis; groundwater sampling and analysis of existing monitoring wells located at Lot 345. Findings of the investigation were reported in ZOIC 2016a.
3 May 2016	Commencement of Site Audit (0503-1613-01 and 0503-1613-02).
25 May 2016	Review of environmental investigation reports (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) by the auditor.
26 May 2016	A site inspection was undertaken by JBS&G to confirm current site conditions and surrounding features.
June 2016	Preparation of a RAP for the site for review by the auditor.
July 2016	ZOIC addressed all outstanding issues at the site and all relevant auditor comments and issued a final RAP for the site (ZOIC 2016b).
July 2016	Preparation of a Site Audit Statement 0503-1613 and Site Audit Report (JBS&G 2016), confirming suitability of the RAP (ZOIC 2016b) for the proposed future landuse.

2. Site Description

2.1 Site Identification

The site details have been summarised in **Table 2.1** and described in further detail in the following sections. A plan identifying the subject site has been presented in **Appendix C**. The site location and layout is shown in **Appendix D**.

Table 2.1: Summary Site Details

Street Address	185 and 195 Fifteenth Avenue, West Hoxton, NSW,2171
Property Description	Lot 345 in DP 2475; Lot 304 in DP 2475, Lot 305 in DP 2475, Lot 306 in DP 2475, Lot 346 in DP 2475 and Lot 2 in DP 307334
Parish	Cabramatta
County	Cumberland
Local Government Area	Liverpool
Property Size	8.9 Hectares
Zoning	WSP SEPP Western Sydney Parklands
Previous Use	Mixed rural, market gardens, farming, residential and commercial/industrial
Current Use	Vacant
Proposed Use	185 Fifteenth Avenue – Mixed commercial/industrial 195 Fifteenth Avenue – Mixed commercial/industrial including child care centre

2.2 Site Condition

The site encompasses a total area of 8.9 hectares and including a total of six lots located at 185 and 195 Fifteenth Avenue, West Hoxton, NSW. A summary of relevant site conditions have been summarised in the ZOIC 2016b report, as observed during site inspections undertaken in April 20125 and May 2016. A summary of the relevant conditions are provided below.

<u>185 Fifteenth Avenue</u>

The land parcel which included 185 Fifteenth Avenue, is identified as Lot 345 and includes an area of 1.2 hectares and was formerly used as a bus depot between 1957 and 2015. The consultant (ZOIC 2016b) reported that during the April 2015 inspection the majority of the surface was paved or covered with asphalt, concrete or gravel. The areas formerly associated with the workshop and wash bay appeared to have been filled or levelled, with visible staining noted in the vicinity of the workshop.

Former underground storage tanks (USTs) were located along the southern boundary of the site. The consultant (ZOIC 2016b) reported that this area was filled with the surface comprising loose compacted aggregate, with no visible signs of staining or odours in this area.

The main workshop and wash bay were constructed of clip-lock metal with concrete flooring, with the area reported as clean and tidy with minimal staining observed. Several metal drums along with pieces of metal and mechanical parts were stored at the north exterior of the workshop. A treatment plant was observed on the south-western corner of the wash b ay which was used for washing water and appeared to discharge into an in ground pit further west.

An office building located next to the main workshop on the east was constructed of ACM, with a small toilet block located north of the office building along with a septic tank.

A small workshop and storage shed were located within the south-eastern corner of the site. The buildings were constructed of galvanized iron and metal and timber frame along with a concrete

floor. Significant oil staining was observed on the workshop/storage building floor. Mechanical plant including a forklift and air compressor were located within the building.

A small building was located in the south-western corner of the site and was potentially used as the main office for the bus depot although it was not open at the time of the inspection. A demountable building was attached to the rear of the building and was used as a lunch room, with a demountable toilet block directly behind the building.

Two 45 kL diesel aboveground storage tanks (ASTs), were located at the site, with one located behind the main workshop, and the second located on a concrete pad on the western portion of the site directly west of the wash bay. Minor hydrocarbon staining was observed around the AST located north of the workshop, with water pooled on the concrete pad making observations of staining impossible. The AST located on the concrete pad was removed offsite before the commencement of fieldwork in 2015.

A mechanic inspection pit was located to the south of the main workshop, with a non-functioning bus located directly to the west of the pit.

Several large shipping containers were located north of the main workshop along with a fire truck and other miscellaneous items such as rims and plastic drums. A portable fuel tank with bowser was located within the north-eastern corner of the site, with visible hydrocarbon staining observed within the vicinity of the fuel tank.

Buses were located across the site with several located across the northern site boundary, with no visible hydrocarbon staining around the buses.

The consultant (ZOIC 2016b) reported that during the May 2016 inspection, the bus depot was no longer operational and the site was fenced and secured. In addition it was observed that the former ASTs, buses and shipping containers also removed from the site.

<u>195 Fifteenth Avenue</u>

The land parcel which included 195 Fifteenth Avenue, includes five land parcels identified as Lot 2, Lot 304, Lot 305, Lot 306 and Lot 346 and includes an area of 7.7 hectares. The consultant (ZOIC 2016b) reported that during the May 2016 site inspection, the site was predominantly undeveloped, cleared grazing land covered by grass, shrubs and small trees.

A residential house and three associated sheds were located on Lot 346, with the site at the time used for horse manure packaging where stockpiles of manure were delivered and then bagged in the sheds prior sale. The sheds appeared to be constructed of corrugated iron with concrete hardstand floors; with the roof of the residential house suspected to be made of ACM.

A large dam was located on Lot 2 (southwestern portion of the site) which covers an area of approximately 2500 m^2. Water in the large dam was clear with no sign of algal growth or hydrocarbon staining. A small dam was also located along the mid-western boundary of the site (boundary of Lot 2 and Lot 304); with no algal growth, staining or other indicators of contamination observed in the waters of this small dam.

An unpaved carpark covering approximately 2000 m^2 was located to the on Lot 2 south of the large dam adjoining Fifteenth Avenue. An earthen drainage ditch has been constructed on Lot 2 between the large dam and the public carpark in the southwestern portion of the site.

A herd of steers occupied the western lots (Lot 2; Lot 304 and Lot 305) with access to the large dam for drinking water.

The majority of the site was observed to be reworked uneven surface soils indicative of past market gardening activities (ZOIC 2016b).

There were no signs of chemical storage at the site, however significant amounts of surficial dumped rubbish, including metal; mattresses; wood; white goods and, household waste were noted along the northern site boundary (Flynn Avenue).

The consultant (ZOIC 2016b) reported that internal fences bound the individual parcels of land at 195 Fifteenth Avenue.

2.3 Topography

The consultant (DP 2015) reviewed the Liverpool 1: 25,000 Topographic Sheet 9030-II-S and reported that the site has an elevation of approximately 95 m Australian Height Datum (AHD).

The consultant (ZOIC 2016) also reported that Lot 345 (185 Fifteenth Avenue) is located on a ridge line running approximately north-east to south-west with a steep fall to the north-east and gentler fall to the south-west. The predominant fall is towards the west. The consultant (ZOIC 2016) noted that the topography of 195 Fifteenth Avenue was uneven with an overall slope to the south and west. The measured RL ranged from 100 m AHD to 85 m AHD (south-western area).

2.4 Soils and Geology

The consultant (Golder 2015a) reported that a review of the 1:100,000 Geological Map of Penrith indicates that the site is underlain by Bringelly Shale of the Wianamatta Group, characterised by shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, rare coal and tuff.

A review of the 1:100,000 Soil Landscape Series Sheet 9030 Penrith indicates that the soil at the site consists of Luddenham soils, typically associated with the undulating to gently hills with local relief of between 50 m and 80 m and slopes between 5% and 20%. Typical soils of this landscape are shallow dark podzolic soils or massive earthy clays on crests, moderately deep red podzolic soils on upper slopes and moderately deep yellow podzolic soils and prairie soils on lower slopes and drainage lines.

A summary of fill conditions encountered across the site, as reported by ZOIC 2016b, is summarised below:

- 185 Fifteenth Avenue – fill materials encountered across Lot 345 comprised clayey sand with inclusions of gravel, asphalt, concrete, timber and sandstone and was encountered across the majority of the site at depths ranging from 0.3 m to 2.8 m, with an average fill depth of 0.9 m. The consultant (Golder 2015a) reported that the soils at the site were most likely modified by cut and fill earthworks to provide a level surface for the former bus depot.
- 195 Fifteenth Avenue – minimal fill was identified across this portion of the site. The majority of fill was encountered in the vicinity of the residential house and associated structures (Lot 346) and comprised blue metal and isolated occurrences of brick, ash, glass and / or plastic to a maximum thickness of 0.9 m. The majority of fill generally comprised reworked natural topsoil associated with historic market gardening activities.

2.5 Acid Sulphate Soils

The consultant (ZOIC 2016b) reported that a review of the NSW Natural Resources Atlas indicated that the site is not located in an area known for the occurrence of acid sulphate soils (ASS).

2.6 Hydrology

The consultant (ZOIC 2016b) reported that at the site of the preparation of the RAP, the surface water was excepted to follow the topography and internal drainage lines of the site. The majority of runoff across 195 Fifteenth Avenue was most likely to enter the large dam located in the south-western portion of the site; with surface water across 185 Fifteenth Avenue most likely to flow across the surface hardstands and entre the Fifteenth Avenue road drainage system.

The consultant (ZOIC 2016b) reported that a review of the Liverpool Council s149 certificate indicates that Lot 346 (part of 195 Fifteenth Avenue) that the land is not subject to flood related development controls.

2.7 Hydrogeology

The consultant (Golder 2015b) conducted a review of the Department of Natural Resources (DNR) database, (http://waterinfo.nsw.gov.au) and did not identify any groundwater bores located within a 500 m radius of the site. The nearest registered bore was located on the grounds of Thomas Hassall Anglican College approximately 520 m to the northeast. The bore was registered as a test bore, with groundwater bearing zones reported at approximate depths of 60 m, 160 m and 190 m below ground surface (bgs).

Previous groundwater investigations reported that groundwater was encountered at depth between 10 m and 15 m bgs; with reported standing water levels (SWLs) ranging from 6.3 m and 10 m bgs. Two rounds of groundwater sampling were undertaken in July 2015 and May 2016, with both rounds confirming that the groundwater flow direction was to the west / southwest across 185 Fifteenth Avenue.

The nearest surface water body (ZOIC 2016b) was reported to be the Sydney Water Supply Channel located on the western side of Twenty-Seventh Avenue, approximately 20 m west of the site.

2.8 Surrounding Environment

The consultant (PB 2013a) reported that the site is surrounded by the following:

- North – Flynn Avenue, further bounded by rural properties including poultry sheds.
- East – Residential and rural residential properties.
- South – Fifteenth Avenue, further bounded by commercial properties including butcher, delicatessen, liquor store, post office and service station (Speedway Austral).
- West – Twenty-seventh Avenue, further bounded by the Sydney Water Supply Channel and associated landscape corridor. A small war memorial is also located to the southwest of the site, Kirkpatrick and Byland Park

2.9 Audit Findings

The information provided by the consultants (Golder 2015a, Golder 2015b, DP 2015, ZOIC 2016a and ZOIC 2016b) in regards to site condition and surrounding environment has been checked against, and generally meets the requirements of OEH 2011.

Site identification details provided in the consultant's reports (Golder 2015a, Golder 2015b, DP 2015, ZOIC 2016a and ZOIC 2016b) have been confirmed by the auditor, with current title plans provided in **Appendix F**. The consultant (ZOIC 2016b) has also provided a site plan showing the correct property boundaries and site area in the report (as detailed in **Section 2.2**). The auditor has also included relevant site plans in relation to the proposed site development in **Appendix C**.

The auditor notes that other information pertaining to the site and surrounding areas by the consultant was generally consistent with the observations made during the audit inspections outlined above in **Table 1.1.**

Overall, the information provided by the consultants, information supplemented by observations made during the site audit inspections and review of publicly available information in relation to the site condition and the surrounding environment is considered adequate for the purposes of the site audit, with the exception that details of climate and acid sulphate soils were not provided.

For completeness, the auditor conducted a review of Bureau of Meteorology (BoM) climate statistics for Prospect Quarry[1] which indicated the following:

- Mean maximum temperatures ranging from 16.8 °C in July to 28.4 °C in January and July;
- Mean minimum temperatures ranging from 6.1 °C in July to 17.8 °C in February and July; and
- Mean monthly rainfall ranging from 4641 mm in September to 96.2 mm in January and March, with an average annual rainfall of 874 mm.

In general, the climate of the site area is described as comprising warm summers and mild winters, and rainfall was described as occurring throughout the year with wetter periods from February to June.

Overall, the information provided by the consultants (Golder 2015a, Golder 2015b, DP 2015, ZOIC 2016a and ZOIC 2016b) in relation to site condition and the surrounding environment is considered adequately complete for the purposes of assessing the contamination status of the site.

[1] http://www.bom.gov.au/climate/averages/tables/cw_067019.shtml, accessed 29 June 2016

3. Site History

3.1 Site History Information Sources

A Preliminary ESA was undertaken by Golder in 2015 for both 185 and 195 Fifteenth Avenue, with findings reported in two separate reports (Golder 2015a and Golder 2015b).

The Preliminary ESAs (Golder 2015a and Golder 2015b) included a detailed desktop review of historical data, including a review of current and historical Land Title information; review of aerial photographs dating from 1955 to 2012; review of Liverpool City Council records, including Section 149 certificates; review of NSW WorkCover dangerous goods licensing records; review of NSW EPA records; and interview with site personnel, where available.

A summary of relevant historical information for the site was provided in the consultants reports (Golder 2015a and Golder 2015b) and is summarised as follows:

- 185 Fifteenth Avenue – The area appeared to have been primarily used for agricultural land, including grazing, market gardening and poultry farming. The southern portion of the site was cleared prior to the 1950s, and based on the evidence of aerial photographs and on land title records, has been used as a bus depot since 1957 (owned by Liverpool Transport Co Pty Ltd). Infrastructure, including a newer bus wash bay and workshop, was constructed in the mid-section of Lot 345 at some point after 1994. The northern portion of the depot was cleared prior to 2002 to provide additional bus parking areas.
- 195 Fifteenth Avenue – The site was owned by numerous private owners between 1895 and 1964, with the site likely to have been used for agricultural purposes, including market gardens and grazing during this time. The site was owned by a succession of companies between 1964 and 1974, upon which the site has been owned by the state government.

3.2 Aerial Photographs

The consultant (Golder 2015a and Golder 2015b) reviewed historical aerial photographs for the years 1955, 1961, 1970, 1978, 1994, 2002, 2009, 2012 and 2015 for both 185 and 195 Fifteenth Avenue, with the following information provided:

<u>185 Fifteenth Avenue</u>

- 1955 to 1961 – Two structures were identified at the site consistent with the existing cottage located in the southwestern corner of the site. Additional features were present in the 1961 photo including service pits and features northeast of the cottage. A number of buses parked on the site had increased in the 1961, compared to 1955.
- 1970 to 1978 – The workshop and sheds located in the south-eastern corner of the site had been extended to the south. Vegetation on the northern part of the site had been partially cleared in the 1970 photo.
- 1994 – Additional features were noted, including possibly a shed or awning along the southern boundary and features in the vicinity of the workshop and existing toilet block. The southern portion of the site was surfaced with asphalt or hardstand surface, with a possible bench indicating a change of level running north-south to the west of the bus wash structure.
- 2002 – Structures were present in the location of the existing workshop and bus wash bay. The northern part of the site had been cleared of vegetation and was surfaced with hardstand or asphalt.
- 2009 – The site speared similar to that observed during the 2015 site inspection.

- 2015 – An area of new asphalt surface cover was present at the southern end of the site, in an area consistent with the former location of the USTs removed in November 2014.

195 Fifteenth Avenue

- 1955 to 1961 – The site was cleared land and may have been used for grazing purposes. Scattered trees were present along the northern boundary; with a small dam on the western portion of the site and to the north of Browns Reserve.
- 1970 – A structure was present on the south-eastern corner of the site, with an apparent depression within the south-western section of the site in the area of the existing large dam. Evidence of market gardening was visible between the depression and the structure along the southern boundary of the site and along the eastern site boundary.
- 1978 – A shed was visible to the north, with evidence of a hardstand or similar area present to the west of the cottage and shed.
- 1994 – The south-eastern corner of the site had changed extensively since the 1978 photo. This area had a number of storage structures and other objects on a hardstand area. There was also evidence of market gardening activities in the eastern portion of the site. Additional tree cover was also noted in the north-western portion of the site. Stockpiled material was present in the central area of the site in the location of the stockpiled manure observed during the site inspection.
- 2002 – Market gardening appeared to have occurred on the eastern and central portions of the site. An additional shed was present west of the cottage and the existing large dam was mostly full with water.
- 2012 – The site speared similar to that observed during the 2014 site inspection, with additional tree cover evident in the north-western portion of the site.

3.3 Land Titles

The consultant (Golder 2015a and Golder 2015b) conducted a review of the title information for the site (formerly identified as Lot 5 in DP 19503). The consultant reviewed the title information, with a summary provided as follows:

185 Fifteenth Avenue

- 1893 to 1957 – The site was owned by numerous individuals, with one owner being an orchardist. The site use at this time is not known, however is likely to have been used as market gardens.
- 1957 to 2015 – The site was owned by Liverpool Transport Co Pty Limited, with site use at this time being for a bus depot.

195 Fifteenth Avenue

- 1895 to 1964 – The site was owned by numerous individuals, with one owner being an orchardist. The site use at this time is not known, however is likely to have been used as market gardens.
- 1964 to 1974 – The site was owned by Bendoc Development Pty Ltd (1964 – 1969); Austrocom Pty Ltd (1969 – 1970) and Guletta Pty Ltd (1970 – 1974).
- 1974 to 2001 – The site was owned by the State Planning Authority of NSW, with ownership transferred to the Minister Administering the *Environmental Planning and Assessment Act* 1979, in 2001. The title was cancelled.

- 2001 – AutoConsol created title, with Part Lot 347 in DP 2475 now identified as Lot 2 in DP 307334.
- 2008 to 2014 – Current title issued in 2008, with the owner of the site identified as Western Sydney Parklands Trust.

The review did not identified any potential landuse activities for the respective sites as leases or easement were not included on the titles and activities of the companies whom owned the land were not identified.

3.4 Regulatory Searches

3.4.1 Council Records – s149 Certificates

Information provided by the consultant (Golder 2015a and Golder 2015b) indicates that at the time of the preparation of the reports, the site was zoned as WSP SEPP Western Sydney Parklands in accordance with the Liverpool Local Environment Plan 2008.

The consultant (Golder 2015a and Golder 2015b) completed a review of the Section 149 Planning Certificates for both 185 and 195 Fifteenth Avenue. Even though a current / updated section 149 certificate has not been obtained for the site, relevant information pertaining to the site is summarised below:

- The land is not a mine subsidence district.
- The land is not affected by a policy adopted by Council that restricts the development of land because of the likelihood of acid sulphate soils.
- The land is subject to a tree preservation provision under the SEPP Western Sydney Parklands 2009.
- The land is affected by a tree preservation order.
- The site is not deemed to be significantly contaminated; subject to a management order; subject of an approved voluntary management proposal; or subject to an on-going management order under the provisions of the Contaminated Land Management (CLM) Act 1997.

3.4.2 WorkCover Dangerous Goods Records

The consultant (Golder 2015a and Golder 2015b) reported a search of the Stored Chemical Information Data Base (SCID) and the micro-fiche records held by NSW WorkCover was conducted and did not identify any records regarding dangerous goods for 195 Fifteenth Avenue.

However the search indicated that Liverpool Transport Co P/L held a license 35/002071 for one UST, with a capacity for 5 kL at 185 Fifteenth Avenue. The content of the tank was not known. No other fuel infrastructure was identified by the search at this property.

3.4.3 EPA Records

The consultant (Golder 2015a and Golder 2015b) conducted a search of the CLM 1997 Register. The search did not identify records for the site or for land immediately adjoining the site or within a 1 km radius of the site.

The consultant (Golder 2015a and Golder 2015b) also conducted a search of the public register provided under the Protection of the Environment Operations Act 1997. The search did not identify records for the site or for land immediately adjoining the site or within a 1 km radius of the site.

3.5 Site Interviews

At the time of the site inspection conducted in 2015 at 185 Fifteenth Avenue, the site was vacant. Two employees were at the site and were interviewed at this time. One of the workers reported that three USTs had been removed from the area adjacent to the southern site boundary in

November 2014. One of the USTs was reported to have contained liquid at the time, which was pumped put prior to the tanks being removed. The site worker did not known if any soil validation works had occurred at the site.

At the time of the site inspection conducted in 2014 at 195 Fifteenth Avenue, the site was occupied by long-term tenant, Mr. Felice Bischetto. The tenant advised that he had occupied the study area since 1970, with the site used for market gardening activities from 1970 to 2004 and manure bagging operation from 2004 to 2014. A builder had used the south-eastern corner of the site as a storage yard.

3.6 Previous Investigations

A review of the Preliminary ESA (Golder 2015a) for 185 Fifteenth Avenue indicates that a Geotechnical Investigation was undertaken for the property. As part of these works selected soil samples (total of five soil samples) were collected and submitted for analysis in 2014. A summary of the results have been provide din the Golder 2015a, with relevant results and findings summarised in **Section 7**. It is noted that a copy of the Geotechnical Investigation Report prepared by Golder has not been provided to the auditor for review.

3.7 Audit Findings

The historical information provided by the consultant (Golder 2015a and Golder 2015b) was sufficiently detailed and has been checked against, and generally meets the requirements of the OEH 2011.

Current title plans have not been provided for the site. For completeness a current title plan has been obtained by the auditor and has been included in **Appendix F**.

Information pertaining to heritage records for the site was not provided by the consultant (Golder 2015a and Golder 2015b). For completeness, the auditor undertook a search of relevant heritage databases (NSW Heritage and Australian Heritage databases) with relevant findings provided as follows:

- No heritage items were listed on the site.
- The nearest heritage item, as listed on the NSW Heritage Database, was the Base Cottage and Landscape located at Lot 351 Fifteenth Avenue. It is noted that this area does not form part of the site or part of the proposed development area / footprint. It is noted that no heritage items of significance were listed on the s149 certificates for both respective sites.

A copy of the search records have been presented in **Appendix F**.

The considers that the extent of site history information presented by both consultant (Golder 2015a and Golder 2015b) is considered adequately complete for the purposes of identifying a range of potential contamination issues at the site as part of the site investigation process.

4. Conceptual Site Model

4.1 Overview

The National Environment Protection (Assessment of Site Contamination) Measure, NEPC, 1999 (as amended 2013, NEPC 2013) identifies a conceptual site model (CSM) as a representation of site related information regarding contamination sources, receptors, and exposure pathways between those sources and receptors. The development of a CSM is an essential part of all site assessments and remediation activities.

NEPC (2013) identified the essential elements of a CSM as including:

- Known and potential sources of contamination and contaminants of concern including the mechanism(s) of contamination;
- Potentially affected media (soil, sediment, groundwater, surface water, indoor and ambient air);
- Human and ecological receptors;
- Potential and complete exposure pathways; and
- Any potential preferential pathways for vapour migration (if potential for vapours identified).

Based on the known contamination, each of the elements of the CSM are discussed as follows.

4.2 Sources of Contamination

Based on a review of site history review, the consultants (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) identified the following areas of potential contamination:

- Potential contamination of near-surface soils associated with hazardous materials in the vicinity of the sheds located at Lot 346;
- Potential contamination of soils associated with uncontrolled filling and illegal dumping of waste across the site;
- Potential contamination of soils associated with the use of pest and weed control across the site;
- Potential contamination of soils associated with hazardous building materials beneath and in the vicinity of former buildings;
- Potential asbestos contamination of near-surface soils located at Lot 345;
- Potential contamination of dam waters;
- Potential contamination of soils and groundwater associated with leaks and spills associated with the former USTs and associated fuel lines; ASTs and activities associated within the former bus depot.

Based on the identified sources of contamination the consultant (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) identified the following contaminants of potential concern:

- Asbestos.
- Heavy metals.
- Total Petroleum Hydrocarbons (TPH).
- Benzene, Toluene, Ethylbenzene and Xylenes (BTEX).
- Volatile Organic Compounds (VOCs).
- Polycyclic Aromatic Hydrocarbons (PAHs).

- Organochlorine pesticides (OCPs).
- Organophosphorus pesticides (OPPs).
- Polychlorinated Biphenyls (PCBs).

The consultant (Golder 2015a) reported that a service station (Speedway Austral) is located south of the site, along Fifteenth Avenue. However taking into consideration the location of the service station and the direction of groundwater flow, (i.e, located downgradient of the site), the service station is not considered a potential source of contamination to the site.

Furthermore, the auditor has completed a review of the NSW EPA Contaminated Sites Register and no known sites are listed in the immediate vicinity of the site.

4.3 Potentially Affected Media

Potentially affected media include soils and groundwater beneath the site.

4.4 Potential Human and Ecological Receptors

The consultant (ZOIC 2016b) considered a range of key human receptors for the potential contaminants sourced from the site including potential human exposures during the future site works, including construction and maintenance workers; and surrounding site users / occupants.

Human receptors including potential current and future users of the site were also considered, including residents and occupants of the proposed developments. Based on the proposed future use of the site, this was considered to include potential residential users, child care centres, commercial occupants of the retail outlets; potential commercial / industrial exposures associated with construction and maintenance workers on or in the vicinity of the site; and potential residential and / or commercial site users from the abstraction of groundwater at or in the vicinity of the site.

The consultant (ZOIC 2016b) reported that the most significant ecological receptors identified included the vegetation across the site including future flora landscaped areas; the Sydney Water Supply Channel located approximately 20 m west of the site; and the regional groundwater aquifer beneath the site and surrounding area, through horizontal and / or vertical migration of potentially impacted groundwater from the site.

4.5 Potential Exposure Pathways

The consultant (ZOIC 2016b) considered that any human exposure of contaminated soils and / or groundwater would be via vapour and dust inhalation (including inhalation of asbestos fibres) and dermal and / or oral contact, by future construction and maintenance workers and future occupants of the site; and via inhalation of vapours of potentially impacted groundwater.

Ecological exposure pathways are anticipated to occur via inhalation of vapours from potentially impacted groundwater migrating offsite or via uptake by the vegetation / flora species across the site (ZOIC 2016b).

4.6 Preferential Pathways

Environmental investigations undertaken across the site have identified the localised areas of contamination, including asbestos impacted soils which may pose a risk to future workers and to future site users; and PAH impacted soils which may pose an ecological risk to potential future vegetation at the site. The consultant (ZOIC 2016b) reported that contamination is generally restricted to the and there is no indication of widespread or offsite migration.

The consultant (ZOIC 2016b) has considered that the primary and secondary sources of contamination identified at the site will be removed as part of the proposed site remediation and redevelopment works, which will reduce any potential risks to future site users under the current proposed zoning of the site.

4.7 Audit Findings

The consultant identified a number of potential contamination issues at the site and based on the site history review and site inspections conducted at the site the auditor considers that list of COPCs identified by the consultant (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) was adequate in assessing the nature and extent of contamination across the site as part of the site investigation process. The consultant also considered both human and ecological receptors and subsequent potential exposure pathways.

The auditor also notes that the CSM prepared by ZOIC 2016b as part of the development of the RAP, generally meets the requirements of the NEPC 2103.

Overall, the auditor considers that the identified potential contamination issues and potentially contaminated media were appropriate for assessing the suitability of the site for the intended uses.

5. Sampling Analytical and Quality Program

5.1 Data Quality Assessment

An assessment of quality assurance and quality control (QA/QC) has been undertaken by the consultant's (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) by developing data quality indicators (DQIs), broadly based on the seven step process referred to in DEC 2006.

The auditor has undertaken a review of the QA/QC undertaken by the consultant, which has been summarised in **Tables 5.1** against the PARCC parameters (precision, accuracy, representativeness, comparability and completeness).

Table 5.1 Data Usability Assessment

Parameter	DQIs	Requirement	Auditor Assessment
Field and Lab QA/QC			
Precision	Intra-laboratory duplicates (blind)	Collected at a rate of 1 per 20 samples. Analysed for primary contaminants of concern. RPDs less than 50%.	Soil duplicates were collected at a rate of less than 5 % and were analysed for the main contaminants of concern during the DP 2015 and ZOIC 2016a works. Even though the duplicate frequency is less than the required rate, it is not considered to significantly affect the assessment of the data, noting the general absence of significant levels of chemical contamination in the dataset. RPDs ranged from 0-127 % and were within the DQIs with the exception of metals (copper and lead) in one duplicate sample (DP 2015). The consultant reported that the elevated RPDs were generally attributed to the heterogeneity of the fill material. The consultant considered that the RPDs did not significantly affect the reliability of the data set, particularly as the primary and duplicate sample results reported concentrations below the adopted criteria. The auditor concurs with the consultant's findings and finds this acceptable and considers that this is indicative of variability of metals in the fill. Duplicates were not collected during the sediment sampling (Golder 2015b). However based on the limited dataset, the auditor considers this acceptable and is not likely to affect an assessment of the data. Furthermore, the sediment results were used to characterise the sediments within the dam only and were not considered as part of overall site suitability as part of this audit. One intra-laboratory duplicate sample was provided as part of the soil sampling works (Golder 2015a). The consultant did not calculate RPDs, however for completeness the auditor has completed this. The calculated RPDs range from 0-178 % with RPD exceedances reported for TRH (F3 and F4). The consultant did not provide a discussion, however a review of the borelogs indicates that the primary and duplicate sample were collected from the fill, with the RPD variation likely attributed to the heterogeneity of the fill material.
			Groundwater duplicates were collected at a rate of 25% and were analysed for main contaminants of concern. RPDs generally ranged from 0-50 % and were

Parameter	DQIs	Requirement	Auditor Assessment
			within the acceptable range (DP 2015 and ZOIC 2016a). Duplicates were not collected as part of the surface water sampling program (DP 2015b). However based on the limited dataset, the auditor considers this acceptable and is not likely to affect an assessment of the data. Furthermore, the surface water results were used to characterise the conditions within the dam only and were not considered as part of overall site suitability as part of this audit.
Precision	Inter-laboratory duplicates (spilt)	Collected at a rate of 1 per 20 samples. Analysed for primary contaminants of concern. RPDs less than 50%.	Soil duplicates were collected at a rate of less than 5 % and were analysed for the main contaminants of concern during the DP 2015 and ZOIC 2016a works. Even though the duplicate frequency is less than the required rate, it is not considered to significantly affect the assessment of the data, noting the general absence of significant levels of chemical contamination in the dataset. RPDs ranged from 0-107 % and were within the DQIs, with the exception of copper, chromium, and nickel. The consultant reported that the elevated RPDs were generally attributed to the heterogeneity of the fill material. The consultant considered that the RPDs did not significantly affect the reliability of the data set, particularly as the primary and duplicate sample results reported concentrations below the adopted criteria. The auditor concurs with the consultant's findings and finds this acceptable and considers that this is indicative of variability of concentrations of the soil matrix at this one location only.
			No inter-laboratory duplicates were collected during the groundwater sampling works during the DP 2015 and ZOIC 2016a investigation works. The auditor considers this to be a minor non-conformance and based on the small dataset, and the collection of sufficient intra-laboratory duplicates, considers this acceptable and is not likely to affect an assessment of the data.
	Laboratory duplicates	One per batch. RPDs less than 50%.	Laboratory duplicates were undertaken by the primary laboratories. The reported RPDs were within the DQI for all samples.
Accuracy	Field rinsate blanks	Collected at a rate of 1 per piece of decontaminated sampling equipment. Analysed for primary contaminants of concern. Laboratory results below the laboratory limit of reporting (LOR).	One rinsate blank was collected during the soil sampling works undertaken by DP (DP 2015). The Rinsate sample was collected from the sampling equipment and analysed for TRH, BTEX and PAHs. All concentrations were reported below the laboratory LOR. A rinsate blank was not collected during the groundwater sampling works (DP 2015). One rinsate blank was collected during the soil sampling works by Golder (Golder 2015a). The analytical results reported concentrations below the LOR, however TRH F1 was marginally reported at a concentration of 15 µg/L. The consultant (Golder 2015a) did not provide a discussion on this QC anomaly in the report. However the auditor considers that the trace levels of TRH F1 in the rinsate blank does

Parameter	DQIs	Requirement	Auditor Assessment
			not affect the outcome of the assessment as the primary results detected concentrations TRH below the adopted site criteria. The consultant (ZOIC 2016a) reported that as no soil samples came into direct contact with the sampling equipment (i.e, samples were collected from the centre of the hand auger or from the centre of the bucket) and dedicated bailers were used for the groundwater sampling, no rinsate blanks were collected as part of the works.
Accuracy	Trip blanks	Collected at a rate of 1 per day of sampling where primary contaminants of concern include volatiles. Analysed for volatiles of concern. Laboratory results below laboratory LOR.	A total of three trip blanks were collected during the soil sampling works undertaken by DP (DP 2015), with all concentrations reported below the LOR. No trip blanks were collected during the ZOIC 2016a investigation works. No discussion was provided in the report, however the auditor considers that this is a minor non-conformance and is not likely to affect the representativeness of the data. Furthermore, a review of the analytical data were comparable to field PID readings and visual observations made in the field.
	Trip spike	Collected at a rate of 1 per batch where primary contaminants of concern include volatiles. Laboratory results / recovery within 30 % of the spiked concentration.	One trip spike was collected during the DP soil sampling works, with two trip spikes collected during the DP groundwater sampling works (DP 2015). The trip spike recoveries were reported between 101 % and 121 % and were within acceptable limits (DP 2015). Trip spikes were collected by during the soil and groundwater sampling works by ZOIC with spike recoveries were reported between 98 % and 105 % and were within acceptable recovery limits (ZOIC 2016a).
Accuracy	Laboratory surrogate spikes	Surrogate spikes to be performed as required by NATA accreditation, generally per sample analysed. Recoveries to be within 70-130 % or 30-130 % (phenols only).	Surrogate recoveries ranged from 70-130 % for metals and inorganics and were within laboratory control limits. It is noted that the laboratory reported that surrogate recoveries are 60-140% for organics; and 10-140 % for SVOCs and speciated phenols. As such, the reported surrogate recoveries were within the laboratory control limits.
	Laboratory method blanks	Laboratory method blanks to be performed as required by NATA accreditation, generally 1 blank per batch. Results to be below laboratory LOR.	All laboratory method blanks < LOR.
	Laboratory control samples (LCS)	LCS to be performed as required by NATA accreditation, generally one per 20 samples per batch.	LCS recoveries ranged from 70-140 % for metals and inorganics and were within the laboratory control limits. It is noted that the laboratory reported that laboratory control limits for LCS recoveries are 60-140% for organics; and 10-140 % for SVCOs and

Parameter	DQIs	Requirement	Auditor Assessment
		Recoveries to be within 70-130 % or 30-130 % (phenols only).	speciated phenols. As such, the reported LCS recoveries were within the laboratory control limits.
	Laboratory matrix spikes (MS)	MS to be performed as required as NATA accreditation, generally one per 20 samples per batch. Recoveries to be within 70-130 % or 30-130 % (phenols only).	MS recoveries ranged from 70-130 % for metals and inorganics and were within the laboratory control limits. It is noted that the laboratory reported that laboratory control limits for MS recoveries are 60-140% for organics; and 10-140% for SVOCs and speciated phenols. As such, the reported MS recoveries were within the laboratory control limits.
Soil Sampling and Analytical Schedule and Sampling Methodology			
Representa-tiveness	Soil sampling locations	Samples to be collected on a representative basis consistent with the CSM.	Sampling undertaken as part of the geotechnical investigations by Golder in 2015, were presented in the Phase 1 ESA Reports for 185 and 195 Fifteenth Avenue, respectively (Golder 2015a and Golder 2015b). Limited soil sampling was undertaken at both site, with six boreholes installed at 185 Fifteenth Avenue to a maximum depth of 5.5 m bgs. These boreholes were targeted towards the vicinity of the potential areas of concern, including the former USTs, site features and wash bay. Sediment and surface water sampling as also undertaken by Golder in 2015 (Golder 2015b), with samples collected from the dams located at 195 Fifteenth Avenue. A total of 25 sampling points were installed across the site during the detailed assessment undertaken at 185 Fifteenth Avenue (DP 2015). Sampling locations were based on a combined targeted and grid pattern layout. The number of sampling locations installed by DP 2015 are consistent with the requirements of Table A, NSW EPA 1995. A total of 50 locations were installed across 195 Fifteenth Avenue. It is noted that the sampling density of 50 locations across the 7.7 site hectare does not meet the recommended minimum number as per the NSW EPA 1995 Guidelines. However, based on the historical use of the site, i.e, rural, combined targeted sampling approach and the lack of contamination identified during the site inspection, the consultant (ZOIC 2016a) considered that the sampling approach adopted is suitable to characterise the subsurface soil conditions at the site. With the exception of the former UST area and potential asbestos in fill materials at 185 Fifteenth Avenue, the number of soil sampling locations and the rationale adopted by the consultants during the site investigations provided sufficient coverage noting the potential areas of concern and associated COPCs identified as part of the site history review.
	Soil sampling depths and intervals	Soil sampling depths should be consistent with the anticipated distribution of contamination as	The sampling depths and intervals at each of the sampling locations were appropriate given the identified potential contamination sources and the site geology. Soil samples were collected from the fill

Parameter	DQIs	Requirement	Auditor Assessment
		detailed in the consultant's CSM.	material, with selected samples also collected from the underlying natural soils. The sampling depth were generally appropriate to assess the vertical extent of contamination and fill across the site, with numerous sampling locations extending to the natural soils.
	Soil sampling methodology	Soil samples to be collected using a methodology which is appropriate for the primary contaminants of concern.	Soil samples were collected either directly via the push tube or handauger (DP 2015); and the handauger or from the centre of the bucket during testpit excavation (ZOIC 2016a). The consultant reported that disposable gloves were work during the soil sampling works. The consultant (Golder 2015a and Golder 2015b) did not provide a detailed description on the methodology used to collect the soil, sediment and surface water samples. Based on the review of the borelogs, all boreholes were advanced with a drilling rig, with samples likely to have been collected from the auger. Sediment samples were likely collected as grab samples. Even in the absence of sufficient information detailing the sampling methodology, the auditor considers that based on the borelogs, samples are likely to have been collected appropriately and are not likely to affect the representativeness of the soil data (including the sediment). Based on the sampling method adopted by the consultant, the auditor notes that the potential for volatilisation may have occurred during sampling (i.e, directly from the auger). However comparison of the TPH and BTEX data between consultants are generally comparable, indicating that any potential volatilisation occurring with differing sampling methods is considered to be low. Based on this, the auditor considers that the sampling methods adopted by the consultants are considered generally appropriate and are not likely to affect the representativeness of the soil data. The exception to this is the omission of testpits for assessing the potential presence of asbestos in fill materials at 185 Fifteenth Ave.
	Groundwater sampling locations	Groundwater sampling locations to assess areas of concern, allow for lateral delineation of contamination and assess the groundwater flow direction.	A total of six monitoring wells (MW2, MW9, MW10, MW23, MW24 and MW25) were installed at 185 Fifteenth Avenue (DP 2015). Monitoring wells were installed at upgradient and downgradient locations, and also targeting areas of potential concern (i.e, the former USTs). The number and locations of monitoring wells installed was sufficient to provide an assessment of groundwater conditions at the site, particularly noting the potential areas of concern (i.e, USTs) and associated potential contaminants of concern. It is noted that the monitoring wells installed by DP (DP 2015) were surveyed to Australian height Datum (AHD).
Representa-tiveness	Groundwater well construction	Wells to be constructed in accordance with the current version of the	The consultant reported that the monitoring wells were installed to a maximum depth of 13 m bgs, to shale bedrock. The consultant reported that the screen interval was installed to intercept either

Parameter	DQIs	Requirement	Auditor Assessment
		Minimum Constructions Requirements for Water Bores in Australia, and screened to target the likely contaminated portion of the water column.	seepage water or standing groundwater within the rock profile. AS such the screen interval was extended from the base of each well to between 2 m and 4.8 m bgs with the remaining section of the well near the surface comprising solid PVC casing. The monitoring wells were constructed using 50 mm diameter acid washed Class 18 PVC casing and machine slotted screen intervals. Wells were backfilled with 2 mm gravel to 0.2 m to 0.5 m above the top of the screen. A 0.5 m thick bentonite plug was installed above the gravel in each well, with the remaining annulus backfilled with gravel, clean natural soils and concrete. The top of each well was finished flush to ground surface and finished with a gatic cover. A copy of the borelogs was provided in DP 2015 with a summary also provided in the report and which provides sufficient detail on the construction of the monitoring wells. Monitoring wells installed by DP in 2015 (DP 2015) were installed correctly, with the screen interval targeting the groundwater zone, representative of groundwater conditions across the site.
	Groundwater sampling methodology	Groundwater samples to be collected approximately 7 days after well installation and development. Groundwater samples to be collected using low flow methods (where it can be demonstrated that this is appropriate), or by purging at least 3 well volumes, until field parameters have adequately stabilised.	The monitoring wells were developed approximately 3-5 days post installation using a submersible pump. The monitoring wells were developed ensuring that all fines were removed and ensure a representative groundwater flow from the formation. Monitoring wells were purged and sampled approximately 7-10 days following installation. Purging and sampling was undertaken using a low-flow pump and non-disposable sampling equipment. Field parameters, including pH, temperature, conductivity, redox potential and dissolved oxygen were measured during purging using a water quality meter. Field purging data was provided by the consultant in the report (DP 2015). A second round of groundwater sampling was undertaken by ZOIC in 2016. Due to missing wells, only a total of four monitoring wells were sampled. Groundwater purging and sampling was undertaken using dedicated disposable bailers. A minimum of three well volumes was removed during purging to ensure a representative sample was collected. The consultant (ZOIC 2016a) reported that a calibrated groundwater quality meter was used onsite, however due to anomalous readings, the results were not relied upon. The auditor notes that the purging and gauging records were not provided in the report. Surface water samples collected by Golder 2015b and ZOIC 2016a, were collected as grab samples. Taking into consideration the above, the auditor considers that the groundwater sampling method adopted by the consultant was generally considered appropriate and not likely to affect the representativeness of the data.
	Soil and groundwater	Soil samples to be collected into laboratory supplied,	Soil samples were immediately placed in laboratory supplied samples jars which were sealed tight and placed on ice for transport to the analytical

Parameter	DQIs	Requirement	Auditor Assessment
	sampling containers	clean unpreserved Teflon lined jars. Groundwater samples to be collected into laboratory supplied, clean and appropriately preserved sampling containers.	laboratories. Bulk soil samples (500 g) collected for analysis of asbestos during the ZOIC 2016a sampling works were collected in plastic zip-lock bags accordance with the WA DoH 2009 sampling protocols. Samples collected for asbestos for the investigation works by DP 2015 were not collected as per the WA DoH 2009 sampling protocols. However a qualitative assessment was undertaken which has been supplemented with the more recent ZOC 2016a work, which is in accordance with the relevant guidelines. Groundwater samples were immediately placed into appropriately preserved containers provided by the laboratory. Samples for heavy metal analysis were field filtered using a disposable 0.45 µm filter.
Representa-tiveness	Soil and groundwater sampling equipment decontamination	Soil sampling equipment to be decontamination between sampling locations or between sampling depths; and monitoring well locations where significant contamination is encountered.	The consultant (DP 2015 and ZOIC 2016a) reported that decontamination of the sampling equipment was undertaken using a three staged wash approach, i.e, the equipment was first rinsed with tap water (and brushed where required), followed by a 3 % Decon 90 Solution, finally rinsed with demineralized water and dried using disposable paper towels. Rinsate samples were collected during the DP 2015 investigation works. Golder 2015a and 2016b did not provide a discussion on the decontamination procedure adopted during the works. However a review of the data indicates that one rinsate blank was collected during the soil sampling works (Golder 2015a). The consultant (ZOIC 2016a) reported that as no samples came into direct contact with the equipment during soil sampling; and dedicated bailers were used during the groundwater sampling, no decontamination procedures were required during the investigation works. The auditor considers the sampling methods employed by the consultants during the investigation works are unlikely to have resulted in significant cross-contamination between sample locations and a review of the available analytical data does not indicate that this has occurred.
	Soil sample contamination screening	Soil samples to be screened for contamination via visual / olfactory observations and photo-ionisation detector (PID) measurement.	The consultant provided borelogs detailing observations of material types; visual and olfactory observations; sample depths; and groundwater observations. Soil samples were also screened in the field using a PID during the field investigations and the validation works.
	Sample storage and transport	Samples to be placed in an insulated container and chilled. Samples to be transported to laboratory under chain of custody conditions.	All soil samples were transported in ice-cooled chests, under chain of custody conditions, to laboratories that were NATA accredited for the analysis performed.

Parameter	DQIs	Requirement	Auditor Assessment
Representa-tiveness	Laboratory sample receipt advice	No damaged containers. No samples submitted in containers which have not been chilled. No samples to be submitted without sufficient times to comply with recommended holding times.	Laboratory sample receipt advice provided by the nominated laboratories confirmed that all samples were received in suitable condition.
	Holding times	Samples to be extracted and analysed within recommended holding times.	A review of the consultant's COC documentation and laboratory reports indicates that all samples were analysed within their holding times for all analyses undertaken.
	Analytical Method	Samples to be analysed using NATA accredited methodology.	Laboratories used included: Envirolab Services (primary for Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) and ALS Group and Eurofins (secondary) for DP 2015 and ZOIC 2016a. Laboratory certificates were NATA accredited.
Complete-ness	Sampling, analysis and quality plan completeness	100 % of sampling, analysis and quality plan to be implemented.	The auditor was appointed post completion of the soil and groundwater investigation works. As such, the auditor was not involved in the preparation including reviewing any SAQP as part of this audit. However, a RAP (ZOIC 2016b) has been prepared for the site, detailing the validation sampling, analytical and quality (SAQP) requirements for the site. The RAP was reviewed by the auditor and has been included as part of this audit (refer to **Section 8**).
	Field documentation	All relevant field documentation to be collated including sampling logs and calibration records.	A geotechnical investigation was undertaken at 185 and 195 Fifteenth Avenue. Limited soil, sediment and surface water sampling was undertaken during these investigations, with findings included in the Phase 1 ESA reports (Golder 2015a and Golder 2015b, respectively). The consultant provided borelogs and site figures showing borehole locations were provided in the Phase 1 reports. The consultant (DP 2015 and ZOIC 2016a) provided borelogs, field screening results, calibration data and relevant field notes. Groundwater purging data was provided in the DP 2015 report, however field notes relating to the groundwater purging and sampling undertaken by ZOIC in 2016 (ZOIC 2016a) were not provided in the report. Even though relevant field notes were not provided, the consultant provided a brief summary of the groundwater purging works completed and results in the report. The auditor considers that this information sufficient and the lack of field notes does not affect the completeness of this audit.
	Laboratory documentation	All relevant laboratory documentation to be collated, including	The consultant provided all relevant COC documentation; laboratory sample receipt advice; and full laboratory certificates in the reports.

Parameter	DQIs	Requirement	Auditor Assessment
		chain of custody records, sample receipt advice and analytical reports.	It is noted however that laboratory reports (by the secondary lab ALS) for inter-laboratory duplicates collected during the soil sampling works by DP 2015 have not been provided in the report. As these laboratory reports apply to the inter-laboratory duplicates only, the absence of these reports does not affect the overall suitability of the data in assessing site suitability.
	Critical sample validity	All critical sample data to be valid.	The auditor considers that the data is considered reliable, for the purpose of the soil investigation and groundwater (including sediment and surface water) investigation.
	Sampling, analysis and quality approach	Adequately comparable sampling, analysis and quality approach to be used throughout the project.	Sampling works undertaken during the Phase 1 assessment was undertaken by Golder; whilst detailed investigations works were undertaken by DP and ZOIC. The auditor considers that the data between investigation programs is comparable, as consistent sampling methods were employed during the works and analysis was undertaken by NATA accredited laboratories. Furthermore, consistent field staff were employed by each consultant during each phase of investigation works.
	Sampler	Samplers used throughout the project to have sufficient experience.	

5.2 Audit Findings

The quality assurance/quality control measures employed by the consultants (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) were checked and found, overall, to generally comply with the requirements outlined in EPA 1997, EPA 2006 and NEPC 2013. The laboratory QA/QC results have been reviewed and the results indicate that the analytical laboratories were achieving adequate levels of precision and accuracy. As such, the sampling, analytical and quality protocols undertaken by the consultant were considered to be adequately reliable for the purpose of assessing the contamination status of the site, with the exception of the following:

- The footprints of the buildings and structures were not sampled at a sufficient frequency;
- The former UST area was not validated and limited sampling/analyses has been undertaken as part of DP 2015 to confirm the absence of residual contamination in this part of the site;
- Further assessment of asbestos in fill materials in accordance with NEPC 2013 / DoH 2009 is required at 185 Fifteenth Avenue; and
- Confirmatory sampling/analyses is required in the potential surface spill area identified at the former bus depot at 185 Fifteenth Ave.

Each of these data gaps has been included in the validation program of the RAP (Zoic 2016b).

6. Assessment Criteria

6.1 Soil Criteria

Two separate site investigations were undertaken at 185 Fifteenth Avenue and 195 Fifteenth Avenue by DP in 2015 (DP 2015) and ZOIC (ZOIC 2016a), respectively. The proposed future use of the single parcel of land, identified as 185 Fifteenth Avenue (Lot 345) will be for proposed commercial usage. Whilst the proposed future usage and layout of 195 Fifteenth Avenue (comprising six land parcels) has not been finalised, the proposed future usage of this area is to include mixed commercial and a childcare centre. For the purposes of this audit, the site will be assessed as follows:

- 185 Fifteenth Avenue (Lot 345) – Commercial / Industrial; and
- 195 Fifteenth Avenue (Lot 2, Lot 304, Lot 305, Lot 306 and Lot 346) – commercial/industrial and childcare.

Based on the proposed future use of the site, the two separate sites were assessed against the NEPC 2013 and includes the following:

- Health Investigation Levels: HIL A – Residential with garden / accessible soil (home grown produce < 10 % fruit and vegetable intake, no poultry), and also includes children's day care centres, preschools and primary schools (ZOIC 2016a).
- HIL D – Commercial / Industrial Land Use (DP 2015).
- Health Screening Levels for petroleum hydrocarbons – Vapour Intrusion – HSL A for 0 m - < 1 m for clay soils (ZOIC 2016a).
- HILs and HSLs – Intrusive Maintenance Worker – Vapour Intrusion and Direct Contact.
- Management Limits for TPH for a coarse soil texture for residential, parkland and open space. No criteria are provided for direct contact exposures for BTEX constituents (DP 2015).
- Health Screening Levels for Asbestos, Residential A, which included an asbestos screening level of 0.001% w/w for friable asbestos (FA) and asbestos fines (AF) and 0.01% w/w for ACM > 7 mm (ZOIC 2016a).
- NEPC (2013) Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for Urban Residential and Public Open Spaces (DP 2015 and ZOIC 2016a).

The consultant (DP 2015) reported that a detailed asbestos assessment as outlined in the NEPC (2013) was not undertaken as part of the DSI for 185 Fifteenth Avenue. Asbestos was screened from samples taken for general analysis and assessment of contaminants, with no separate 500 g samples collected, as per the sampling protocol reported in the NEPC (2013). Based on this, the consultant (DP 2015) reported that the presence of absence of asbestos at a limit of reporting of 0.1 g/kg was adopted as an initial screening level.

The auditor notes that limited soil and sediment samples were collected during geotechnical investigations undertaken by Golder in 2015. Findings from these investigations were provided in the Phase 1 ESA reports for 185 and 195 Fifteenth Avenue, respectively (Golder 2015a and Golder 2015b). An assessment of the data was undertaken in accordance with the requirements of the NEPC 2013, as listed above. As part of the preparation of the RAP (ZOIC 2016b) all data was reviewed and assessed in accordance with the appropriate NEPC 2013 investigation levels, as cited above.

6.2 Groundwater Criteria

The groundwater criteria adopted by the consultant (DP 2015 and ZOIC 2016a) during the groundwater investigation, including surface water from the dams (Golder 2015b), was based on the following:

- Trigger values relating to the protection of "slightly to moderately disturbed ecosystems" (fresh water) based on 95% protection levels (ANZECC/ARMCANZ 2000).

The consultant (DP 2015) also considered recreational uses of the nearby surface waters and potential usage of the groundwater for drinking water purposes, based on the following:

- Australian Drinking Water Guidelines (2011).
- Guidelines for Managing Risk in Recreational Water (2008).

The consultant (DP 2015) also considered HSLs for the assessment of vapour intrusion risks arising from petroleum sources and direct contact risks from exposure to contaminated groundwater, adopted from NEPC 2013. The consultant (DP 2015) reported that the derivation of the HSLs were based on a proposed future commercial / industrial landuse setting, with a sand soil, with a depth to contamination of 4 m to < 8 m (based on depth to groundwater reported at 6 m to 10 m bgs).

Consideration was also given to the Victoria Department of Environment and Primary Industries (August 2013) in regards to an assessment of surface water conditions in the dams located within 195 Fifteenth Avenue (ZOIC 2016a).

6.3 Audit Findings

The soil criteria adopted by the consultants (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) have been checked against, and were generally consistent with, criteria endorsed by the EPA, with the exception of the following:

- The consultant (ZOIC 2016a) did not make reference NEPC 2013 TPH management limits. However potential aesthetic indicators of petroleum indicators and potential impacts to groundwater have been otherwise assessed.
- The ESLs and EILs adopted by DP 2015 and ZOIC 2016a were inconsistent for selected constituents, including metals, naphthalene, and OCPs. The criteria adopted by ZOIC 2016a were more conservative and were considered by the auditor as part of the assessment.

The consultant also took into consideration aesthetic issues (i.e., odours and discolouration) as part of the site investigation works.

As part of the asbestos assessment undertaken for 185 Fifteenth Avenue, the consultant (DP 2015) did not adopt the asbestos criteria as per the NEPC 2013. Quantification of asbestos was not undertaken as per the NEPC 2013 requirements and the results are considered preliminary in nature.

It is noted that the groundwater laboratory limits of reporting were raised for the groundwater sample collected at MW2 for main contaminants of concern (selected VOCs, MAHs). The raised LORs were marginally above the criteria, however no direct exposure pathway to groundwater and / or no potential ecological receptors in close proximity have been identified. On this basis, the raised LORs for one sample are not considered to significantly affect the interpretation of the data and / or decision making on site suitability.

The groundwater investigation criteria adopted by the consultant have been checked against, and were sourced from relevant EPA endorsed guidelines, namely ANZECC/ARMCANZ 2000. The adopted criteria are considered appropriate for assessing the potential impacts to ecological receptors relevant to the site (i.e., fresh water in a semi-urban environment).

The consultant (DP 2015) has considered recreational users of nearby surface waters and potential usage of groundwater for drinking water purposes. It is noted however, that ZOIC (ZOIC 2016a) did not consider recreational uses of the nearby surface waters or beneficial reuse of the groundwater for drinking water purposes. However taking into consideration that the following:

- The nearby Sydney Water Supply Channel is not likely to be used for recreational purposes; and
- The absence of any registered bores hydraulically downgradient of the site for drinking water; and the TDS of the groundwater to be in excess of 5,000 mg/L and unsuitable for drinking water,

The auditor considers that the omission of recreational and drinking water guidelines by ZOIC 2016a does not have any material impact on the conclusions drawn regarding groundwater quality or the potential migration of contamination from the site.

Overall, the auditor considers that the soil and groundwater (including sediment and surface water) criteria adopted by the consultant were appropriate for assessing the nature and extent of contamination that may be present beneath the site, relative to the proposed uses of the site.

7. Site Investigation Results

7.1 Field Observations

Detailed field investigations were undertaken at 185 and 195 Fifteenth Avenue in 2015 and 2016, respectively. Field investigations within these two areas were undertaken by two different consultants with results presented in two separate reports, DP 2015 and ZOIC 2016a, respectively.

Limited sampling works were also undertaken during geotechnical investigation completed by Golder in 2015. Relevant findings have been summarised in Golder 2015a and Golder 2015b.

A summary of field observations encountered during the field investigations are described as follows:

- The general stratigraphy across 185 Fifteenth Avenue comprised clayey sand and sandy clay fill with trace inclusions of concrete, sandstone, shale, basalt, wood fragments and rootlets to depth of 0.1 m to 2.6 m bgs; further underlain by peat, stiff sandy clay to hard clay /shaly clay to depths of 0.2 m and 1.8 m bgs. Shale was encountered at depths ranging between 0.9 m to a maximum drilling depth of 15 m bgs (DP 2015).
- Concrete and sandstone was reported in the fill in the borehole installed along the western and northern boundaries of 185 Fifteenth Avenue, likely to have been used to level the site (DP 2015).
- The general stratigraphy across 195 Fifteenth Avenue comprised sandy clay fill and reworked natural topsoil between 0.2 m and 1.0 m bgs; further underlain by natural clay and silty clay, to the maximum investigation depth of 1.2 m bgs.
- The consultant (ZOIC 2016a) did not observe the presence of potential asbestos fragments in any of the soil samples, however did note the presence of localised inclusions comprising blue metal, gravel and small amounts of brick, title, glass and plastic in the topsoil in selected sampling locations in the vicinity of the sheds and residential house.
- During site inspections undertaken by Golder (Golder 2015b) at 1295 Fifteenth Avenue, two asbestos fragments were noted within the south-eastern portion of the site. These samples were analysed and were confirmed to contain chrysotile and amosite asbestos.
- Surface waste was identified along the northern site boundary of 195 Fifteenth Avenue (ZOIC 2016a).
- The dam located within the southwestern portion and the small dam located along the mid-western boundary of 195 Fifteenth Avenue, did not show visible signs of contamination.
- Hydrocarbon odours were noted during the soil sampling works at one location only, BH2/MW2 (DP 2015). Hydrocarbon odours or hydrocarbon staining were not reported at any other sample location during the DP and ZOIC soil sampling works. All PID readings were reported at < 10 ppm.
- Groundwater was not encountered during the soil sampling works undertaken by ZOIC (ZOIC 2016a). Localised waterlogging of the soils was however noted in the vicinity of some of the low-lying areas and the dams.
- Groundwater sampling of the monitoring wells located at 185 Fifteenth Avenue, was undertaken by DP in 2015 and ZOIC in 2016. No PSH was reported during the groundwater monitoring events. Hydrocarbon odours were reported at one location, MW2 in 2015 and 2016, with a possible hydrocarbon sheen also reported by ZOIC (ZOIC 2016a). Due to the colour and highly turbid nature of the groundwater, the consultant could not accurately ascertain whether the presence of a hydrocarbon sheen in MW2 (ZOIC 2016a).

- Six monitoring wells were installed by DP (DP 2015) at 185 Fifteenth Avenue. Groundwater sampling of these monitoring wells was undertaken by both DP and ZOIC.
- Standing water levels (SWLs) were measured and reported in 2015 (DP 2015). The SWLs ranged from 6.43 m below top of casing (BTOC) to 10.04 m BTOC. Groundwater gauging data was not presented in the ZOIC 2016a report, as such a review of historical trends could not be provided.
- All monitoring wells were surveyed to AHD, with TOC elevations tabulated in Table 14 by the consultant (DP 2015). A review of the data has reported water elevation ranging from 82.57 m AHD to 87.18 m AHD. The direction of groundwater flow was calculated to be to the west/southwest. The consultant (ZOIC 2016b) reported that the inferred groundwater flow was comparable between sampling rounds (2015 and 2016).
- A summary of groundwater quality parameters collected in 2015 is provided as follows:
    - pH ranged 6.75 to 9.69;
    - EC ranged from 211,344 µS/cm to 24,517 µS/cm, indicative of highly saline conditions;
    - Redox ranged from -15 mV to 102 mV; and
    - Dissolved oxygen ranged from 0.32 ppm to 6.09 ppm in all wells.

7.2 Soil Analytical Results

As discussed above, detailed field investigations were undertaken in 2015 and 2016 by DP and ZOIC, respectively at 185 and 195 Fifteenth Avenue. The consultant's (DP 2015 and ZOIC 2016a) provided summary tables (**Appendix E**) in addition to detailed laboratory reports and chain of custody documentation.

In addition, limited soil sampling was also undertaken as part of the geotechnical investigation undertaken by Golder in 2015 at 185 Fifteenth Avenue. Even though the Geotechnical Investigation Report was not provided to the auditor for review, relevant tabulated results, laboratory reports and associated documentation was included in the Golder 2015a Preliminary ESA Report. For completeness, the auditor has reviewed and considered this data, to assess soil conditions at the site, and has been included in **Section 7.2**, where necessary.

A summary of the soil analytical results, in comparison to the adopted soil investigation levels (as provided in **Section 6.1**) is provided in **Table 7.1**, as follows.

Table 7.1: Summary of Soil Analytical Results (mg/kg)

Substance	Minimum concentration	Maximum concentration	Exceedance to SIL
Metals			
Arsenic	< 4	14	No exceedance
Cadmium	< 0.4	< 1	No exceedance
Chromium	4	76	No exceedance
Copper	2	290	No exceedance
Lead	< 5	590	No exceedance
Nickel	2	152	No exceedance
Zinc	10	1,100	No exceedance
Mercury	< 0.1	0.4	No exceedance
Volatile Organic Compounds (VOCs)			
Benzene	< 0.2	-	No exceedance
Toluene	< 0.5	-	No exceedance
Ethylbenzene	< 1	-	No exceedance
Total Xylenes	< 3	4	No exceedance
TPH			
TRH C_6-C_9	< 25	-	No exceedance
TRH C_{10}-C_{14}	< 50	-	No exceedance
TRH C_{15}-C_{28}	< 100	470	No exceedance
TRH C_{29}-C_{36}	< 100	600	No exceedance

Substance	Minimum concentration	Maximum concentration	Exceedance to SIL
TRH C_6-C_{10} Fraction	< 10	< 25	No exceedance
TRH C_6-C_9 (F1)	< 10	<25	No exceedance
TRH > C_{10}-C_{16} Fraction	< 25	1,810	Duplicate QC sample of BH14-0-0.1 exceedance to HSL-D; EILs/ESLs and Management Limits for Commercial/Industrial Setting (Golder 2015a) No exceedance at remaining locations
TRH > C_{10}-C_{16} (F2)	< 50	1810	Duplicate QC sample of BH14-0-0.1 exceedance to HSL-D; EILs/ESLs and Management Limits for Commercial/Industrial Setting (Golder 2015a) No exceedance at remaining locations
TRH C_{16}-C_{34} Fraction	< 100	920	No exceedance
TRH > C_{16}-C_{34} (F3)	120	5,410	Duplicate QC sample of BH14-0-0.1 exceedance to HSL-D; EILs/ESLs and Management Limits for Commercial/Industrial Setting (Golder 2015a) No exceedance at remaining locations
TRH > C_{34}-C_{40} (F4)	< 100	1,000	No exceedance
PAHs			
Benzo(a)pyrene	< 0.05	2.2	BH7-0.1-0.2, BH13-0.1-0.2 and BH19-01-0.2 exceedance to ESLs – Commercial / Industrial Setting (DP 2015) No exceedance at remaining locations
Naphthalene	< 0.1	< 1	No exceedance
Total PAHs	< 0.5	21	No exceedance
OCPs			
DDE	< 0.1	< 0.25	No exceedance
DDT	< 0.1	< 0.25	No exceedance
DDT	< 0.1	< 0.25	No exceedance
Heptachlor	< 0.1	< 0.25	No exceedance
Individual OCPs	< 0.1	< 0.25	No exceedance
PCBs			
Individual PCBs	< 0.1	-	No exceedance
Other			
Individual MAH Compounds	< 1	-	No exceedance
Individual chlorinated hydrocarbons	< 1	-	No exceedance
Individual halogenated hydrocarbons	< 1	-	No exceedance
Individual halogenated benzenes	< 1	-	No exceedance
Total phenols	< 5	-	No exceedance
Asbestos			
Asbestos in Soil (Golder 2015a)	Not detected at reporting limit of 0.01 % w/w	Not detected at reporting limit of 0.01 % w/w	No exceedance
Trace analysis (Golder 2015a)	No asbestos detected	No asbestos detected	No exceedance
Asbestos (DP 2015)	Not detected	Not detected	No exceedance
ACM > 7 mm (ZOIC 2016a)	No asbestos detected	1.2347 % w/w	Chrysotile, amosite and crocidolite detected at TP02

Substance	Minimum concentration	Maximum concentration	Exceedance to SIL
			No asbestos at remaining locations
FA / AF	No asbestos detected	0.1522 % w/w	Chrysotile, amosite and crocidolite detected at TP02 No asbestos at remaining locations

7.3 Groundwater Analytical Results

Groundwater sampling was undertaken by DP in 2015 and ZOIC in 2016 (DP 2015 and ZOIC 2016a) for monitoring wells installed at 185 Fifteenth Avenue. A total of six monitoring wells were sampled by DP, with only four wells sampled by ZOIC. The remaining two wells could not be located (ZOIC 2016a). It is noted that no monitoring wells were installed at 195 Fifteenth, as such no groundwater monitoring data is available for this site. However, the data obtained for 185 Fifteenth Avenue is sufficient to provide an assessment of groundwater conditions across the entire site area.

The consultant's provided summary tables (**Appendix F**) in addition to detailed laboratory reports and chain of custody documentation.

A summary of the groundwater analytical results collected during both monitoring events, in comparison to the adopted groundwater investigation levels (as provided in **Section 6.2**) is provided in **Table 7.2**, as follows.

Table 7.2: Summary of Groundwater Analytical Results (µg/L)

Substance	Minimum concentration	Maximum concentration	Exceedance to GIL
Metals			
Arsenic	< 1	2	No exceedance
Cadmium	0.1	0.5	MW2 and MW10 exceeds freshwater GILs (DP 2015); and MW25 exceeds freshwater GILs (DP 2015 and ZOIC 2016a)
Chromium	< 1	-	No exceedance
Copper	< 1	4	MW25 exceeds freshwater GILs (ZOIC 2016a)
Lead	< 1	6	MW2 exceeds freshwater GILs (ZOIC 2016a)
Nickel	2	10	No exceedance
Zinc	6	30	MW9, MW24 and MW25 exceeds freshwater GILs (DP 2015)
Mercury	< 0.05	-	No exceedance
Volatile Organic Compounds (VOCs)			
Benzene	< 1	1,700	MW2 exceeds freshwater GILs (DP 2015)
Toluene	< 1	4,700	MW2 exceeds drinking water GILs (DP 2015 and ZOIC 2016a)
Ethylbenzene	< 1	1,400	MW2 exceeds drinking water GILs (DP 2015 and ZOIC 2016a)
Total Xylenes	< 3	2,890	MW2 exceeds freshwater GILs (for o-xylene)
TPH			
TRH C_6-C_9 (F1)	< 10	23,000	No exceedance
TRH > C_{10}-C_{16} (F2)	< 50	420,000	No exceedance
PAHs			
Benzo(a)pyrene	< 0.1	-	No exceedance
Naphthalene	< 0.2	420	MW2 exceeds freshwater GILs (ZOIC 2016a)
Total PAHs	< 1	13	No exceedance
Other			

Substance	Minimum concentration	Maximum concentration	Exceedance to GIL
Individual MAH Compounds	< 1	240	No exceedance
Individual chlorinated hydrocarbons	< 1	-	No exceedance
Individual halogenated hydrocarbons	< 1	< 10	No exceedance
Individual halogenated benzenes	< 1	< 10	No exceedance
Solvents	< 1	71	No exceedance
PCBs individual	< 0.01	-	No exceedance
OCPs individual	< 0.001	-	No exceedance
OPPs individual	< 0.001	-	No exceedance
Total VOCs	< 1	-	No exceedance

7.4 Sediment and Surface Water Analytical Results

Sediment and surface water samples were collected for analysis in June 2014 by Golder (Golder 2015b) as part of the Phase 1 ESA at 195 Fifteenth Avenue. Two sediments samples (Location 1-001 and 1-002) and one water sample (Location 1-001) were collected from the large dam; with one sediment sample (Location 2-001) and one water sample (Location 2-001) collected from the smaller dam located near the western site boundary. The sediment and surface water sampling was undertaken as part of the geotechnical investigation for this area. It is noted that a geotechnical investigation report was not provided to the auditor for review. However tabulated results, laboratory reports and associated documentation was provided in the Golder Phase 1 ESA Report (Golder 2015b). For completeness, the auditor has reviewed and considered this data to assess sediment and surface water conditions in the two dams located at 195 Fifteenth Avenue, and has been included in **Section 7.3**, where necessary.

Surface water samples were also collected as part of the ZOIC 2016a investigation.

A summary of the sediment and surface water analytical results, in comparison to the adopted investigation levels is provided in **Table 7.3** and **Table 7.4**, respectively, as follows.

Table 7.3: Summary of Sediment Analytical Results (mg/kg)

Substance	Minimum concentration	Maximum concentration	Exceedance to IL
Metals			
Arsenic	5	9	No exceedance
Cadmium	< 0.4	-	No exceedance
Chromium	15	26	No exceedance
Copper	21	38	No exceedance
Lead	16	20	No exceedance
Nickel	9	17	No exceedance
Zinc	41	68	No exceedance
Mercury	< 0.1	-	No exceedance
Volatile Organic Compounds (VOCs)			
Benzene	< 0.2	-	No exceedance
Toluene	< 0.5	-	No exceedance
Ethylbenzene	< 1	-	No exceedance
Total Xylenes	< 3	4	No exceedance
TPH			
TRH C_6-C_{10} Fraction	< 25	-	No exceedance
TRH C_6-C_9 (F1)	< 25	-	No exceedance
TRH > C_{10}-C_{16} Fraction	< 25	-	No exceedance
TRH > C_{10}-C_{16} (F2)	< 50	-	No exceedance
TRH > C_{16}-C_{34} (F3)	< 100	-	No exceedance
TRH > C_{34}-C_{40} (F4)	< 100	-	No exceedance
PAHs			
Benzo(a)pyrene	< 0.05	-	No exceedance
Naphthalene	< 0.1	-	No exceedance

Substance	Minimum concentration	Maximum concentration	Exceedance to IL
Total PAHs	< 0.5	0.11	No exceedance
OCPs / OPPs			
DDE	< 0.1	-	No exceedance
DDT	< 0.1	-	No exceedance
DDT	< 0.1	-	No exceedance
Heptachlor	< 0.1	-	No exceedance
Individual OCPs	< 0.1	-	No exceedance
Individual OPPs	< 0.1	-	No exceedance
Total phenols	< 5	-	No exceedance

Table 7.4: Summary of Surface Water Analytical Results (µg/L)

Substance	Minimum concentration	Maximum concentration	Exceedance to IL
Metals			
Arsenic	1	-	No exceedance
Cadmium	< 0.1	-	No exceedance
Chromium	< 1	-	No exceedance
Copper	< 1	-	No exceedance
Lead	< 1	-	No exceedance
Nickel	< 1	-	No exceedance
Zinc	< 1	1	No exceedance
Mercury	< 0.05	-	No exceedance
Volatile Organic Compounds (VOCs)			
Benzene	< 1	-	No exceedance
Toluene	< 1	-	No exceedance
Ethylbenzene	< 1	-	No exceedance
Total Xylenes	< 3	-	No exceedance
TPH			
TRH C_6-C_{10} Fraction	< 10	-	No exceedance
TRH C_6-C_9 (F1)	< 10	-	No exceedance
TRH > C_{10}-C_{16} Fraction	< 50	-	No exceedance
TRH > C_{10}-C_{16} (F2)	< 50	-	No exceedance
TRH > C_{16}-C_{34} (F3)	< 100	310	No exceedance
TRH > C_{34}-C_{40} (F4)	< 100	-	No exceedance
PAHs			
Benzo(a)pyrene	< 2	-	No exceedance
Naphthalene	< 1	-	No exceedance
Total PAHs	-	-	No exceedance
OCPs / OPPs			
DDE	< 0.2	-	No exceedance
DDT	< 0.2	-	No exceedance
DDT	< 0.2	-	No exceedance
Heptachlor	< 0.2	-	No exceedance
Individual OCPs	< 0.2	-	No exceedance
Individual OPPs	< 0.2	-	No exceedance

7.5 Consultant's Interpretations and Conclusions

The consultant's (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) provided the following discussion of results, conclusions and recommendations:

<u>185 Fifteenth Avenue</u>

- The consultant (DP 2015) reported that the laboratory results did not show evidence of any widespread contamination across the site, with results for all contaminants of concern generally below the laboratory limit of reporting or below the adopted soil investigation levels.
- It is noted that field observations reported the presence of hydrocarbon odours at BH2 at a depth of 5 m bgs. This borehole is located in the immediate vicinity of the former USTs and

is likely residual odours, as laboratory results either reported low levels or concentrations close to the laboratory limit of reporting for BTEX.

- Marginal exceedances to the ESLs for B(a)P were reported in selected samples, however the consultant (DP 2015) considered that statistically these exceedances were not considered significant.
- Exceedances to ESLs for TRH were also reported in BH14 by Golder 2015a, however it is reported that these concentrations are likely associated with surface soils / leaks and are not considered to pose a risk to future users of the site, however consideration should be given if landscaping is proposed.
- Soil sampling undertaken during the geotechnical investigation by Golder in 2015 and present in Golder 2015a indicates that duplicate sample collected from BH14 reported concentrations of >C_{10}-C_{16}, F2 (>C_{10}-C_{16} minus naphthalene) and F3 (>C_{16}-C_{34}) hydrocarbon fractions above the ecological screening levels or management limits. The consultant (Golder 2015a) noted however that concentrations were below the health screening levels for commercial / industrial settings. The consultant reported that the elevated results reported in the duplicate sample were attributed to variations in laboratory result due to sample heterogeneity or potential impact from surface asphalt at this location. Based on this, the results of the primary sample was considered, with concentrations of TRH fractions all reported below the adopted soil investigation levels.
- Low detections of TRH were reported at MW2, located in the former UST pit. Minor exceedances of benzene and xylene were also reported at MW2. The consultant (DP 2015) reported that the identified hydrocarbon related contaminants will naturally biodegrade over time once the source (USTs) have been removed. It is likely that the reported concentrations above will reduce over time to an acceptable level. Given that there are no exceedances of the HSLs considering the vapour intrusion pathway, and there are no groundwater extraction processes known in close proximity to the site, the consultant considered that remediation of the groundwater is not required.
- Exceedances for several heavy metals including cadmium, copper and zinc and copper were also reported in the monitoring wells. Following hardness modified values being applied to the results, all metals were within the adopted GILs. The consultant considered that based on the consistency in the results between the upgradient, sidegradient and downgradient monitoring wells, the concentrations are considered to be reflective of local groundwater quality and hence the site is not considered to be adversely impacting on local groundwater quality. The reported exceedances are considered consistent for groundwater quality in urban areas where contaminants are added to the local surface water and groundwater from a variety of sources.

<u>195 Fifteenth Avenue</u>

- Asbestos was detected in one sample collected from the fill material at TP02. The consultant (ZOIC 2016a) reported that this sample was located in the vicinity of the shed located at Lot 346, within the south-eastern portion of 195 Fifteenth Avenue. The consultant also reported that the location of TP02 is in the immediate vicinity of two confirmed ACM fragments identified in the Golder 2015b.
- With the exception of the identified asbestos contamination at TP02 and localised dumping of household waste and rubbish identified along the northern and north-western site boundaries of 195 Fifteenth Avenue, the consultant (ZOIC 2016a) concluded that there was no areas of widespread contamination.

- The consultant (ZOIC 2016a) concluded that 195 Fifteenth Avenue may be developed for the proposed uses providing that remediation of the south-eastern portion of the site is undertaken, through the implementation of a remediation strategy and RAP for the site. This should also I include removal of all localised dumped waste.
- The consultant reported that sampling within building footprints was not undertaken. As such following demolition of the site structures, the consultant reported that sampling beneath the building footprints should be undertaken.
- Sediment and surface water sampling confirmed that the historical market garden activities have not significantly impacted upon the sediment and water quality of the dam (Golder 2015b).
- The consultant (ZOIC 2016a) reported that the nutrient concentrations reported in the surface water samples collected from the dams were above the Victoria Department of Environment and Primary Industries (August 2013) 'maximum desirable concentration to minimise changes of algal blooms'. It was noted during fieldworks that both dams were clear, odourless and free of visual indicators of algal blooms. The consultant reported that should the dams be drained, further analysis of the waters may be required and associated sediments to ensure disposal in accordance with the *Protection of Environment Operations Act* 1997.
- Groundwater monitoring was undertaken on six monitoring wells located at 185 Fifteenth Avenue. Monitoring wells were not installed within 195 Fifteenth Avenue. However the consultant (ZOIC 2016a) reported that given the absence of any apparent onsite sources of potential groundwater contamination at 195 Fifteenth Avenue. The consultant however did consider that the hydraulically upgradient former bus depot (located at 185 Fifteenth Avenue) was a potential source of groundwater impact that could migrate onto the site.
- Groundwater flow across 185 Fifteenth Avenue, flows in a south-westerly direction. The consultant (ZOIC 2016a) considered that groundwater wells representing water quality migrating onto the site are considered to be MW24 and MW25. Groundwater from these two locations did not contain concentrations of TRH and BTEX above laboratory detection limits. Concentrations of metals were generally below the adopted groundwater investigation levels, with the exception of cadmium and copper which reported concentrations marginally above the adopted GILs in MW25 (copper concentration of 4ug/l vs GIL of 1.4ug/L; and cadmium concentration of 0.5ug/L vs GIL of 0.2ug/L).
- Concentrations reported in the remaining two monitoring wells (MW2 and MW9) sampled on the former bus depot, reported that residual petroleum hydrocarbons were only detected in MW2. The consultant reported that monitoring well MW2 is located in the vicinity of the former USTs. Analytical results from MW2 detected concentration of lead and BTEX exceeding the adopted criteria; and TRH fraction at elevated concentrations (noting that groundwater in clay 4-8m bgl is 'non-limiting' for petroleum hydrocarbons). Based on the direction of groundwater flow, groundwater from MW2 is unlikely to migrate onto 195 Fifteenth Avenue and further offsite.
- The consultant (ZOIC 2016a) concluded that based on the current data there is no evidence to suggest contaminated groundwater from 185 Fifteenth Avenue will migrate and impact 195 Fifteenth Avenue and offsite areas.

7.6 Audit Findings

The consultant's (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) provided tables and a summary of results that were generally accurate and complete.

Relevant site plans provided by the consultant (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) adequately identified the sampling locations relevant to the main site features such as boundaries and street frontage, and have been produced to scale. Site plans are included in **Appendix D**.

Soil waste classifications were not conducted by the consultant (DP 2015 and ZOIC 2016a) on soils at the site, the auditor notes that a strategy for waste classification of soils has been nominated in the RAP (refer to **Section 8**).

The laboratory procedures were generally appropriate for the identified potential contaminants of concern and the adopted groundwater criteria against which the results were compared.

The consultant's (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) addressed both the potential and actual migration of the identified contaminants of concern through an assessment of groundwater. The auditor concurs with the findings of the consultant's (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a), summarised as follows:

- The most recent groundwater monitoring event (ZOIC 2016a) identified the presence of elevated concentrations of lead, TRH and BTEX in the groundwater at one monitoring well location only, MW2. Concentrations in remaining monitoring wells, at either downgradient or upgradient locations were either reported at trace levels or below the laboratory LOR. The consultant's considered that based on the location of MW2, the absence of concentrations at downgradient locations, it is considered that concentrations are not likely to migrate significant distances offsite and may be limiting over time. However as part of the development of the RAP (ZOIC 2016b), additional groundwater investigation works have been proposed prior to determining site suitability.
- Taking into consideration the depth to groundwater (> 5 m bgs), any risk to future site users from dermal contact and ingestion of groundwater is considered to be acceptable as site users are not likely to come into contact with groundwater. Furthermore, based on regional bore data, use of reticulated water, beneficial reuse of the groundwater is considered to be unlikely at the site.
- Concentrations of metals exceeded the adopted GILs in the monitoring wells across the site. The auditor concurs with the consultant's conclusions that the metals in groundwater are likely representative of local groundwater quality and is not considered to be adversely affecting groundwater quality at the site or surrounding areas. The reported exceedances are considered consistent for groundwater quality in urban areas where contaminants are added to the local surface water and groundwater from a variety of sources. Furthermore, the auditor notes that the quality of the surface water in the dams located at 195 Fifteenth Avenue, confirms that site activities are not impacting to adverse conditions at the site.

The conclusions reached by the consultant's in relation to the soil and groundwater contamination issues are considered generally appropriate and meet the requirements of the site audit. The exceptions to this relate to the data gaps identified in **Section 5.2**.

Overall, the consultant reports (Golder 2015a, Golder 2015b, DP 2015 and ZOIC 2016a) are considered to have obtained and reported results in a manner which enables conclusions to be drawn regarding the need for remediation (as discussed in **Section 8**) and therefore meets the requirements of the site audit.

8. Remediation and Validation

8.1 Remediation Objective

As outlined in the RAP (ZOIC 2016b), the objective of the remedial program is to ensure that the site is suitable for the redevelopment for the proposed uses and ensure that any residual contamination does not pose a risk to human health of the environment and is suitable for the following potential beneficial landuse scenarios:

- Retail outlets, including large format retail, fast food outlets, service station, central carpark facility in addition to internal roads and landscaped areas for Lot 345 (185 Fifteenth Avenue).
- Retail outlets, including large format retail, fast food outlets, service station, central carpark facility in addition to internal roads and landscaped areas; and a childcare centre for Lot 346 and Lot 2 (195 Fifteenth Avenue).
- Proposed landuse of the three northern lots, including Lot 304, Lot 305 and Lot 306 is not known, however, is proposed to be subdivided. At the time of the preparation of this audit and the RAP, this area will be assessed at the most conservative landuse scenario, including residential with garden / accessible soils, including childcare centre, along with less sensitive uses including commercial/industrial.

8.2 Remediation Options

The consultant (ZOIC 2016b) reported, in accordance with the waste management hierarchy, in accordance with the *Waste Minimisation and Management Act* 1995 and DEC 2006, the preferred options for remediation and/or management of contaminated land are summarised as follows, in order of preference:

1. Excavation of contaminated soils and disposal to an appropriate facility.
2. Leave the site in its current condition and do not undertake further remediation and / or management of the sit – 'Do-Nothing'
3. Consolidation and isolation of the soil on-site by containment within a properly designed barrier.

8.3 Preferred Remediation Approach

Based on the nature and extent of the identified contamination, low human health risk and the proposed redevelopment of the site, the consultant (ZOIC 2016b) considered the following most viable remediation options for the site:

- Source removal, including the removal of all asbestos and PAH contaminated soils and disposed offsite to a licensed landfill facility. Validated soils and imported VENM, if required, will be used to backfill excavations and reinstate the site.
- Completion of additional investigation works to assess data gaps in previously unassessed areas, particularly in the vicinity of former buildings, former UST areas and other potential sources of contamination areas. If required, these areas may also require further remediation and will also include the same remediation approach, i.e, excavation and offsite disposal of contaminated soils.
- Assessment of groundwater conditions at the site post- remediation to confirm that concentrations of contaminants in the groundwater do not pose a risk to onsite and offsite receptors. Remediation Activities

8.3.1 Work Plans, Pre-Demolition Works and Licenses

The consultant (ZOIC 2016b) detailed that preliminary works will be required to be undertaken at the site prior to any commencement of site remediation works and will include the following:

- A Site Management Plan (SMP) and Work Health and Safety Management Plan (WHSMP) must be prepared prior to the commencement of the site works, and ensure implementation doing the duration of the site works.
- Obtain relevant regulatory approvals and licenses required to complete the proposed remediation works at the site.
- The proposed remediation works are classified as Category 2 in accordance with the *State Environmental Planning Policy No. 55 – Remediation of Land* (SEPP55). It is noted that the s149 certificate obtained from Liverpool Council for Lot 345 and Lot 346 was evaluated taking into consideration Clause 9(e) of SEPP55.
- Undertake a Hazardous Materials Building Survey (HMBS) for onsite buildings located at Lot 345 and Lot 346.
- Removal of any hazardous materials from the existing site structures, as identified as part of the HMBS, in accordance with current regulations and guidelines. Any hazardous materials, including asbestos will need to be removed offsite in accordance with the *Work Health and Safety (WHS) Act* 2011, and WHS Regulation 2011 and WorkCover requirements. Removal of friable asbestos or asbestos greater than 10 m^2 will require notification to WorkCover NSW, seven days prior to the commencement of site works.
- Removal of all remaining site structures as part of the demolition works, to allow access for soil testing and collection of validation data.
- Prior to the commencement of the demolition works, obtain a clearance certificate by an appropriately licensed contractor.
- Waste disposal and landfill licensing documentation will be provided by the appointed Contractor for inclusion into the validation report, ensuring compliance with the Protection of the *Environment Operations (Waste) Regulations* 2005.
- Soils proposed to be removed from the site include asbestos, TRH and PAH impacted soils. Further waste classification will be undertaken prior to their removal to classify the soils for offsite disposal. A waste classification letter will be prepared classifying soil types as part of the remediation activities.

8.3.2 Data Gap Investigation Works

Following the removal of the buildings, site structures and hardstands, the consultant (ZOIC 2016b) reported that additional targeted sampling will be required in the following areas:

- Existing Structures (Data Gap 1) - Sampling beneath buildings and structures.
- Lot 346 - Two sampling locations within each of the four building/shed footprints (8 testpits).
- Lot 345 (Bus Depot) - 8 sampling locations within building footprints (testpits); beneath the former ASTs on western side of central workshop (3 testpits) and beneath in-ground inspection pit, south of main workshop (one testpit).
- Former UST area at the bus depot – Lot 345 (Data Gap 2) - The former UST area soil sampling requires validation of 'wall' and 'base samples (five testpits - one for each wall and one in the centre).

- Resampling of MW2. The consultant recommended the installation of an additional monitoring well hydraulically immediately downgradient of the former UST (south-west) to establish whether associated groundwater impacts have the potential to be migrating offsite towards Fifteenth Avenue.

- Asbestos Analysis - Lot 345 (Date Gap 3) - 12 grid-based testpits across the former bus depot with appropriate 500g samples analysed in accordance with NEPC 2013 from surface and/or near surface fill locations.
- Potential surface spill – Lot 345 (Data Gap 4) - sampling of potential surface spill area in the central-western portion of the bus depot near the former 45kL diesel ASTs (5 targeted testpits should be sampled in this area).

8.4 Remediation Activities

The consultant (ZOIC 2016b) reported that remediation works will be undertaken across three areas and have been summarised in the following sections.

8.4.1 General Site Area

- Excavated contaminated fill will be temporarily stockpiled on either a sealed surface or a plastic sheet and covered with an impermeable plastic sheet to prevent rain infiltration, dust and runoff generation.
- If placement on an impervious surface is not possible, confirmation is required that cross-contamination of the soil underneath has not occurred.
- Where contaminant concentrations in validation samples exceed the site remediation criteria, further 'chase-out' excavation must be carried out, until new validation samples confirm that concentrations are below the site validation criteria.
- Soil samples will be analysed as per the validation sampling plan (refer to **Section 8.9**).

8.4.2 Area 1 – Asbestos ACM/FA/AF Impacts – Lot 346

- Scraping of surface soils across the area to 0.2m.
- Collection of validation samples as per Validation Sampling Plan (refer to Section 8.9).
- Inspection of surface soils walking 1m transects (in two perpendicular directions).
- Validation of the excavation to demonstrate that the asbestos contamination has been successfully remediated and validated (refer to **Section 8.9**).Waste classification of excavated soils to allow for appropriate waste disposal to licensed landfill facility.

8.4.3 Area 2

The consultant (ZOIC 2016b) reported that remediation of Area 2 (previously identified B(a)P impacted soils BH19, at 185 Fifteenth Avenue, DP 2015) may or may not be required, depending on whether the proposed development includes proposed landscaping in this part of the site, where soils impacted by B(a)P were encountered.

The consultant reported that if remediation and subsequent validation of Area 2 is required, the following remediation procedures will be followed:

- Excavation of fill soils to a depth of 0.4 m (i.e, the thickness of fill at BH19), covering an area of 3 m x 3 m.
- Inspection of the excavation followed by collection of validation samples (refer to **Section 8.9**).
- Excavated soils will be either reused onsite beneath hardstands or buildings; or will be classified for waste classification purposes for offsite disposal to a licensed landfill facility.

8.5 Waste Classification

The consultant (ZOIC 2016b) reported that waste classification of soils is required to be undertaken in accordance with the NSW EPA 2014 Guidelines, to allow for materials to be suitably disposed to a licensed landfill facility.

The consultant (ZOIC 2016b) reported that analysis for waste classification purposes should include metals, TRH, BTEX, PAHs and asbestos, with TCLP testing for metals and PAHs, as required.

The consultant reported that all records associated with waste classification, transport and receipt by the recycling and/or landfill facility must be collated and provided to the environmental consultant for inclusion in the validation report.

8.6 Remediation Works Contingency Plan

The consultant (ZOIC 2016b) provided a contingency plan which outlines procedures for the identification and management of unexpected issues or events that may arise during the remediation works, corresponding corrective actions and procedures for reporting relevant issues to regulatory authorities, as required. It contains provisions for the following events:

- Identification of asbestos cement sheeting, lagging and piping.
- Identification of friable asbestos.
- Identification of USTs at the site.
- Identification of groundwater contamination at the site, greater than anticipated.
- Spills, leaks and exposure of chemicals and hazardous materials.
- Excessive rain at the site.
- Unmanageable mud in the excavation zone.
- Excessive drainage at the site.
- Generation of excessive dust and odours during the excavation and remediation works.
- Generation of excessively wet materials during the excavation works.
- Failure of environmental and/or WHS Controls or environmental and WHS monitoring indicates potential hazards at the site.

8.7 Remediation Works Site Management Plan

The consultant (ZOIC 2016b) reported that the Principal Contractor will be responsible for the preparation and implementation of a detailed remedial works SMP (Construction Environmental Management Plan). The SMP will be required to comply with Liverpool Council requirements and relevant legislative requirements, meeting the following minimum requirements:

- Hours of operation;
- Underground Services;
- Soil, Water and Waste Management;
- Excess/Accumulated Waters;
- Noise Control and Assessment;
- Odour and Dust Control and Assessment;
- Asbestos Handling;
- Material Transporting and Tracking;

- Community Consultation; and
- Complaint Reporting and Resolution.

8.7.1 Soil, Water and Waste Management

The consultant (ZOIC 2016b) reported that soil excavation works will be conducted in a manner that minimises the potential migration of impacted soil and water offsite and complies with the requirements of the proposed Development Consent.

Sediment controls will be required to be erected downgradient of excavations to assist with sediment and erosion control. Stormwater may be managed through diversion (around excavation and stockpile areas) or detention (prior to controlled release).

Detailed soil and water management plans will be required to be provided in the SMP for the remedial works.

The consultant (ZOIC 2016b) reported that all works shall be suspended during periods of severe inclement weather.

8.7.2 Noise Control and Assessment

The consultant (ZOIC 2016b) reported that remediation works will be required to comply with the requirements of the proposed Development Consent and relevant council requirements, in addition to the AS2436-1981 Guide to Noise Control on Construction, Maintenance Demolition Sites and the NSW EPA Environmental Noise Control Manual for the control of noise from construction sites.

In addition, the consultant recommended that where machinery and mechanical equipment is used onsite, it will be in good working order and will be fitted with appropriate silencers when necessary.

8.7.3 Odour and Dust Control and Assessment

The consultant (ZOIC 2016b) reported that dust emissions will be minimised by implementing the following controls:

- Erection of dust screens at the site perimeter;
- Securely covering all loads entering or exiting the site;
- Wetting down excavated materials / excavation;
- Covering stockpiles; and
- Sealing of site ingress and egress points.

Based on the nature of contaminants potentially encountered in the vicinity of the UST and associated infrastructure, odours may pose a potential environmental and health hazard. As such, the Principal Contractor will be responsible for establishing a procedure to proactively manage this problem if it arises.

8.7.4 Asbestos Handling

The consultant (ZOIC 2016b) reported that where asbestos containing material is suspected or identified, all excavation works must cease and a competent person (i.e, an AS1 (asbestos fibres) or AS2 (ACM) licensed contractor) must be engaged to coordinate and supervise the works and specify appropriate environmental control measures (e.g. airborne asbestos fibre monitoring) in accordance with existing legislation and guidance.

8.7.5 Materials Transporting and Tracking

The consultant (ZOIC 2016b) reported that the Principal Contractor will be required to ensure that there is no material tracked onto the street and that loads are securely covered. Soil, earth, mud or similar materials must be removed from the roadway by sweeping, shovelling, or a means other than

washing, on a daily basis or as required. Soil washings from wheels shall be collected and disposed of in a manner that does not pollute waters.

All road rules shall be observed and the use of local roads shall be minimised.

A record of truck movements shall be kept in order to enable the waste to be tracked to the receiving landfill. The receiving landfill shall issue weighbridge and tipping documents and these shall be reconciled against the truck movement records to ensure accountability for all materials removed from site as part of remedial works.

8.7.6 Community Consultation

The consultant (ZOIC 2016b) reported that all owners and/or occupants of adjoining and opposite (across roadways) premises shall be notified of the remedial works program prior to works being commenced.

8.7.7 Complaint Reporting and Resolution

The consultant (ZOIC 2016b) reported that all complaints received from adjoining sites or the general public will be directed to the Principal Contractor. A Complaints Register (Date, Complainant Details, Nature of Complaint, Action Required, Responsibility, Due Date) must be maintained onsite to ensure that any concerns are recorded and addressed.

8.8 Occupational Health and Safety Plan

The consultant (ZOIC 2016b) reported that prior to the commencement of any site works, the Principal Contractor, subcontractor or environmental consultant must manage risks in accordance with the NSW WHS Act 2011 and NSW WHS Regulations 2011. As such, prior to the commencement of any site remediation and validation works, as detailed in the RAP, a site specific work method statement (SWMS) and associated WHSMP will be prepared by the Principal Contractor, subcontractor or environmental consultant. The WHSMP will contain procedures and requirements (including PPE requirements) that will be implemented during the remediation works and should consider the following:

- Hazard identification and control;
- Air monitoring (including asbestos and hydrocarbons) during the earthworks;
- Chemical hazard control;
- Handling procedures;
- Personal protection equipment (PPE);
- Work zones;
- Decontamination procedures;
- Contingency plans;
- Details of key personnel and contact telephone numbers;
- Emergency response; and
- Incident reporting.

The consultant (ZOIC 2016b) reported that the Principal Contractor will be responsible for ensuring that all works are undertaken in accordance with the WHSMP and will be prepared prior to the commencement of site remediation works. The WSHMP will also detail the process of identifying possible emergency situation and procedures necessary to ensure the safety of both onsite and offsite personnel in an emergency event.

8.9 Validation Plan

The consultant (ZOIC 2016a) reported that the objective of the validation program is to ensure that at the completion of the remedial works, the property is suitable for the proposed land use. The validation program is to be implemented as follows, following the removal of all buildings, hardstand surfaces at the site and the data gap investigation works.

8.9.1 Validation Approach

The consultant (ZOIC 2016b) reported that the objective of the validation program is to ensure that at the completion of the remediation works, the site is suitable for the proposed land use. The validation program is to be implemented as follows, following the removal of all buildings, hardstand surfaces at the site and the data gap investigation works.

Area 1 – Asbestos Lot 346

- A minimum of nine surface validation samples are to be collected across a 1 m grid across the 900 m^2 area.
- If the depth of the excavation is to extend to a depth of greater than 0.5 m bgs, then wall validation samples will be required at 1 sample per 10 m lineal metres.
- 500 g samples will be collected and analysed for asbestos in accordance with NEPC 2013.

Area 2 – Lot 345 (if required)

- A minimum of five validation samples (4 wall samples and one base samples) will be collected and submitted for analysis of PAHs.

Waste Classification for Offsite Disposal

- Collection of 1 sample per 100 m^3 of stockpiled materials.
- Collection of nine waste classification from Area 1.
- Collection of one sample from Area 2, if required.
- Samples to be submitted for analysis of TPH, BTEX, PAHs, heavy metals, asbestos and possible TCLP testing.

Stockpile Footprint (if not placed on hardstand / plastic)

- One sample per 100 ^{m3} to be collected and analysed for metals, TPH, BTEX, PAHs and asbestos.

Data Gap 1

- Installation of eight testpits within the building footprint at Lot 346.
- Installation of eight testpits within the building footprints located at Lot 345.
- Installation of three testpits in the vicinity of the AST footprint (lot 345).
- Installation of one testpits beneath the former in-ground pit (Lot 345).
- Samples will be collected at the near surface, then at 0.5 m or where a change in lithology is encountered. A minimum of two samples will be collected from each location.
- Samples will be submitted for the analysis of metals, TPH, TEX, PAHs, Phenol, asbestos and selected VOCs.

Data Gap 2

- Five validation testpits will be installed from the walls and floor of the former UST area.

- No fill points, bowsers or associated fuel lines were identified during the DP 2015 investigation works, however if these are uncovered during the excavation works, targeted validation works will be undertaken as follows:
    - 1 sample per bowser;
    - 1 sample per fill point; and
    - 1 sample per 5 m of fuel line.
- Soil samples will be analysed for TPH, BTEX, PAHs and heavy metals.
- Groundwater sampling of MW2 and analysis for TPH, BTEX, VOCs and metals.

Data Gap 3

- Installation of 12 testpits across a grid-based pattern across Lot 345.
- Near-surface samples will be collected for the analysis of asbestos in accordance with NEPC 2013.
- Deeper samples to be collected, if required, for delineation purposes.

Hot-Spot Removal (Contingency)

- The consultant reported that if areas of impact, greater than Area 1 and Area 2 are identified during the demolition works, then additional excavation and remediation works will be required. The consultant proposed the collection of five validation samples from the excavation of walls and base, as required.
- As a minimum, soil samples will be analysed for TPH, BTEX, PAHs, metals and asbestos.

Imported Fill

- Where required, and following successful validation of insitu soils, excavations will be backfilled using validated excavated natural material (ENM) or virgin excavated natural material (VENM) imported to the site.
- If the imported material requires testing, samples will be submitted for analysis of metals, TPH. BTEX, PAHs, OCPs, PCBs and asbestos. Testing will be conducted prior to importation to the site.
- A minimum of three soil samples will be analysed per source site, with one additional sample per 500 m3.
- Any other beneficial use of imported material (such as ENM or roadbase) will be required to be assessed in accordance with the requirements of the Exemptions issued under Part 6, Clause 51 and 51a of the Protection of the Environment Operation (waste) Regulation 2005.

QA/QC Samples

- Duplicate samples and rinsate blanks / trip blanks will be analysed for TPH, BTEX, PAHs, metals and/or asbestos.
- Trip spikes will be analysed for BTEX only.

8.9.2 Validation Acceptance Criteria

The consultant (ZOIC 2016b) reported that the soil and bedrock validation acceptance criteria established for the site is based on the NEPC 2013 and includes the following:

- Health Based Investigation Levels (HIL) A – Residential with garden / accessible soils (including childcare centres), for 195 Fifteenth Avenue. Even though the layout of this part

of the site has not been finalised, it is understood that this portion will contain the proposed childcare centre and as such will be assessed under the most conservative landuse criteria.

- HIL D – Commercial / Industrial, for 185 Fifteenth Avenue, identified as Lot 345.
- Soil Health Screening Levels (HSLs) The HSLs have been applied to assess human health risks via the inhalation and direct contact pathways of exposure. HSL A and HSL B for soils > 4 m have been applied for 195 Fifteenth Avenue; whilst HSL D Commercial for soils > 4 m have been applied 185 Fifteenth Avenue.
- Ecological Investigation Levels (Interim EILs) for metals, DDT and naphthalene. The EILs are applicable for areas proposed for landscaping and any growing media that may be imported to the site for landscaping purposes. EILs for commercial will apply for 185 Fifteenth Avenue; whilst EILs for urban residential will apply for 195 Fifteenth Avenue.
- Ecological Screening Levels (ESLs) for TPH C6-C40 fractions, BTEX and B(a)P. ELS have been applied to assess risks t terrestrial ecosystems within the top 2 m of coarse of fine soil at the final surface / ground level. The ESL for commercial has been applied for 185 Fifteenth Avenue; whilst ESL for urban residential has been applied for 195 Fifteenth Avenue.
- Freshwater Groundwater Investigation Levels (as per ANZECC and ARMCANZ 2000) have been applied to assess groundwater conditions. IN the absence of the freshwater GILs, the Drinking Water Guidelines (NHMRC 2011) will be applied.
- Groundwater Health Screening Levels (HSLs) for vapour intrusion for TPH, BTEX and naphthalene for commercial (clay) setting.

8.9.3 Validation Sampling Methodology

The consultant (ZOIC 2016b) reported that the validation soil samples will be collected according to the procedures outlined as follows:

- Based on the nature of the shallow extent of excavation associated with Area 1 and Area 2, if\ required, a hand trowel will be used for collecting soil validation samples; the equipment will be rinsed with deionised water and phosphate free detergent (Decon 90) between sampling locations. New nitrile gloves will be used to collect each sample.
- If deeper excavations are required, validation samples will be collected from the excavator bucket or directly from the excavation wall by using a decontaminated stainless steel trowel or by hand with nitrile gloves. Where samples are collected from the excavator bucket, the sample will be obtained from the centre of the bucket to minimise the potential for cross-contamination and to ensure a representative sample is obtained.
- All laboratory supplied sample containers will be clearly labelled with a sample number, sample location, sample depth, sample date and samplers initials. The sample containers will then transferred into an esky for shipment to the testing laboratory for analysis. COC documentation will be completed, and forwarded with the samples to the testing laboratory. Sample analysis is to be conducted NATA accredited laboratory in accordance with NATA approved methods.
- A PID will be used for all data gap works associated with the hydrocarbon contamination including base and wall sample collection from the UST area; beneath former diesel ASTs; potential spill area; beneath in-ground inspection pit; and, beneath workshop buildings. Sample collection methods will be recorded and reported, with rationale for sample selection.
- Based on the validation sampling results, one of the following actions will be taken:

- If some of the validation samples fail to meet the remediation criteria, the soils identified as failing the remediation criteria will be further excavated. Further validation of these areas will be required.
- If some of the validation samples fail the remediation criteria and further excavation is not considered practicable, alternate remedial strategies and / or risk assessment to assess the significance of the remaining contamination may be considered.
- If all validation samples meet the remediation criteria, no further remedial works will be required.

8.9.4 Quality Assurance and Quality Control (QA/QC)

The consultant (ZOIC 2016b) reported that data quality objectives (DQO) for the validation process were developed in accordance with the seven step process referred to in EPA 2006.

The consultant (ZOIC 2016b) provided both a field and laboratory QA/QC program will be conducted during the validation works.

The consultant (ZOIC 2016b) reported that the field QA/QC will consist of the following:

- Collection and analysis of 'blind and split duplicates' at a rate of 1 duplicate per 20 samples;
- Collection of rinsate samples to determine the potential for cross-contamination between samples occurring due to sampling equipment for both soil and groundwater, at a rate of 1 sample per day per equipment; and
- Collection of trip blanks and spikes for both soil and groundwater.

Laboratory QA/QC will consist of the following procedures:

- Analysis and reporting of laboratory duplicate samples.
- Analysis and reporting of laboratory method blank samples.
- Analysis and reporting of laboratory control samples.
- Analysis and reporting of laboratory control spikes, matrix and surrogate spikes.

The consultant (ZOIC 2016b) reported the proposed validation works will include the use of laboratories which are NATA accredited for the chemical analyses undertaken. Laboratory analysis will be conducted in accordance with NEPC and are referenced to USEPA methods. The analytical schedule, laboratory methods, laboratory LORs and reference methods to be applied for the validation works must be appropriate to meet the project DQOs and DQIs.

8.9.5 Validation Report

The consultant (ZOIC 2016b) reported at the completion of the remediation and validation of the site a Validation Report is required to be completed by the consultant. The Validation Report is required to be written in compliance with the relevant requirements of the EPA guidelines and other applicable guidelines and will be provided to the site auditor for review and endorsement, with a SAR and SAS issued outlining the suitability of the site for the intended use. The validation report will also provide a statement as to whether the objectives of the remediation works have been met. The consultant (ZOIC 2016b) reported the Validation Report must contain information including, but not limited, to the following:

- Details on the scope of remediation works completed including justification of any deviations from the RAP during the works;
- Details of any unexpected finds during the remedial works program, including details of management, materials tracking and validation;

- Results of all the data gap sampling completed in accordance with the RAP;
- Results of all validation sampling undertaken during the remediation works;
- Details of QA/QC data acceptance;
- Details on waste classification, tracking and offsite disposal documentation;
- Waste classification and landfill licenses;
- Details of any environmental incidents that occurred at the site during the remediation works and actions taken in response to these incidents;
- Clear statement of the suitability of the site for the proposed future landuse; and
- Details of any areas of the site where contamination was identified extending beyond the site boundary, if appropriate, and requirements to manage this.

8.10 Audit Findings

Remediation Objective and Approach

The auditor considers that the consultant's nominated remediation objectives, as discussed in ZOIC 2016 b, were appropriate and consistent with the proposed site landuses.

Based on the nature and extent of the proposed future redevelopment of the site and the identified contamination, the auditor accepts that the remediation approach was appropriate and consistent with relevant NSW EPA guidance, and was found to be:

- Technically feasible.
- Environmentally justifiable.
- Consistent with relevant laws, policies and guidelines.

The consultant nominated relevant regulatory approvals and licenses required prior to commencing site works. The remediation works have been classified as Category 2 in accordance with SEPP 55. Based on this, notification will be required to Liverpool Council 30 days prior to commencement of site works. The auditor requires that copies of all relevant notifications and approvals are provided in the validation report.

The soil validation acceptance criteria nominated by the consultant have been checked against and were generally consistent with the criteria endorsed by the EPA. The auditor notes that as part of the soil validation process, consideration will also be given to aesthetic issues (i.e, odours).

The proposed validation approach and sampling methodology is generally in accordance with EPA requirements and meets the requirements of the audit. The proposed actions to address the identified data gaps are also considered to be in accordance with relevant EPA requirements.

Based on the nature and extent of contamination, excavations are not expected to extend to the water table, i.e, greater than 5 m bgs. However two dams are located within 195 Fifteenth Avenue. As part of recommendations in the investigation report for 95 Fifteenth Avenue, the consultant (ZOIC 2016a) provided brief comment regarding the dams, stating that in the event the dams are to be drained as part of the future redevelopment works, further analysis will be required.

Upon successful completion of the remediation and validation activities, the consultant (ZOIC 2016b) stated a validation report will be prepared. The auditor notes the report will need to be prepared in accordance with the requirements of EPA 2011 and EPA 2006 and other relevant endorsed EPA guidelines, and should also include, but not limited to the groundwater contour plans and site survey plans.

The site management provisions appear to broadly control the potential impacts associated with the proposed remediation works, and appear adequately protective of both the remediation workforce and the surrounding environment (including the neighbouring community). However the auditor notes that as part of the preparation of the plans, consideration should also be given to control measures which may be implemented to minimise hydrocarbon odours; and the requirements of air monitoring, both odours and asbestos.

The remediation strategy proposed for the site is considered appropriate for the site given the identified contamination issues, and is able to make the site suitable for the proposed uses. As such, the proposed remediation and validation work process, as detailed in the RAP (ZOIC 2016b) meets the requirements of the site audit.

9. Evaluation of Landuse Suitability

In assessing the suitability of a site for an existing or proposed landuse in an urban context, the decision process for assessing urban redevelopment sites should be followed (Page 50 and 51, EPA 2006), as discussed in the following sections.

9.1 Reporting in accordance with EPA requirements

The documents provided by the consultant have been checked against, and meet the requirements of, OEH 2011. As such, the reporting of the site investigation and proposed remediation/validation process is considered to be appropriate and meets the requirements of this audit.

9.2 Aesthetics have been addressed

As part of the site investigation works, consideration was given to odours, discolouration and the presence of foreign materials. Furthermore, these considerations have also been appropriately included in the remediation and validation works required to be undertaken at the site in the RAP (Zoic 2016b). As such, aesthetic issues are considered to have been adequately addressed.

9.3 Soils have been assessed against the appropriate investigation levels

The criteria adopted by the consultants for the site investigation process have been checked against, and are consistent with, appropriate criteria endorsed by the EPA for the proposed landuses at the site, as they apply to the relevant parts of the site.

The proposed criteria to be adopted as part of the remediation and validation works are also consistent with criteria endorsed by the EPA relevant to the proposed landuses.

On this basis, soils are considered to have been assessed against appropriate investigation levels.

9.4 Background soil concentrations have been adequately addressed

During the site investigation works, there were no issues relating to background soils identified. As such, there is no requirement to address issues relating to background soil concentrations at the site.

9.5 All impacts of chemical mixtures have been assessed

No issues relating to chemical mixtures in relation to the identified contaminants of concern were identified by the consultants. Hence, there was no requirement to give any further consideration to the impact of chemical mixtures.

9.6 Site Management Strategy is Appropriate

The proposed remediation works at the site, as documented in the RAP (Zoic 2016b) are considered to be: technically feasible; environmentally justifiable; and consistent with relevant laws, policies and guidelines. On the basis that this is consistent with the requirements outlined in DEC 2006, the site management strategy is considered appropriate.

9.7 Contaminant migration (actual or potential) has been addressed

The consultant addressed both the potential and actual migration of the identified contaminants of concern through an assessment of soil and groundwater during the investigations. While impacts to groundwater have been identified in the former UST location, there is no evidence that contamination has migrated, or will migrate, from the site and/or pose any unacceptable risks to either on-site or off-site receptors. As such, the requirements of the site audit in relation to consideration of contaminant migration have been met.

10. Audit Summary Opinion

On the basis of the findings of the site audit, and subject to the limitations in **Section 11**, the following summary opinions are provided:

- The site investigation activities are considered to have met generally met the requirements of the Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition) (DEC 2006). Where the investigations did not met the requirements, these have been acknowledged and appropriate data gap actions have been documented in the RAP prepared for the site (Zoic 2016b).
- The investigations undertaken at the site have identified the need for remediation works in order to make the site suitable for the proposed uses. The RAP developed for the site (Zoic 2016b) documents the required actions to address the identified contamination issues and the proposed remediation works are considered to be: technically feasible; environmentally justifiable; and consistent with relevant laws, policies and guidelines, as per the requirements of DEC 2006.
- An assessment of groundwater at the site identified the presence of petroleum-based impacts which appear to be associated with the former UST. However, there is no evidence that contamination has migrated, or will migrate, from the site and/or pose any unacceptable risks to either on-site or off-site receptors.
- Following the implementation of the RAP (Zoic 2016b), a validation report must be prepared by a suitably qualified and experienced contaminated land consultant to demonstrate that the remedial works and data gap verification works were appropriately undertaken. A site auditor should review the remediation and validation works in order to confirm the suitability of the site prior to occupation for the proposed uses.
- In relation to landuse suitability, the following is concluded:
    - For SAS-0503-1613-1: 185 Fifteenth Ave, identified as Lot 345 DP2475, can be made suitable for commercial/industrial use, as defined in NEPC 2013, subject to implementation of the RAP (Zoic 2016b); and
    - For SAS-0503-1613-2, 195 Fifteenth Ave, identified as Lot 2 DP307334, Lots 304-306 DP2475 and Lot 346 DP2475, can be made suitable for commercial/industrial use, parks/open space use and childcare use, as defined in NEPC 0213, subject to implementation of the RAP (Zoic 2016b).

11. Limitations

This audit was conducted with a reasonable level of scrutiny, care and diligence on behalf of the client for the purposes outlined in the Contaminated Land Management Act 1997. The data used to support the conclusions reached in this audit were obtained by other consultants and the limitations which apply to the consultant's report(s) apply equally to this audit report.

Every reasonable effort has been made to identify and obtain all relevant data, reports and other information that provide evidence about the condition of the site, and those that were held by the client and the client's consultants, or that were readily available. No liability can be accepted for unreported omissions, alterations or errors in the data collected and presented by other consultants. Accordingly, the data and information presented by others are taken and interpreted in good faith.

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

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

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

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G and the Site Auditor reserve the right to review the report in the context of the additional information, subject to meeting relevant guideline requirements imposed by the EPA.

Appendix A Guidelines made or approved by the EPA

Guidelines made or approved by the EPA (s.105 CLM Act 1997)

Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Paper No 4, 2000 (ANZECC/ARMCANZ 2000)

Australian Drinking Water Guidelines, National Health and Medical Research Council and Agriculture and Resource Management Council of Australia and New Zealand, 2011 (NHMRC/NRMMC 2011)

Composite Sampling, Lock, W. H., National Environmental Health Forum Monographs, Soil Series No.3, 1996, SA Health Commission, (NEHF 1996)

Contaminated Sites: Sampling Design Guidelines, NSW EPA, 1995 (EPA 1995)

Contaminated Sites: Guidelines for the Vertical Mixing of Soil on Former Broad-Acre Agricultural Land, NSW EPA, 1995 (EPA 1995b)

Contaminated Sites: Guidelines for the Assessment and Clean Up of Cattle Tick Dip Sites for Residential Purposes, NSW Agriculture and CMPS&F Environmental, February 1996 (NSW Agr. 1996)

Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites, NSW OEH, 2011 (OEH 2011)

Contaminated Sites: Guidelines for Assessing Banana Plantation Sites, NSW EPA, 1997 (EPA 1997)

Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens, NSW EPA, 2005 (EPA 2005)

Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd Edition), NSW DEC, 2006 (DEC 2006)

Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination, NSW DEC, March 2007 (DEC 2007)

Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, NSW EPA, September 2015 (EPA 2015)

Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards, Department of Health and Ageing and EnHealth Council, Commonwealth of Australia, June 2002 (EnHealth 2002)

National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013, National Environment Protection Council (NEPC 2013)

Appendix B Audit Correspondence

Sahani Gunatunge

From: Andrew Lau
Sent: Wednesday, 25 May 2016 2:06 PM
To: Luke Wilson
Cc: tim.ireson@wspt.nsw.gov.au; Graeme Malpass; Sahani Gunatunge; Andrew Lau
Subject: FABH- Audit Comments on Reports
Attachments: Urban Design Plan.pdf

Luke,

I've reviewed the contamination reports prepared for the 185 and 195 Fifteenth Avenue West Hoxton properties and have the following comments:

In order for me to issue a statement confirming that the site can be made suitable for the proposed uses, a Remedial Action Plan (RAP) needs to be prepared to address the contamination issues identified in both the ZOIC report and the Douglas Partners (DP) report.

In preparing the RAP, please ensure the following is addressed:

- The contamination issues identified in both reports;
- The data gaps/uncertainties which are outline in the Zoic report which relate to sampling/analysing parts of the #195 property;
- At the #185 property, I'm concerned that the nature of the DP investigations (boreholes and 40 g samples) do not provide sufficient confidence as to the likely presence of asbestos in fill materials and this will need to be addressed as part of the site validation process. It is further noted that, for due diligence purposes prior to commencing construction, you may wish to consider excavating some exploratory testpits on #185 to gain a better understanding as to whether the fill material at this property contains asbestos and, if present, put appropriate plans in place throughout the construction phase. The RAP should include contingency actions for dealing with asbestos should it be encountered during either the remediation or construction works;
- At the #185 property, further validation of the former underground tank pits (now backfilled) will be required and the RAP should detail contingency actions – presumably excavation of impacted soils – if additional hydrocarbon impacts are identified during this process;
- At the #185 property, the same process of additional sampling beneath buildings should occur in the same manner as what is required on the #195 property; and
- Please include a site boundary plan consistent with the urban design plan if this is the intended boundary of the audit.

If I have any additional comments following tomorrow's scheduled site visit, I will provide them before the end of this week.

Please call if you have any queries or would like to discuss.

Kind regards,
Andrew

Andrew Lau | Managing Director, Accredited Auditor | JBS&G
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Contaminated Land | Groundwater Remediation | Auditing and Compliance | Assessments and Approvals | Occupational Hygiene and Monitoring

From: Luke Wilson [mailto:LWilson@hansenyuncken.com.au]
Sent: Wednesday, 25 May 2016 9:27 AM
To: Andrew Lau <ALau@jbsg.com.au>
Cc: tim.ireson@wspt.nsw.gov.au
Subject: RE: FABH- Site Audit PSC

Andrew,

As discussed the site will consist of the following uses per the EIS;

TABLE 4 – Lot Details

Lot	*Conceptual Land Use*	*Site Area*	*Conceptual GFA*
1	Fast Food	5,595m^2	400m^2
2	Large Format Retail	5,655m^2	1,500m^2
3	Service Station	4,690m^2	250m^2
4	Retail/Business/Supermarket	14,260m^2	2,700m^2
5	Child Care Centre	4,550m^2	500m^2
6	N/A (Subject to future development application)	5,590m^2	-
7	Detention	1,173m^2	-
8 (Part Lot)	Road Reserve	3,504m^2	-
8 (Part Lot)	Residue	4.716ha	-

I have attached the latest urban design plan by LFA for your reference. Let me know if you require anything further.

Regards,

Luke Wilson
Assistant Development Manager

Hansen Yuncken Pty Ltd
M 0400 506 926 **T** 02 9770 7600

Sahani Gunatunge

From: tim.ireson@wspt.nsw.gov.au
Sent: Wednesday, 1 June 2016 7:31 PM
To: Andrew Lau; Luke Wilson
Cc: Graeme Malpass; Sahani Gunatunge
Subject: RE: FABH- Audit Comments on Reports

Hi Andrew,

In response to your email below I provide the following response. Can you please review and confirm so I can understand next steps.

- **185 Fifteenth Avenue (Douglas Partners)**
  - Our understanding from Douglas Partners was that a Remediation Action Plan was not required. The conclusions / recommendations they noted were construction related items based on Unexpected Finds Protocol & items relating to the demolition of buildings – which would require a clearance certificate from an accredited firm (i.e. does not need to form part of a RAP).
    - Hazardous Building Survey: **Will be undertaken by licenced contractor in accordance with Workcover during demolition.**
    - Demolition: **Will be undertaken by licenced contractor in accordance with Workcover during demolition.**
    - Hydrocarbon Odours: **Standard construction requirements and would be assessed for lawful disposal as required.**
    - Surplus Soil: **Standard construction requirements**
    - Unexpected Finds Protocol: **Standard construction requirements**
    - Child Care: **Child care is not proposed on this site – N/A**
- **195 Fifteenth Avenue (ZOIC)**
  - Our understanding from ZOIC was that a Remediation Action Plan was not required. The conclusions / recommendations they noted were items which a licensed demolition contractor will undertake as part of WorkCover requirements.construction related items based on Unexpected Finds Protocol & items relating to the demolition of buildings – which would require a clearance certificate from an accredited firm (i.e. does not need to form part of a RAP).
    - Hazardous Building Survey: **Will be undertaken by licenced contractor in accordance with Workcover during demolition.**
    - Asbestos Removal: **Will be undertaken by licenced contractor in accordance with Workcover during demolition – why is a RAP required (LW TO F/U WITH ZOIC)**
    - Unexpected Finds Protocol: **Standard construction requirements**
    - Demolition: **Will be undertaken by licenced contractor in accordance with Workcover during demolition.**
    - De-watering of dam: **A detailed note on dewatering and filling can be found within Costin Roe's originally lodged Civil Works Plans on Drawing No. CO11995.00DA30 Rev D. This was requested by Department of Primary Industries during the Planning Phase & covered off.** http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6407
    - Rubbish: **Standard construction requirements**

Just need to be clear on the extent on any further works and to narrow down the scope as applicable. In reading your comments it seems as though the RAP is more a document which the civil/demo contractor should consult during their works (rather than having an Environmental Consultant engaged to provide a Validation Report)? I am unsure how this would work. Would this be a Work Plan which would be consulted and a hygienist providing sign off for JBS&G to provide final SAR/SAS?

Thanks for your time mate and we look forward to hearing from you.

Regards

Tim Ireson
0437 945 499

From: Andrew Lau [mailto:ALau@jbsg.com.au]
Sent: Wednesday, 25 May 2016 2:06 PM
To: Luke Wilson
Cc: Tim Ireson; Graeme Malpass; Sahani Gunatunge; Andrew Lau
Subject: FABH- Audit Comments on Reports

Luke,

I've reviewed the contamination reports prepared for the 185 and 195 Fifteenth Avenue West Hoxton properties and have the following comments:

In order for me to issue a statement confirming that the site can be made suitable for the proposed uses, a Remedial Action Plan (RAP) needs to be prepared to address the contamination issues identified in both the ZOIC report and the Douglas Partners (DP) report.

In preparing the RAP, please ensure the following is addressed:

- The contamination issues identified in both reports;
- The data gaps/uncertainties which are outline in the Zoic report which relate to sampling/analysing parts of the #195 property;
- At the #185 property, I'm concerned that the nature of the DP investigations (boreholes and 40 g samples) do not provide sufficient confidence as to the likely presence of asbestos in fill materials and this will need to be addressed as part of the site validation process. It is further noted that, for due diligence purposes prior to commencing construction, you may wish to consider excavating some exploratory testpits on #185 to gain a better understanding as to whether the fill material at this property contains asbestos and, if present, put appropriate plans in place throughout the construction phase. The RAP should include contingency actions for dealing with asbestos should it be encountered during either the remediation or construction works;
- At the #185 property, further validation of the former underground tank pits (now backfilled) will be required and the RAP should detail contingency actions – presumably excavation of impacted soils – if additional hydrocarbon impacts are identified during this process;
- At the #185 property, the same process of additional sampling beneath buildings should occur in the same manner as what is required on the #195 property; and
- Please include a site boundary plan consistent with the urban design plan if this is the intended boundary of the audit.

If I have any additional comments following tomorrow's scheduled site visit, I will provide them before the end of this week.

Please call if you have any queries or would like to discuss.

Kind regards,
Andrew

Andrew Lau | Managing Director, Accredited Auditor | JBS&G
Sydney | Melbourne | Adelaide | Perth | Brisbane
Level 1, 50 Margaret Street Sydney NSW 2000
T: 02 8245 0300 | M: 0412 512 614 | www.jbsg.com.au
Contaminated Land | Groundwater Remediation | Auditing and Compliance | Assessments and Approvals | Occupational Hygiene and Monitoring

From: Luke Wilson [mailto:LWilson@hansenyuncken.com.au]
Sent: Wednesday, 25 May 2016 9:27 AM
To: Andrew Lau <ALau@jbsg.com.au>
Cc: tim.ireson@wspt.nsw.gov.au
Subject: RE: FABH- Site Audit PSC

Andrew,

As discussed the site will consist of the following uses per the EIS;

TABLE 4 – Lot Details

Lot	*Conceptual Land Use*	*Site Area*	*Conceptual GFA*
1	Fast Food	5,595m^2	400m^2
2	Large Format Retail	5,655m^2	1,500m^2
3	Service Station	4,690m^2	250m^2
4	Retail/Business/Supermarket	14,260m^2	2,700m^2
5	Child Care Centre	4,550m^2	500m^2
6	N/A (Subject to future development application)	5,590m^2	-
7	Detention	1,173m^2	-
8 (Part Lot)	Road Reserve	3,504m^2	-
8 (Part Lot)	Residue	4.716ha	-

I have attached the latest urban design plan by LFA for your reference. Let me know if you require anything further.

Regards,

Luke Wilson
Assistant Development Manager

Hansen Yuncken Pty Ltd
M 0400 506 926 **T** 02 9770 7600

Sahani Gunatunge

From: Andrew Lau
Sent: Friday, 24 June 2016 2:49 PM
To: Luke Wilson; tim.ireson@wspt.nsw.gov.au
Cc: Sahani Gunatunge; Andrew Lau
Subject: FABH- Audit Comments on draft RAP

Luke/Tim,

I've reviewed the draft RAP and have the following comments:

- s.1 / s.16. In the introduction the RAP relates to the southern three lots on Fifteenth avenue, with `the site' including the additional lands to the north. The conclusions relate the `the site' rather than the proposed FABH development. I accept the conclusions if they apply only to the proposed FABH development (i.e., the southern three lots), but don't if they are intended to include the northern lands as well. In my comments on the previous reports, I requested that a site boundary plan be provided consistent with the urban design plan if this is the intended boundary of the audit. Can you please confirm and provide.

- s.2 / figure 2. Please revisit what is being referred to as `the site'. Refer to previous comment.

- s.4/5. Please include a conceptual site model consistent with the requirements of NEPC 2013.

- s.5.1. The estimation of impacted soil should be increased given that the asbestos was identified at the depth used in the volumetric calculation.

- s.5.2. The proposed additional works to address the data gaps are considered appropriate.

- s.9. Where remediation works in Area 1 extend below shallow surface levels (to be defined in the RAP), then wall validation samples will be required in addition to floor samples.

- s.10.8. If the validation works are to be audited (as indicated in Table 1.4) to confirm that the site is suitable for the proposed development, the assessment of imported fill and other imported materials such as recycled roadbase will be required. Please include proposed frequencies in the RAP consistent with the relevant guidance/exemptions.

- S.11. Please expand contingency actions for the identification of friable asbestos to be consistent with asbestos-related licensing requirements in s.13.1 and address what will happen to the immediate work area in the intervening notification period for friable work.

- s.13.2. Please demonstrate, by reference to s.149 certificates and matters under SEPP55, that the proposed works Category 2 works as claimed in the RAP.

Happy to discuss if anything's unclear or if you have any queries.

Regards,
Andrew

Andrew Lau | Managing Director, Accredited Auditor | JBS&G
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Sahani Gunatunge

From: Andrew Lau
Sent: Tuesday, 28 June 2016 1:10 PM
To: Luke Wilson
Cc: Tim Ireson; Andrew Lau; Sahani Gunatunge
Subject: RE: FABH- Final RAP

Luke,

Thanks for sending through. The responses generally address my comments, with the exception of the following:

- In relation to `the site' boundary, the response provided by Zoic is different to the plan you have previously provided me. Please clarify which land you are seeking the audit on then ensure the reports are consistent. At the moment, the consultant is defining the site boundary different to how you've defined it to me.
- In relation to the SEPP55 category 2 comment, I am requesting that the consultant provide the evidence why they believe the works are category 2 works. In order for them to do this, they will need to provide a s.149 (2&5) certificate for all of the land which is within `the site' as you define it, then they will need to confirm – by referring to the s.149 certificates – that the triggers for category 1 works are not met. The response provided below by the consultant does not tell me any more than what the RAP provided.

Please call if this is unclear or if you wish to discuss.
Regards,
Andrew

Andrew Lau | Managing Director, Accredited Auditor | JBS&G
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Level 1, 50 Margaret Street Sydney NSW 2000
T: 02 8245 0300 | M: 0412 512 614 | www.jbsg.com.au

From: Luke Wilson [mailto:LWilson@hansenyuncken.com.au]
Sent: Tuesday, 28 June 2016 12:52 PM
To: Andrew Lau <ALau@jbsg.com.au>
Cc: Tim Ireson <TIreson@hansenyuncken.com.au>
Subject: RE: FABH- Final RAP

Hi Andrew,

I have just sent you the final RAP via 'wetransfer' which reflects your comments. ZOIC have also provided a response in red which can be seen below.

Please feel free to call if you have any queries.

We look forward to progressing the SAS.

Regards,

Luke Wilson
Assistant Development Manager

Hansen Yuncken Pty Ltd
M 0400 506 926 **T** 02 9770 7600

From: Silja Kuerzinger [mailto:silja.kuerzinger@zoic.com.au]
Sent: Monday, 27 June 2016 1:20 PM
To: Luke Wilson <LWilson@hansenyuncken.com.au>
Cc: Tim Ireson <TIreson@hansenyuncken.com.au>
Subject: Zoic response to Auditor comments for FABH

Dear Luke

Please find below in **red** Zoic responses (and reference where the RAP has been updated).

Regards
Silja

From: Andrew Lau [mailto:ALau@jbsg.com.au]
Sent: Friday, 24 June 2016 2:49 PM
To: Luke Wilson <LWilson@hansenyuncken.com.au>; tim.ireson@wspt.nsw.gov.au
Cc: Sahani Gunatunge <SGunatunge@jbsg.com.au>; Andrew Lau <ALau@jbsg.com.au>
Subject: FABH- Audit Comments on draft RAP

Luke/Tim,

I've reviewed the draft RAP and have the following comments:

- s.1 / s.16. In the introduction the RAP relates to the southern three lots on Fifteenth avenue, with `the site' including the additional lands to the north. The conclusions relate the `the site' rather than the proposed FABH development. I accept the conclusions if they apply only to the proposed FABH development (i.e., the southern three lots), but don't if they are intended to include the northern lands as well. In my comments on the previous reports, I requested that a site boundary plan be provided consistent with the urban design plan if this is the intended boundary of the audit. Can you please confirm and provide.
  The 'site' relates to all six lots; the southern three lots form the proposed Stage 1 FABH; the northern three lots are to be subdivided (Stage 2); I would think that entire site can be closed out in one SAS/SAR.

- s.2 / figure 2. Please revisit what is being referred to as `the site'. Refer to previous comment.

- s.4/5. Please include a conceptual site model consistent with the requirements of NEPC 2013. Has been added (Section 6 of the RAP).

- s.5.1. The estimation of impacted soil should be increased given that the asbestos was identified at the depth used in the volumetric calculation.

The sample from TP2 was collected from 0.0- 0.2m; The asbestos fragments were identified across the surface of this area; It is considered appropriate and justifiable that the 900m2 area be scraped to 0.2m and then complete a walkover site inspection followed by validation sampling on a 10m grid.
Both DP and Zoic considered that the identified asbestos is likely to be associated with onsite maintenance works in the yard of the shed (rather than associated with imported fill material) – based on this, it is considered that 0.2m scraping is considered adequate for initial remedial works.
Further scraping/excavation will be completed if validation samples indicate that asbestos has not been removed.

- s.5.2. The proposed additional works to address the data gaps are considered appropriate.

- s.9. Where remediation works in Area 1 extend below shallow surface levels (to be defined in the RAP), then wall validation samples will be required in addition to floor samples.

Table 10.1 updated to include: If the depth of excavation is required to be extended beyond a depth of 0.5m, then wall validating samples will be required (1 per 10 lineal meters).

- s.10.8. If the validation works are to be audited (as indicated in Table 1.4) to confirm that the site is suitable for the proposed development, the assessment of imported fill and other imported materials such as recycled roadbase will be required. Please include proposed frequencies in the RAP consistent with the relevant guidance/exemptions.

  Section 11.8 updated to include:

  Any other beneficial use imported material (such as ENM, road base) will be required to be assessed in accordance with the frequency and analytical suites prescribed in the relevant Exemptions issued under Part 6, Clause 51 and 51a of Protection of the Environment Operations (Waste) Regulation 2005; Although the development layout has not been finalised, it is considered that these may include:

  - The Excavated Natural Material Exemption
  - The Recovered Aggregate Exemption
  - The 'Batch Process' Recovered Fines Exemption
  - The 'Continuous process' Recovered Fines Exemption

- S.11. Please expand contingency actions for the identification of friable asbestos to be consistent with asbestos-related licensing requirements in s.13.1 and address what will happen to the immediate work area in the intervening notification period for friable work.

  Table 12.1 updated to include Friable Asbestos corrective actions up until appointment of Class A Licenced Asbestos Contractor.

-

- s.13.2. Please demonstrate, by reference to s.149 certificates and matters under SEPP55, that the proposed works Category 2 works as claimed in the RAP.
- Not clear what Auditor means?
- The Liverpool Council 149 Certificates Golders Phase 1 do not make reference to Category 1 or Category 2 remediation.
- As indicated, Zoic have provided an opinion that the works are classified as Category 2 remediation (and thus do not require consent).
- Section 4.4.1 of the DUAP (1998) Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land guidelines specified when remedial works are considered Category 1 (requiring consent); Based on this, Zoic consider the small-nature of required works constitute Category 2 remediation. Council will have 30 days to verify whether they agree.

Happy to discuss if anything's unclear or if you have any queries.

Regards,
Andrew

Andrew Lau | Managing Director, Accredited Auditor | JBS&G
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Contaminated Land | Groundwater Remediation | Auditing and Compliance | Assessments and Approvals | Occupational Hygiene and Monitoring

Sahani Gunatunge

From: Luke Wilson <LWilson@hansenyuncken.com.au>
Sent: Monday, 4 July 2016 9:56 AM
To: Andrew Lau
Cc: Tim Ireson; Sahani Gunatunge
Subject: RE: FABH- Final RAP
Attachments: Appendix 3_ Draft Plan of Subdivision.PDF

Hi Andrew,

Thank you for taking my call this morning. Please see below clarification on the 'site boundary' to assist with your assessment.

The site covers an area of approximately 8.9 hectares which consists of six parcels of land, and is the subject of State Significant Development Application (SSD 6407). Under the SSD the following development works are proposed across the site:

- Three southern Lots [See green below] (Lot 345; Lot 346 and Lot 2) fronting Fifteenth Avenue are proposed for retail outlets, large format retail, fast food outlet, service station, central carpark and childcare facility in addition to internal roads and landscaped areas; and
- Three northern Lots [See orange below] (Lot 304; Lot 305 and Lot 306) are proposed to be subdivided. *Assume commercial type use.*

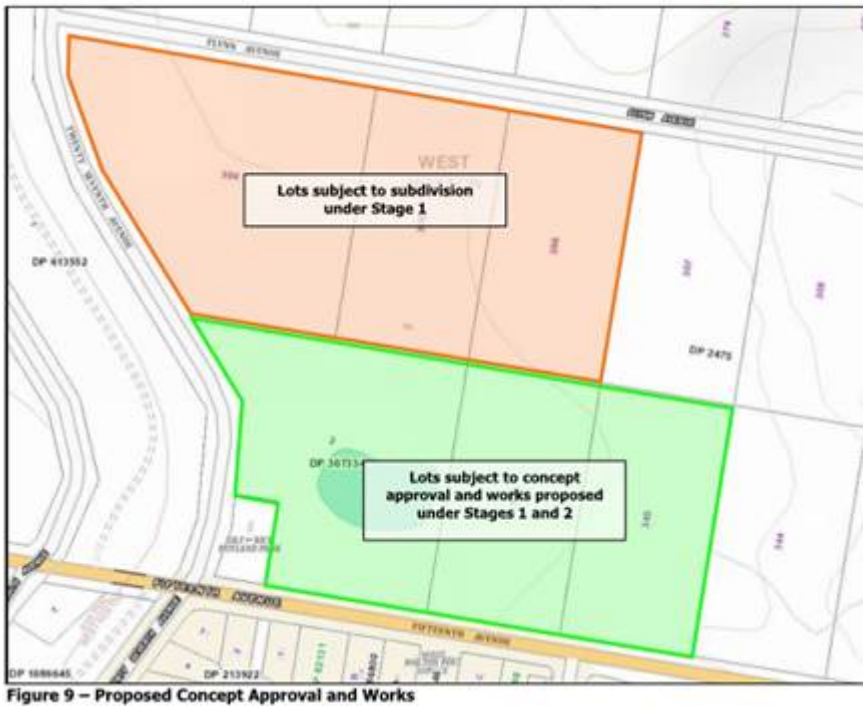

Figure 9 – Proposed Concept Approval and Works

See the following link for further information on this;
https://majorprojects.affinitylive.com/public/afe5dedfd254d061c9e2c0c965c2c510/Environmental%20Impact%20Statement.pdf

The childcare centre will be located on 195 Fifteenth Avenue.

I have attached the plan of subdivision as requested.

Please call if you have any queries on the above or if you require anything further. I will send through the updated report by ZOIC with further background information on the category 2 classification as per your request below, this will be sent via 'wetransfer' this afternoon.

As discussed based on the previous timing WSPT were expecting the SAS for this Thurdsay, therefore we are eager to progress the works as quickly as possible and hope you are able to assist.

Thanks again and speak soon.

Kind Regards,

Luke Wilson
Assistant Development Manager

Hansen Yuncken Pty Ltd
M 0400 506 926 **T** 02 9770 7600

From: Andrew Lau [mailto:ALau@jbsg.com.au]
Sent: Tuesday, 28 June 2016 1:10 PM
To: Luke Wilson <LWilson@hansenyuncken.com.au>
Cc: Tim Ireson <TIreson@hansenyuncken.com.au>; Andrew Lau <ALau@jbsg.com.au>; Sahani Gunatunge <SGunatunge@jbsg.com.au>
Subject: RE: FABH- Final RAP

Luke,

Thanks for sending through. The responses generally address my comments, with the exception of the following:

- In relation to `the site' boundary, the response provided by Zoic is different to the plan you have previously provided me. Please clarify which land you are seeking the audit on then ensure the reports are consistent. At the moment, the consultant is defining the site boundary different to how you've defined it to me.
- In relation to the SEPP55 category 2 comment, I am requesting that the consultant provide the evidence why they believe the works are category 2 works. In order for them to do this, they will need to provide a s.149 (2&5) certificate for all of the land which is within `the site' as you define it, then they will need to confirm – by referring to the s.149 certificates – that the triggers for category 1 works are not met. The response provided below by the consultant does not tell me any more than what the RAP provided.

Please call if this is unclear or if you wish to discuss.
Regards,
Andrew

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To: Andrew Lau <ALau@jbsg.com.au>
Cc: Tim Ireson <TIreson@hansenyuncken.com.au>
Subject: RE: FABH- Final RAP

Hi Andrew,

I have just sent you the final RAP via 'wetransfer' which reflects your comments. ZOIC have also provided a response in red which can be seen below.

Appendix C Site Plans

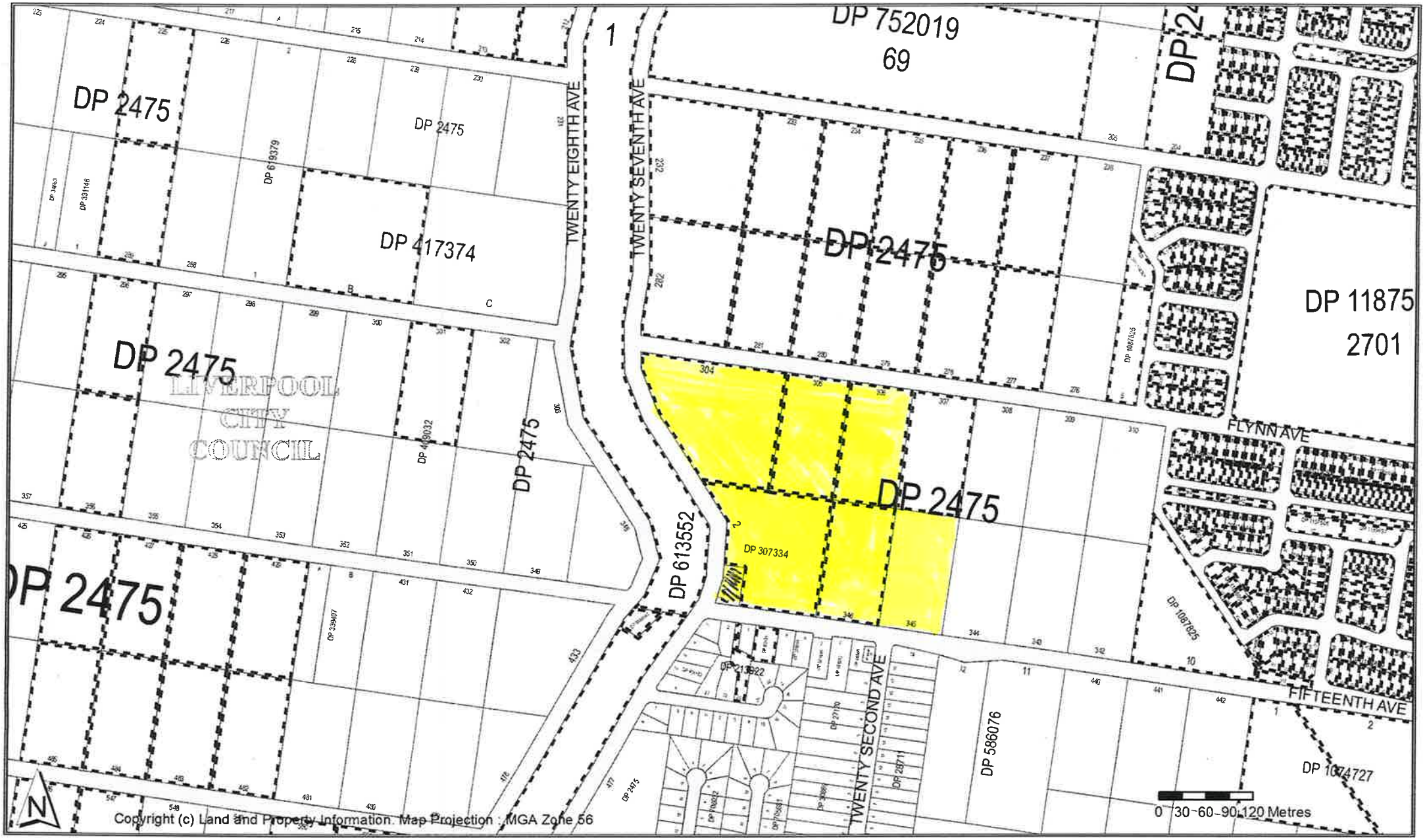
Land & Property Information

Cadastral Records Enquiry Report

Ref : MARK

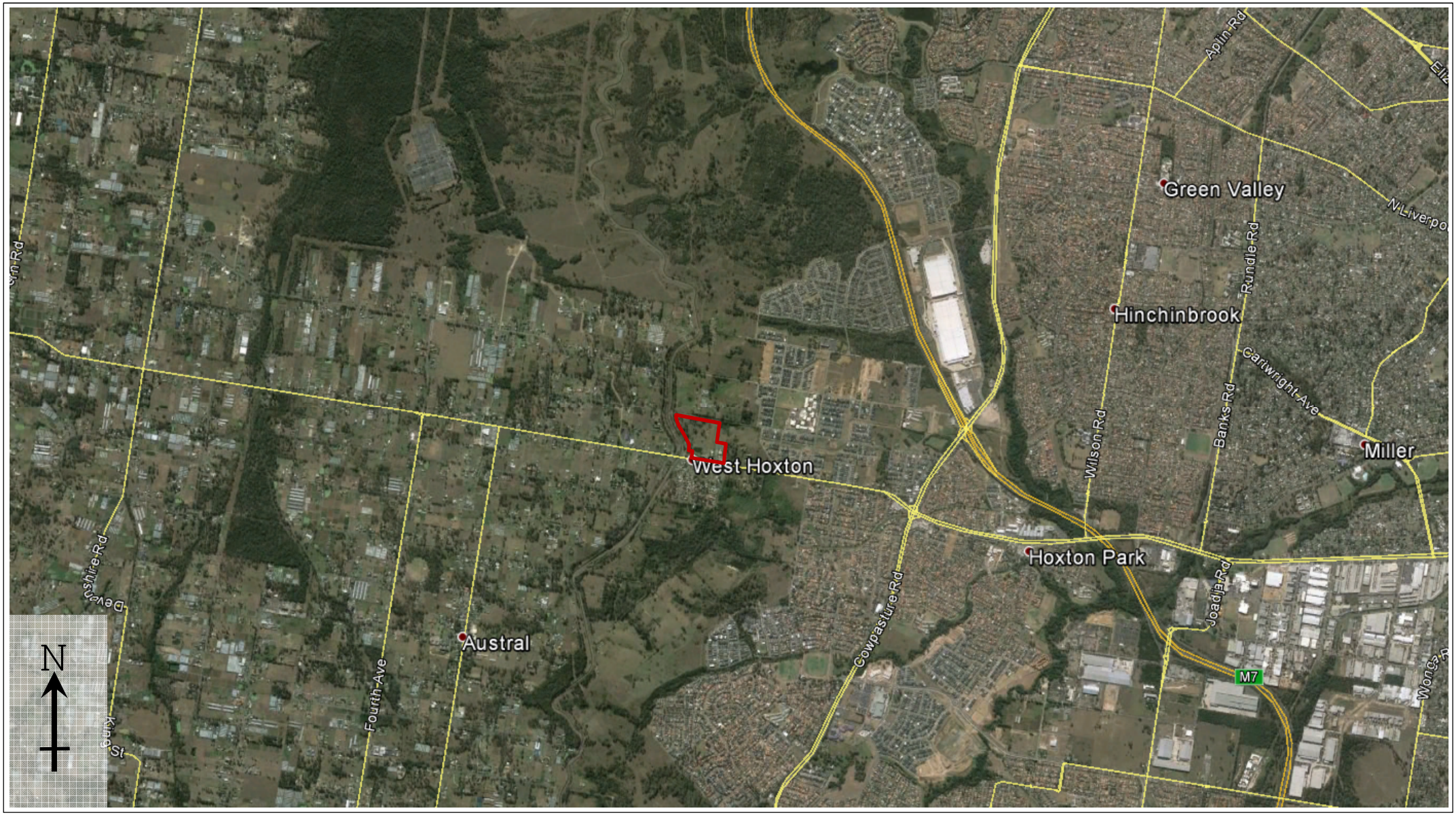
Requested Parcel : Lot 304 DP 2475 **Identified Parcel :** Lot 304 DP 2475

Locality : WEST HOXTON **LGA :** LIVERPOOL **Parish :** CABRAMATTA **County :** CUMBERLAND



Report Generated 10:15:55 AM, 8 July, 2016

This information is provided as a searching aid only. While every endeavour is made to ensure the current cadastral pattern is accurately reflected, the Registrar General cannot guarantee the information provided. For all ACTIVITY PRIOR to SEPT 2002 you must refer to the RGs Charting and Reference Maps.



LEGEND:

Site Boundary

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of nearmap.com

ZOIC Environmental Pty Ltd – www.zoic.com.au

Western Sydney Parklands Trust

June 2016

16058

FIGURE 1

Site Location Plan

Remediation Action Plan
185-195 Fifteenth Avenue, West Hoxton NSW

LEGEND:

- Site Boundary
- Zoic 2016 Area (195 Fifteenth Ave)
- DP 2015 Area (185 Fifteenth Ave)

Western Sydney Parklands Trust

June 2016

16058

FIGURE 2

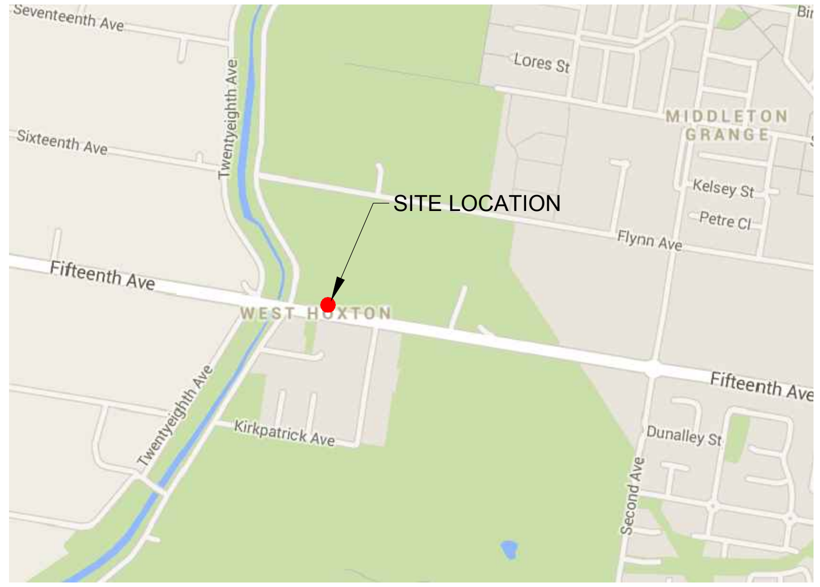
Site Layout Plan

Remediation Action Plan
185-195 Fifteenth Avenue, West Hoxton NSW

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of nearmap.com

Appendix D Consultant's Figures

Golder 2015a



LOCALITY PLAN
NOT TO SCALE

LEGEND

BOREHOLE LOCATIONS

REFERENCE
BASE SURVEY CONTOUR TAKEN FROM TOTAL SURVEYING SOLUTION DRAWING 15060_A.DWG, RECEIVED DATED 2015-02-10

nearmap
IMAGE DATED 24-05-2014
SOURCED WITH PERMISSION FROM NEARMAP ON 17-06-2014
IMAGE GEOREFERENCED BY GOLDER AND INTENDED FOR INDICATIVE PURPOSES ONLY
www.nearmap.com.au

0 50 100
1:2,000 METRES

CLIENT
WESTERN SYDNEY PARKLANDS TRUST

PROJECT
1□5 FIFTEENTH AVENUE, WEST HOXTON

CONSULTANT
Golder Associates

YYYY-MM-DD	2015-02-10
PREPARED	EJJ
DESIGN	AS
REVIEW	BMS
APPROVED	-

TITLE
INVESTIGATION LOCATIONS

PROJECT No.	REPORT	Rev.	FIGURE
147622023	003 - R	0	F001

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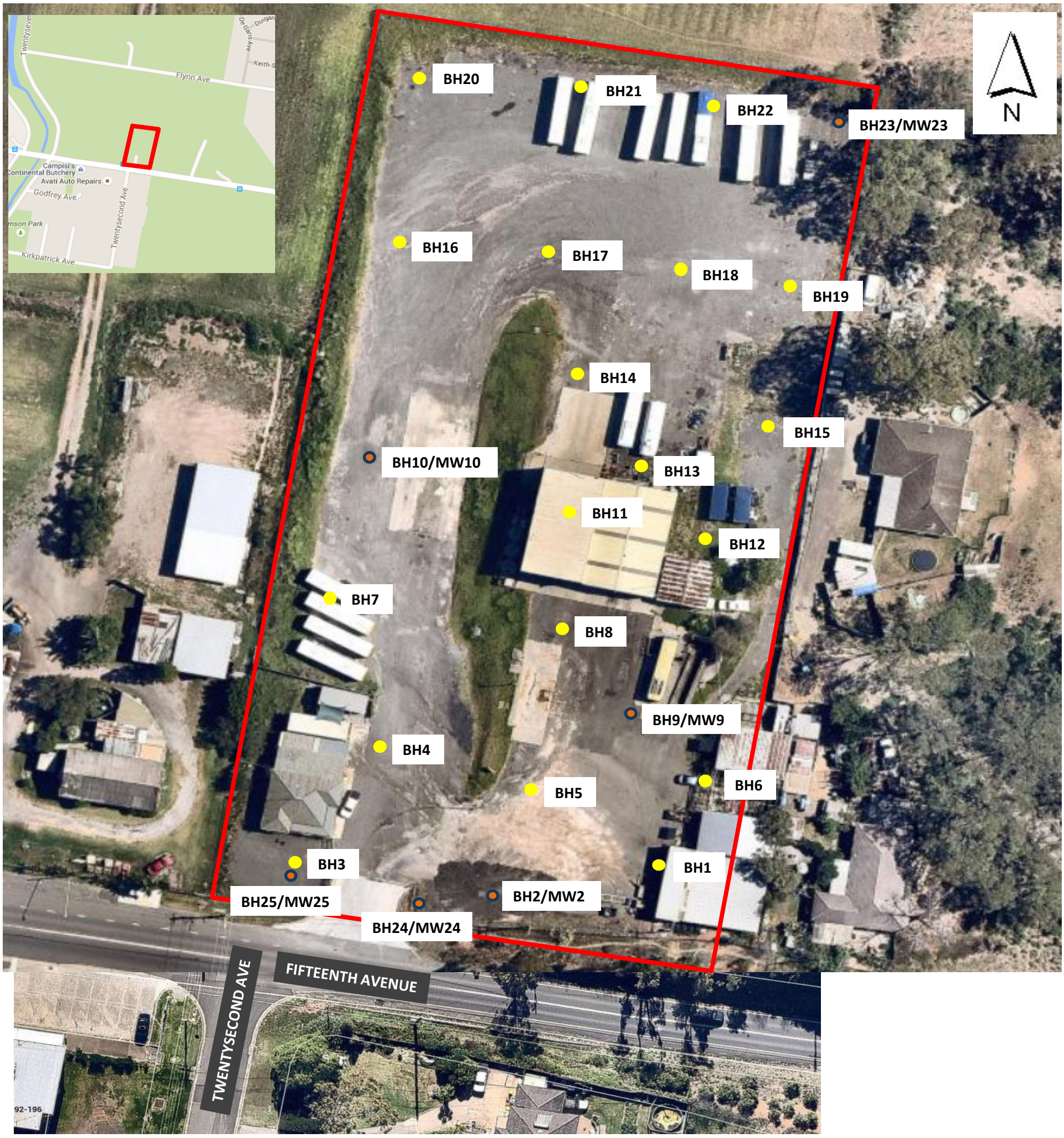
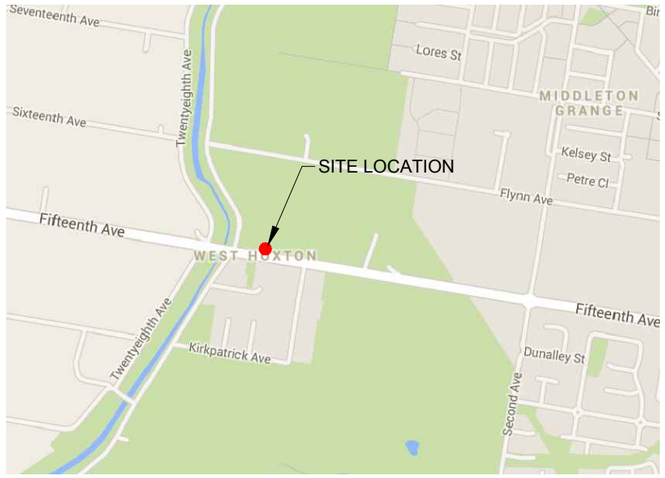


LEGEND

- Borehole
- Groundwater Monitoring Well
- Site Boundary

Douglas Partners Geotechnics / Environment / Groundwater	CLIENT: Western Sydney Parklands Trust	TITLE: **Borehole and Monitoring Well Locations** **185 Fifteenth Avenue, West Hoxton**	PROJECT No: 84801
	OFFICE: Sydney DRAWN: RJL		DRAWING No: 1
	SCALE: NTS DATE: 10 Jun 2015		REVISION: A

Golder 2015b



LOCALITY PLAN
NOT TO SCALE

LEGEND

- BOREHOLE LOCATIONS
- TEST PIT LOCATIONS
- ENVIRONMENTAL SAMPLE LOCATION
- EXISTING STUDY AREA FOR 195 FIFTEENTH AVE.

REFERENCE

BASE SURVEY CONTOUR TAKEN FROM TOTAL SURVEYING SOLUTION DRAWING 15060_A.DWG, RECEIVED DATED 2015-02-10

nearmap

IMAGE DATED 24-05-2014
SOURCED WITH PERMISSION FROM NEARMAP ON 17-06-2014
IMAGE GEOREFERENCED BY GOLDER AND INTENDED FOR INDICATIVE PURPOSES ONLY
www.nearmap.com.au

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1:2,000 METRES

CLIENT

WESTERN SYDNEY PARKLANDS TRUST

CONSULTANT

Golder Associates

YYYY-MM-DD	2015-04-21
PREPARED	EJJ
DESIGN	AS
REVIEW	BMS
APPROVED	CSC

PROJECT

195 FIFTEENTH AVENUE, WEST HOXTON

TITLE

195 FIFTEENTH AVENUE, WEST HOXTON INVESTIGATION LOCATIONS

PROJECT No.	REPORT	Rev.	FIGURE
147622023	001 - R	0	FIGURE 1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ISO A3

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LEGEND:

- 195 Fifteenth Avenue (current site)
- 185 Fifteenth Avenue
- Fifteenth Avenue Business Park

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

ZOIC Environmental Pty Ltd – www.zoic.com.au

Western Sydney Parkland Trust

16035

FIGURE 1

Fifteenth Avenue Business Park Site Boundary

Detailed Site Investigation,
195 Fifteenth Avenue, West Hoxton, NSW

LEGEND:

- Test pits
- Hand auger

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

ZOIC Environmental Pty Ltd – www.zoic.com.au

Western Sydney Parkland Trust

16035

FIGURE 2

Sampling Points

Detailed Site Investigation,
195 Fifteenth Avenue, West Hoxton, NSW

LEGEND:

Zoic Phase II Environmental Site Assessment, 2016

Golder Phase I Environmental Site Assessment, 2015

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Google Maps

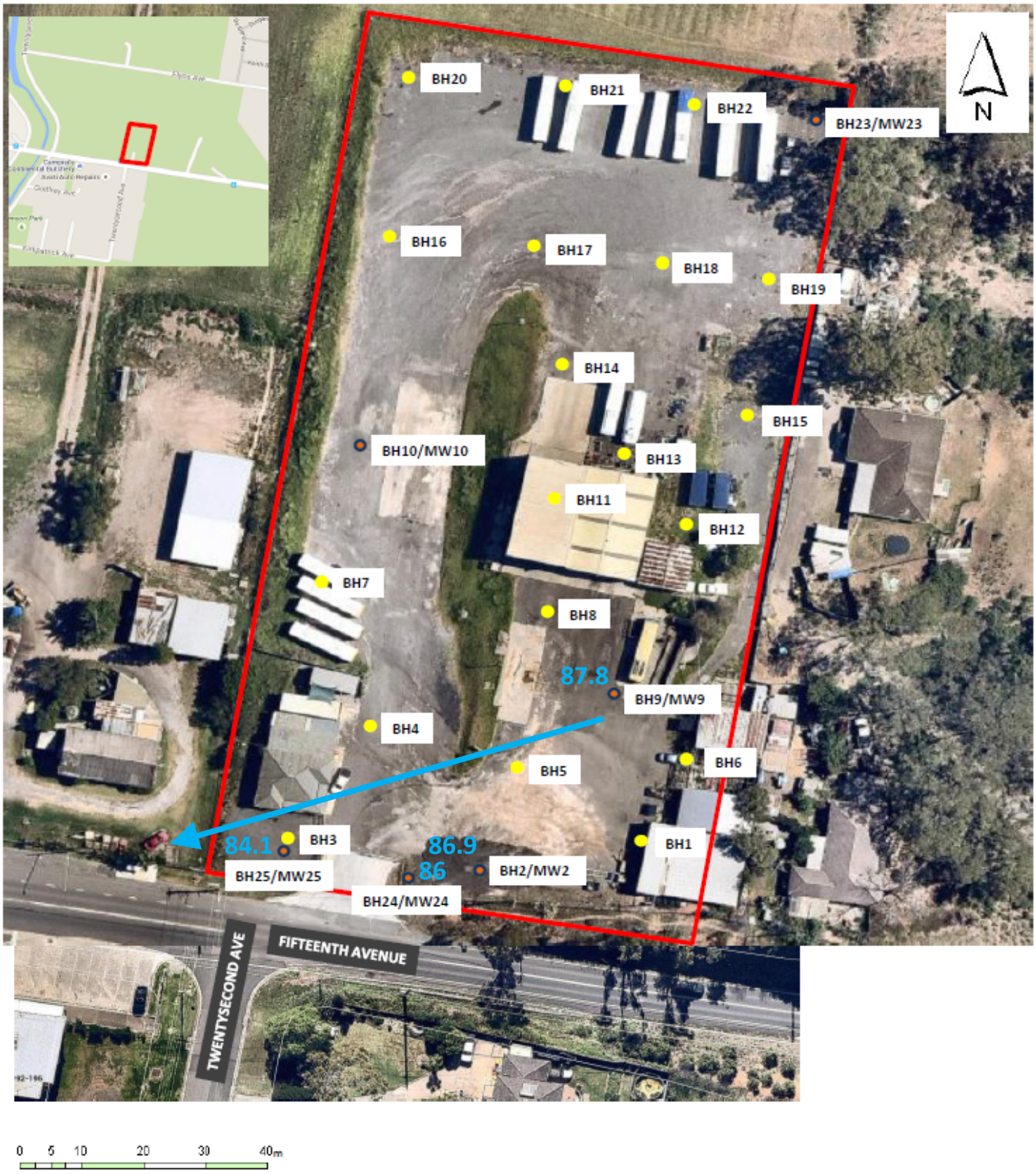
ZOIC Environmental Pty Ltd – www.zoic.com.au

Western Sydney Parkland Trust
16035

FIGURE 3

Areas Requiring Remediation

Detailed Site Investigation,
195 Fifteenth Avenue, West Hoxton, NSW



LEGEND:

- Douglas Partner Borehole (2015)
- Groundwater Monitoring Well (DP, 2015)

86.9 Groundwater Level (RL) – May 2016

FIGURE 4

Inferred Direction of Flow (from 185 Fifteenth Ave)

Detailed Site Investigation
195 Fifteenth Avenue, West Hoxton, NSW

Western Sydney Parkland Trust

16035

Figure sourced from Douglas Partner (2015) Phase 2 ESA

This product has been created to support the main report and is not suitable for other purposes. Image courtesy of Douglas Partners, 2015.

Appendix E Consultant's Summary Results Tables

147622023

Table 1: Summary Analytical Results - Soil Samples

						Sample Location	BH11	BH11	BH12	BH13	BH14
						Sample Depth	0.5-0.95	0.5-0.95	0.5-0.95	0.1-0.2	0.0-0.1
						Sample Date	9/02/2015	9/02/2015	9/02/2015	9/02/2015	9/02/2015
						Sample Description					
						Sample Type	PS	LD	PS	PS	PS
						Batch	123357	123357	123357	123357	123357
			NEPM Soil Investigation Levels[1]								
Analyte	**Units**	**LOR**	**HILs - Commercial / industrial land use**	**HSL - D Vapour Instrusion Sand 0-1m**	**EILs / ESL - Commercial and Industrial Coarse Grain**	**Management limits Commercial / Industrial Coarse Grain**					
TRH											
C6 - C10 Fraction	mg/kg	25				700	<25	<25	<25	<25	<25
C6 - C10 Fraction minus BTEX (F1)	mg/kg	25		260	215^		<25	<25	<25	<25	<25
>C10 - C16 Fraction	mg/kg	50				1000	<50	<50	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50		NL/20,000[+]	170^		<50	<50	<50	<50	<50
>C16 - C34 Fraction (F3)	mg/kg	100		27,000[+]	1700	3500	**230**	**340**	**120**	**620**	**320**
>C34 - C40 Fraction (F4)	mg/kg	100		38,000[+]	3300	10000	**140**	**160**	<100	**1000**	**210**
BTEX											
Benzene	mg/kg	0.2		3	75		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	0.5		NL/99,000[+]	135		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	1		NL/27,000[+]	165		<1	<1	<1	<1	<1
meta- & para-Xylene	mg/kg	2		230/81,000*	95		<2	<2	<2	<2	<2
ortho-Xylene	mg/kg	1					<1	<1	<1	<1	<1
Inorganics											
Arsenic	mg/kg	4	3000		160		**8**	**9**	**13**	<4	<4
Cadmium	mg/kg	0.4	900				**0.5**	**0.5**	<0.4	<0.4	<0.4
Chromium *	mg/kg	1	3600				**76**	**74**	**13**	**4**	**23**
Copper	mg/kg	1	240000				**20**	**17**	**21**	**150**	**53**
Lead	mg/kg	1	1500		1800		**23**	**24**	**41**	**12**	**3**
Nickel	mg/kg	1	6000				**19**	**15**	**8**	**5**	**76**
Zinc	mg/kg	1	400000				**33**	**24**	**49**	**74**	**41**
Mercury	mg/kg	0.1	180				<0.1	<0.1	**0.1**	<0.1	<0.1
Polycyclic Aromatic Hydrocarbons											
Naphthalene	mg/kg	0.1		NL/11,000+	370		<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1					**0.1**	**0.1**	**0.2**	**0.1**	**0.1**
Anthracene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1					**0.1**	**0.1**	**0.4**	**1.1**	<0.1
Pyrene	mg/kg	0.1					**0.2**	**0.2**	**0.4**	**1.3**	**0.1**
Benz(a)anthracene	mg/kg	0.1					<0.1	<0.1	**0.2**	**0.3**	<0.1
Chrysene	mg/kg	0.1					<0.1	<0.1	**0.2**	**0.3**	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.2					<0.2	<0.2	**0.4**	**0.6**	<0.2
Benzo(a)pyrene	mg/kg	0.05			1.4		**0.1**	**0.1**	**0.2**	**0.3**	<0.05
Indeno(1.2.3.cd)pyrene	mg/kg	0.1					**0.1**	**0.2**	**0.1**	**0.2**	<0.1
Dibenz(a.h)anthracene	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g.h.i)perylene	mg/kg	0.1					**0.2**	**0.3**	**0.2**	**0.2**	<0.1
Benzo(a)pyrene TEQ	mg/kg	0.5	40				<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve	mg/kg	0.5	4000				**0.97**	**1.1**	**2.3**	**4.5**	**0.21**
Organochlorine Pesticides											
HCB	mg/kg	0.1	80				<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC (Lindane)	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	50				<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	0.1	530				<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	0.1	2000				<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	45				<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	0.1	100				<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	0.1	3600				<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	0.1			640		<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	2500				<0.1	<0.1	<0.1	<0.1	<0.1
Polychlorinated Biphenyls											
Arochlor 1016	mg/kg	0.1	7				<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos											
Asbestos ID in soil	g/kg	0.1					-	**ND**	**ND**	-	-
Trace analysis	-	-					-	**NAD**	**NAD**	-	-

Notes

-: Not analysed, not applicable
mg/kg: Milligram per kilogram
PS: primary sample
LD: laboratory duplicate
FD: field duplicate, analysed by ALS
Sample identified as Dup on ELS certificate of analysis 123357 reported as BH14/0.0-0.1
Sample identified as Trip 1 on ALS certificate of analysis ES 1503478 reported as BH14/0.0-0.1
ND: no asbestos detected at reporting limit of 0.1g/kg (0.01 % w/w)
NAD: no asbestos detected
TRH: Total recoverable hydrocarbons
BTEXN: Benzene, toluene, ethylbenzene, xylene
LOR: Limits of Reporting
* Criteria for chromium (VI) adopted for total chromium.
† HSLs for direct contact where HSL for vapour intrusion is non limiting (NL)
Criteria for course grained soils have been adopted as a conservative measure.
1: NEPC (2013), National Environmental Protection (Assessment of Site Contamination) Measure 1999. Guideline on the Investigation Levels for Soil and Groundwater, Health Based Investigation Levels (HILs)-D (for commercial/industrial sites).

Exceeds HILs - Commercial / industrial land use
Exceeds HSL - D Vapour Instrusion Sand 0-1m
Exceeds EIL / ESL - Commercial and Industrial Coarse Grain
Exceeds Management limits Commercial / Industrial Coarse Grain
Exceeds multiple critera

Prepared By: SPD 4/3/2015
Checked By: TC 4/3/2015

147622023

Table 1: Summary Analytical Results - Soil Samples

Sample Location	BH14	BH14	BH15	BH16
Sample Depth	0.0-0.1	0.5-0.95	0.5-0.95	0.5-0.95
Sample Date	9/02/2015	9/02/2015	9/02/2015	9/02/2015
Sample Description				
Sample Type	FD	PS	PS	PS
Batch	ES1503478	123357	123357	123357

			NEPM Soil Investigation Levels[1]							
Analyte	**Units**	**LOR**	**HILs - Commercial / industrial land use**	**HSL - D Vapour Instrusion Sand 0-1m**	**EILs / ESL - Commercial and Industrial Coarse Grain**	**Management limits Commercial / Industrial Coarse Grain**				
TRH										
C6 - C10 Fraction	mg/kg	25				700	<10	<25	<25	<25
C6 - C10 Fraction minus BTEX (F1)	mg/kg	25		260	215^		<10	<25	<25	<25
>C10 - C16 Fraction	mg/kg	50				1000	**1810**	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50		NL/20,000†	170^		**1810**	<50	<50	<50
>C16 - C34 Fraction (F3)	mg/kg	100		27,000†	1700	3500	**5410**	<100	<100	<100
>C34 - C40 Fraction (F4)	mg/kg	100		38,000†	3300	10000	<100	<100	<100	<100
BTEX										
Benzene	mg/kg	0.2		3	75		<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	0.5		NL/99,000†	135		<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	1		NL/27,000†	165		<0.5	<1	<1	<1
meta- & para-Xylene	mg/kg	2		230/81,000*	95		<0.5	<2	<2	<2
ortho-Xylene	mg/kg	1					<0.5	<1	<1	<1
Inorganics										
Arsenic	mg/kg	4	3000		160		<5	**7**	<4	<4
Cadmium	mg/kg	0.4	900				<1	<0.4	<0.4	<0.4
Chromium *	mg/kg	1	3600				**41**	**13**	**18**	**14**
Copper	mg/kg	1	240000				**45**	**22**	**24**	**20**
Lead	mg/kg	1	1500		1800		<5	**11**	**31**	**54**
Nickel	mg/kg	1	6000				**152**	**4**	**14**	**6**
Zinc	mg/kg	1	400000				**87**	**21**	**45**	**67**
Mercury	mg/kg	0.1	180				**0.2**	<0.1	<0.1	**0.1**
Polycyclic Aromatic Hydrocarbons										
Naphthalene	mg/kg	0.1		NL/11,000+	370		<0.5	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Benz(a)anthracene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.2					<0.5	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.05			1.4		<0.5	<0.05	<0.05	<0.05
Indeno(1.2.3.cd)pyrene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Benzo(g.h.i)perylene	mg/kg	0.1					<0.5	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	mg/kg	0.5	40				**0.6**	<0.5	<0.5	<0.5
Total +ve	mg/kg	0.5	4000				<0.5	**NIL (+)VE**	**NIL (+)VE**	**NIL (+)VE**
Organochlorine Pesticides										
HCB	mg/kg	0.1	80				<0.25	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
gamma-BHC (Lindane)	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
beta-BHC	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	50				<0.25	<0.1	<0.1	<0.1
delta-BHC	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	0.1	530				<0.25	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	0.1	2000				<0.25	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	45				<0.25	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
Endrin	mg/kg	0.1	100				<0.25	<0.1	<0.1	<0.1
pp-DDE	mg/kg	0.1	3600				<0.25	<0.1	<0.1	<0.1
pp-DDD	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
pp-DDT	mg/kg	0.1			640		<0.2	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	0.1					<0.25	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	2500				<0.2	<0.1	<0.1	<0.1
Polychlorinated Biphenyls										
Arochlor 1016	mg/kg	0.1	7				-	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	0.1					-	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	0.1					-	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	0.1					-	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	0.1					-	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	0.1					-	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	0.1					-	<0.1	<0.1	<0.1
Asbestos										
Asbestos ID in soil	g/kg	0.1					-	-	-	-
Trace analysis	-	-					-	-	-	-

Notes

-: Not analysed, not applicable
mg/kg: Milligram per kilogram
PS: primary sample
LD: laboratory duplicate
FD: field duplicate, analysed by ALS
Sample identified as Dup on ELS certificate of analysis 123357 reported as BH14/0.0-0.1
Sample identified as Trip 1 on ALS certificate of analysis ES 1503478 reported as BH14/0.0-0.1
ND: no asbestos detected at reporting limit of 0.1g/kg (0.01 % w/w)
NAD: no asbestos detected
TRH: Total recoverable hydrocarbons
BTEXN: Benzene, toluene, ethylbenzene, xylene
LOR: Limits of Reporting
* Criteria for chromium (VI) adopted for total chromium.
† HSLs for direct contact where HSL for vapour intrusion is non limiting (NL)
Criteria for course grained soils have been adopted as a conservative measure.
1: NEPC (2013), National Environmental Protection (Assessment of Site Contamination) Measure 1999. Guideline on the Investigation Levels for Soil and Groundwater, Health Based Investigation Levels (HILs)-D (for commercial/industrial sites).

Exceeds HILs - Commercial / industrial land use
Exceeds HSL - D Vapour Instrusion Sand 0-1m
Exceeds EIL / ESL - Commercial and Industrial Coarse Grain
Exceeds Management limits Commercial / Industrial Coarse Grain
Exceeds multiple critera

Prepared By: SPD 4/3/2015
Checked By: TC 4/3/2015

147622023

Table 1: Summary Analytical Results - Soil Samples

							Maximum reported value (mg/kg)	No exceeding guidelines
Sample Location								
Sample Depth								
Sample Date								
Sample Description								
Sample Type								
Batch								
			NEPM Soil Investigation Levels[1]					
Analyte	**Units**	**LOR**	**HILs - Commercial / industrial land use**	**HSL - D Vapour Instrusion Sand 0-1m**	**EILs / ESL - Commercial and Industrial Coarse Grain**	**Management limits Commercial / Industrial Coarse Grain**		
TRH								
C6 - C10 Fraction	mg/kg	25				700	<25	0
C6 - C10 Fraction minus BTEX (F1)	mg/kg	25		260	215^		<25	0
>C10 - C16 Fraction	mg/kg	50				1000	1810	1
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50		NL/20,000†	170^		1810	1
>C16 - C34 Fraction (F3)	mg/kg	100		27,000†	1700	3500	5410	1
>C34 - C40 Fraction (F4)	mg/kg	100		38,000†	3300	10000	1000	0
BTEX								
Benzene	mg/kg	0.2		3	75		<0.2	0
Toluene	mg/kg	0.5		NL/99,000†	135		<0.5	0
Ethylbenzene	mg/kg	1		NL/27,000†	165		<1	0
meta- & para-Xylene	mg/kg	2		230/81,000*	95		<2	0
ortho-Xylene	mg/kg	1					<1	0
Inorganics								
Arsenic	mg/kg	4	3000		160		13	0
Cadmium	mg/kg	0.4	900				<1	0
Chromium *	mg/kg	1	3600				76	0
Copper	mg/kg	1	240000				150	0
Lead	mg/kg	1	1500		1800		54	0
Nickel	mg/kg	1	6000				152	0
Zinc	mg/kg	1	400000				87	0
Mercury	mg/kg	0.1	180				0.2	0
Polycyclic Aromatic Hydrocarbons								
Naphthalene	mg/kg	0.1		NL/11,000+	370		<0.5	0
Acenaphthylene	mg/kg	0.1					<0.5	-
Acenaphthene	mg/kg	0.1					<0.5	-
Fluorene	mg/kg	0.1					<0.5	-
Phenanthrene	mg/kg	0.1					<0.5	-
Anthracene	mg/kg	0.1					<0.5	-
Fluoranthene	mg/kg	0.1					1.1	-
Pyrene	mg/kg	0.1					1.3	-
Benz(a)anthracene	mg/kg	0.1					<0.5	-
Chrysene	mg/kg	0.1					<0.5	-
Benzo(b+k)fluoranthene	mg/kg	0.2					0.6	-
Benzo(a)pyrene	mg/kg	0.05			1.4		<0.5	0
Indeno(1.2.3.cd)pyrene	mg/kg	0.1					<0.5	-
Dibenz(a.h)anthracene	mg/kg	0.1					<0.5	-
Benzo(g.h.i)perylene	mg/kg	0.1					<0.5	-
Benzo(a)pyrene TEQ	mg/kg	0.5	40				0.6	0
Total +ve	mg/kg	0.5	4000				4.5	0
Organochlorine Pesticides								
HCB	mg/kg	0.1	80				<0.25	0
alpha-BHC	mg/kg	0.1					<0.25	-
gamma-BHC (Lindane)	mg/kg	0.1					<0.25	-
beta-BHC	mg/kg	0.1					<0.25	-
Heptachlor	mg/kg	0.1	50				<0.25	0
delta-BHC	mg/kg	0.1					<0.25	-
Heptachlor Epoxide	mg/kg	0.1					<0.25	-
gamma-Chlordane	mg/kg	0.1	530				<0.25	0
alpha-chlordane	mg/kg	0.1					<0.25	0
Endosulfan I	mg/kg	0.1	2000				<0.25	0
Endosulfan II	mg/kg	0.1					<0.25	0
Aldrin	mg/kg	0.1	45				<0.25	0
Dieldrin	mg/kg	0.1					<0.25	0
Endrin	mg/kg	0.1	100				<0.25	0
pp-DDE	mg/kg	0.1	3600				<0.25	0
pp-DDD	mg/kg	0.1					<0.25	0
pp-DDT	mg/kg	0.1			640		<0.2	0
Endrin Aldehyde	mg/kg	0.1					<0.25	-
Endosulfan Sulphate	mg/kg	0.1					<0.25	-
Methoxychlor	mg/kg	0.1	2500				<0.2	0
Polychlorinated Biphenyls								
Arochlor 1016	mg/kg	0.1	7				<0.1	0
Arochlor 1221	mg/kg	0.1					<0.1	0
Arochlor 1232	mg/kg	0.1					<0.1	0
Arochlor 1242	mg/kg	0.1					<0.1	0
Arochlor 1248	mg/kg	0.1					<0.1	0
Arochlor 1254	mg/kg	0.1					<0.1	0
Arochlor 1260	mg/kg	0.1					<0.1	0
Asbestos								
Asbestos ID in soil	g/kg	0.1					**ND**	-
Trace analysis	-	-					**NAD**	-

Notes

-: Not analysed, not applicable
mg/kg: Milligram per kilogram
PS: primary sample
LD: laboratory duplicate
FD: field duplicate, analysed by ALS
Sample identified as Dup on ELS certificate of analysis 123357 reported as BH14/0.0-0.1
Sample identified as Trip 1 on ALS certificate of analysis ES 1503478 reported as BH14/0.0-0.1
ND: no asbestos detected at reporting limit of 0.1g/kg (0.01 % w/w)
NAD: no asbestos detected
TRH: Total recoverable hydrocarbons
BTEXN: Benzene, toluene, ethylbenzene, xylene
LOR: Limits of Reporting
* Criteria for chromium (VI) adopted for total chromium.
† HSLs for direct contact where HSL for vapour intrusion is non limiting (NL)
Criteria for course grained soils have been adopted as a conservative measure.
1: NEPC (2013), National Environmental Protection (Assessment of Site Contamination) Measure 1999. Guideline on the Investigation Levels for Soil and Groundwater, Health Based Investigation Levels (HILs)-D (for commercial/industrial sites).

Exceeds HILs - Commercial / industrial land use
Exceeds HSL - D Vapour Instrusion Sand 0-1m
Exceeds EIL / ESL - Commercial and Industrial Coarse Grain
Exceeds Management limits Commercial / Industrial Coarse Grain
Exceeds multiple critera

Prepared By: SPD 4/3/2015
Checked By: TC 4/3/2015

147622023

Table 2: Summary Analytical Results - Rinsate Sample

Sample Location	BH11
Sample Depth	-
Sample Date	9/02/2015
Sample Description	Rinsate
Sample Type	PS
Batch	123357

Analyte	Units	LOR	
TRH			
C6 - C10 Fraction	ug/L	25	<10
C6 - C10 Fraction minus BTEX (F1)	ug/L	25	**15**
>C10 - C16 Fraction	ug/L	50	<50
>C10 - C16 Fraction minus Naphthalene (F2)	ug/L	50	<50
>C16 - C34 Fraction (F3)	ug/L	100	<100
>C34 - C40 Fraction (F4)	ug/L	100	<100
BTEX			
Benzene	ug/L	0.2	<1
Toluene	ug/L	0.5	<1
Ethylbenzene	ug/L	1	<1
meta- & para-Xylene	ug/L	2	<2
ortho-Xylene	ug/L	1	<1
Inorganics			
Arsenic	mg/L	0.05	<0.05
Cadmium	mg/L	0.01	<0.01
Chromium *	mg/L	0.01	<0.01
Copper	mg/L	0.01	<0.01
Lead	mg/L	0.03	<0.03
Nickel	mg/L	0.02	<0.02
Zinc	mg/L	0.02	<0.02
Mercury	mg/L	0.0005	<0.0005
Polycyclic Aromatic Hydrocarbons			
Naphthalene	ug/L	1	<1
Acenaphthylene	ug/L	1	<1
Acenaphthene	ug/L	1	<1
Fluorene	ug/L	1	<1
Phenanthrene	ug/L	1	<1
Anthracene	ug/L	1	<1
Fluoranthene	ug/L	1	<1
Pyrene	ug/L	1	<1
Benz(a)anthracene	ug/L	1	<1
Chrysene	ug/L	1	<1
Benzo(b+k)fluoranthene	ug/L	2	<2
Benzo(a)pyrene	ug/L	1	<1
Indeno(1.2.3.cd)pyrene	ug/L	1	<1
Dibenz(a.h)anthracene	ug/L	1	<1
Benzo(g.h.i)perylene	ug/L	1	<1
Benzo(a)pyrene TEQ	ug/L	5	<5
Total +ve	ug/L	-	NIL (+)VE
Organochlorine Pesticides			
HCB	ug/L	0.2	<0.2
alpha-BHC	ug/L	0.2	<0.2
gamma-BHC (Lindane)	ug/L	0.2	<0.2
beta-BHC	ug/L	0.2	<0.2
Heptachlor	ug/L	0.2	<0.2
delta-BHC	ug/L	0.2	<0.2
Heptachlor Epoxide	ug/L	0.2	<0.2
gamma-Chlordane	ug/L	0.2	<0.2
alpha-chlordane	ug/L	0.2	<0.2
Endosulfan I	ug/L	0.2	<0.2
Endosulfan II	ug/L	0.2	<0.2
Aldrin	ug/L	0.2	<0.2
Dieldrin	ug/L	0.2	<0.2
Endrin	ug/L	0.2	<0.2
pp-DDE	ug/L	0.2	<0.2
pp-DDD	ug/L	0.2	<0.2
pp-DDT	ug/L	0.2	<0.2
Endrin Aldehyde	ug/L	0.2	<0.2
Endosulfan Sulphate	ug/L	0.2	<0.2
Methoxychlor	ug/L	0.2	<0.2
Polychlorinated Biphenyls			
Arochlor 1016	ug/L	2	<2
Arochlor 1221	ug/L	2	<2
Arochlor 1232	ug/L	2	<2
Arochlor 1242	ug/L	2	<2
Arochlor 1248	ug/L	2	<2
Arochlor 1254	ug/L	2	<2
Arochlor 1260	ug/L	2	<2

Notes

-: Not analysed, not applicable
mg/L: Milligram per litre
ug/L: Microgram per litre
PS: primary sample
TRH: Total recoverable hydrocarbons
BTEX: Benzene, toluene, ethylbenzene, xylene
LOR: Limits of Reporting

Prepared By: SPD 18/2/2015
Checked By: TC 19/2/2015

						Metals									TPH									BTEX					MAH												
			Benzo(a)pyrene TEQ calc (PQL)	Benzo(a)pyrene TEQ calc(half)	Benzo(a)pyrene TEQ calc (zero)	Asbestos	Arsenic	Cadmium	Chromium (III+VI)	Copper	Iron	Lead	Mercury	Nickel	Zinc	C10-C16	C16-C34	C34-C40	>C10-C16 less NAPHTHALENE (F2)	C6 - C9	C10 - C14	C15 - C28	C29-C36	>C6-C10 less BTEX (F1)	>C6-C10	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	isopropylbenzene	n-butylbenzene	n-propylbenzene	p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane
			mg/kg	mg/kg	mg/kg	g/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.5	0.5	0.5	0.01	4	0.4	1	1	1	1	0.1	1	1	50	100	100	50	25	50	100	100	25	25	0.2	1	0.5	2	1	1	1	1	1	1	1	1	1	1	1	1
NEPC (2013) HIL D			40	40	40		3,000	900	3,600	240,000		1,500	730	6,000	400,000																											
NEPC (2013) HSL D, vapour intrusion, sand, 0-<1m																			NL					260		3	NL	NL	NL												
CRC Care (2011) HSL Intrusive Maintenance Worker, vapour intrusion, sand, 0-<2m																			NL					NL		77	NL	NL													
CRC Care (2011) HSL D, direct contact																20,000	27,000	38,000							26,000	430	27,000	99,000														
CRC Care (2011) HSL, Intrusive Maintenance Worker, direct contact																	85,000	120,000	62,000					82,000		1,100	85,000	120,000	130,000												
NEPC (2013) EIL, Commercial and Industrial							160		670	330		1,800		460	1,200																										
NEPC (2013) ESL, Commerical and Industrial, coarse																	1,700	3,300	170					215		75	165	135	180												
NEPC (2013) Management Limits, Commerical and Industrial, coarse soil																1,000	3,500	10,000							700																
Field_ID	**Sample_Depth_Range**	**Sampled_Date-Time**																																							
BH1	0.1-0.2	14/04/2015	<0.5	<0.5	<0.5	ND	14	<0.4	48	7	84,000	24	<0.1	7	12	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH2	0.1-0.2	14/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	13	25	-	14	<0.1	17	40	<50	180	270	<50	<25	<50	<100	160	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BH2	5.5-5.7	14/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	10	40	-	19	<0.1	19	81	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	0.9	3	1	-	-	-	-	-	-	-	-	-	-	-
BH3	0.1-0.2	14/04/2015	<0.5	<0.5	<0.5	ND	4	<0.4	46	290	-	45	<0.1	45	150	<50	920	460	<50	<25	<50	470	600	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH3	0.9-1	14/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	18	55	-	19	<0.1	12	56	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH4	0.1-0.2	14/04/2015	<0.5	<0.5	<0.5	ND	4	<0.4	39	35	-	48	<0.1	50	73	<50	140	120	<50	<25	<50	<100	110	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH5	0.1-0.2	14/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	30	48	-	6	<0.1	81	39	<50	180	460	<50	<25	<50	<100	260	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH5	0.4-0.5	14/04/2015	<0.5	<0.5	<0.5	ND	11	<0.4	37	17	-	31	<0.1	12	35	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH6	0.1-0.2	14/04/2015	0.6	0.6	0.5	ND	<4	<0.4	12	120	-	7	<0.1	7	38	<50	260	550	<50	<25	<50	<100	360	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH6	0.9-1	14/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	11	27	-	12	<0.1	6	31	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH7	0.1-0.2	14/04/2015	1.5	1.5	1.5	ND	<4	<0.4	13	32	-	89	0.4	9	69	<50	310	410	<50	<25	<50	110	300	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BH8	0.1-0.2	14/04/2015	0.7	0.6	0.6	ND	<4	<0.4	19	59	92,000	19	<0.1	36	51	<50	190	330	<50	<25	<50	<100	210	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH8	0.9-1	14/04/2015	<0.5	<0.5	<0.5	ND	5	<0.4	21	34	-	19	<0.1	13	54	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH9	0.1-0.2	14/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	5	13	-	8	<0.1	4	20	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH9	1.4-1.5	14/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	12	42	-	16	<0.1	9	48	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH10	0.1-0.2	14/04/2015	1.2	1.1	1.1	ND	<4	<0.4	15	40	-	20	<0.1	35	61	<50	230	390	<50	<25	<50	<100	260	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH10	1.9-2	15/04/2015	<0.5	<0.5	<0.5	ND	6	<0.4	19	27	-	17	<0.1	10	43	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH11	0.2-0.3	15/04/2015	0.6	0.6	0.5	ND	<4	<0.4	10	8	-	12	<0.1	5	24	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH11	0.9-1	15/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	10	2	-	30	<0.1	2	18	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH12	0.1-0.2	15/04/2015	<0.5	<0.5	<0.5	ND	7	<0.4	14	25	-	15	<0.1	34	86	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BH13	0.1-0.2	15/04/2015	1.7	1.7	1.7	ND	<4	<0.4	13	30	-	96	0.2	22	79	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH13	0.9-1	15/04/2015	<0.5	<0.5	<0.5	ND	6	<0.4	18	31	-	26	<0.1	19	77	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH14	0.1-0.2	15/04/2015	1.4	1.4	1.4	ND	<4	<0.4	9	17	-	66	0.2	5	80	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH14	0.9-1	15/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	11	4	-	26	<0.1	7	32	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH15	0.1-0.2	15/04/2015	<0.5	<0.5	<0.5	ND	4	<0.4	17	30	-	21	<0.1	12	57	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH16	0.1-0.2	15/04/2015	<0.5	<0.5	<0.5	ND	8	<0.4	13	25	-	10	<0.1	6	13	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH16	0.4-0.5	15/04/2015	<0.5	<0.5	<0.5	ND	6	<0.4	16	22	-	19	<0.1	7	39	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH17	0.1-0.2	15/04/2015	0.7	0.6	0.6	ND	11	<0.4	11	50	-	21	<0.1	9	28	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH17	0.4-0.5	15/04/2015	<0.5	<0.5	<0.5	ND	9	<0.4	9	50	-	31	<0.1	9	58	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH18	0.1-0.2	15/04/2015	0.9	0.8	0.8	ND	9	0.4	12	53	24,000	590	<0.1	14	53	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH19	0.1-0.2	15/04/2015	3.2	3.2	3.2	ND	<4	<0.4	13	57	-	140	<0.1	22	67	<50	440	760	<50	<25	<50	150	480	<25	<25	<0.2	<1	<0.5	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
BH20	0.1-0.2	15/04/2015	<0.5	<0.5	<0.5	ND	7	<0.4	19	30	-	11	<0.1	12	20	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH20	0.4-0.5	14/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	20	45	-	53	<0.1	17	1100	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH21	0.1-0.2	14/04/2015	<0.5	<0.5	<0.5	ND	9	<0.4	12	21	-	10	<0.1	6	10	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH22	0.1-0.2	14/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	7	17	-	9	<0.1	4	15	61	130	<100	61	<25	<50	180	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH22	0.4-0.5	14/04/2015	<0.5	<0.5	<0.5	ND	6	<0.4	20	23	-	19	<0.1	14	50	<50	<100	<100	<50	<25	<50	<100	<100	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-
BH23	0.1-0.2	15/04/2015	<0.5	<0.5	<0.5	ND	<4	<0.4	6	120	-	22	<0.1	7	50	<50	320	530	<50	<25	<50	<100	370	<25	<25	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-

NOTES: ND - Not Detected at the laboratory reporting limit
NL - Not limiting
LOR - Limit of Reporting

			Chlorinated Hydrocarbons																										Halogenated Hydrocarbons				Halogenated Benzenes									
			1,1,1,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Hexachlorobutadiene	Trichloroethene	Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Vinyl chloride	1,2-dibromoethane	Bromomethane	Dichlorodifluoromethane	Trichlorofluoromethane	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	Hexachlorobenzene
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.1
NEPC (2013) HIL D																																										80
NEPC (2013) HSL D, vapour intrusion, sand, 0-<1m																																									
CRC Care (2011) HSL Intrusive Maintenance Worker, vapour intrusion, sand, 0-<2m																																									
CRC Care (2011) HSL D, direct contact																																									
CRC Care (2011) HSL, Intrusive Maintenance Worker, direct contact																																									
NEPC (2013) EIL, Commercial and Industrial																																									
NEPC (2013) ESL, Commerical and Industrial, coarse																																									
NEPC (2013) Management Limits, Commerical and Industrial, coarse soil																																									
Field_ID	**Sample_Depth_Range**	**Sampled_Date-Time**																																								
BH1	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH2	0.1-0.2	14/04/2015	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1
BH2	5.5-5.7	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH3	0.9-1	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH5	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH5	0.4-0.5	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH6	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH6	0.9-1	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH7	0.1-0.2	14/04/2015	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1
BH8	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH8	0.9-1	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH9	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH9	1.4-1.5	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH10	1.9-2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11	0.2-0.3	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH11	0.9-1	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12	0.1-0.2	15/04/2015	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1
BH13	0.1-0.2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH13	0.9-1	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14	0.1-0.2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH14	0.9-1	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15	0.1-0.2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH16	0.1-0.2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH16	0.4-0.5	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17	0.1-0.2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH17	0.4-0.5	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18	0.1-0.2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH19	0.1-0.2	15/04/2015	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<0.1
BH20	0.1-0.2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH20	0.4-0.5	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH22	0.1-0.2	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH22	0.4-0.5	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23	0.1-0.2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1

NOTES: ND - Not Detected at the laboratory reporting limit
NL - Not limiting
LOR - Limit of Reporting

			Solvents	PAH/Phenols																Polychlorinated Biphenyls							Organochlorine Pesticides																	
			Cyclohexane	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)&(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	PAHs (Sum of total)	Phenanthrene	Phenolics Total (as Phenol)	Pyrene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	4,4-DDE	a-BHC	Aldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			1	0.1	0.1	0.1	0.1	0.05	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1		0.1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPC (2013) HIL D																	4,000		240,000		7 (sum of non dioxing-like PCB)							3,600		45		530			3,600	45				100			50
NEPC (2013) HSL D, vapour intrusion, sand, 0-<1m																NL																											
CRC Care (2011) HSL Intrusive Maintenance Worker, vapour intrusion, sand, 0-<2m																NL																											
CRC Care (2011) HSL D, direct contact																11,000																											
CRC Care (2011) HSL, Intrusive Maintenance Worker, direct contact																																										
NEPC (2013) EIL, Commercial and Industrial																370																		640									
NEPC (2013) ESL, Commerical and Industrial, coarse								1																																		
NEPC (2013) Management Limits, Commerical and Industrial, coarse soil																																										
Field_ID	**Sample_Depth_Range**	**Sampled_Date-Time**																																									
BH1	0.1-0.2	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH2	0.1-0.2	14/04/2015	<1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH2	5.5-5.7	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1 - 0.5	0.53	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	0.1-0.2	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.23	0.1	<5	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH3	0.9-1	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	0.1-0.2	14/04/2015	-	<0.1	<0.1	<0.1	0.2	0.2	0.3	0.2	0.2	<0.1	0.3	<0.1	0.1	<1 - 0.1	3	0.8	<5	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH5	0.1-0.2	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH5	0.4-0.5	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH6	0.1-0.2	14/04/2015	-	<0.1	0.2	<0.1	<0.1	0.4	0.6	0.4	<0.1	<0.1	0.2	<0.1	0.3	<0.1	2.4	<0.1	<5	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH6	0.9-1	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH7	0.1-0.2	14/04/2015	<1	<0.1	0.2	0.2	0.8	1.1	2	0.7	0.8	0.1	1.3	<0.1	0.7	<0.1	9.6	0.4	<5	1.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH8	0.1-0.2	14/04/2015	-	<0.1	<0.1	<0.1	0.4	0.4	0.7	0.2	0.3	<0.1	0.6	<0.1	0.2	<0.1	3.4	0.2	<5	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH8	0.9-1	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH9	0.1-0.2	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH9	1.4-1.5	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	0.1-0.2	14/04/2015	-	<0.1	0.1	0.1	0.6	0.82	1	0.7	0.5	<0.1	1.1	<0.1	0.5	<0.1	7.1	0.3	<5	1.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH10	1.9-2	15/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11	0.2-0.3	15/04/2015	-	<0.1	<0.1	<0.1	0.3	0.4	0.6	0.2	0.3	<0.1	0.5	<0.1	0.2	<0.1	3.5	0.2	<5	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH11	0.9-1	15/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12	0.1-0.2	15/04/2015	<1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	0.1	<0.1	0.5	<0.1	<0.1	<0.1	1.1	0.2	<5	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH13	0.1-0.2	15/04/2015	-	<0.1	0.2	0.2	1	1.2	2	0.7	0.9	0.1	1.8	<0.1	0.7	<0.1	11	0.8	<5	1.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH13	0.9-1	15/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14	0.1-0.2	15/04/2015	-	<0.1	0.1	0.2	0.7	0.98	1	0.6	0.7	0.1	1.1	<0.1	0.6	<0.1	8.1	0.4	<5	1.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH14	0.9-1	15/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15	0.1-0.2	15/04/2015	-	<0.1	<0.1	<0.1	<0.1	0.07	<0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.28	<0.1	<5	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH16	0.1-0.2	15/04/2015	-	<0.1	<0.1	<0.1	<0.1	0.06	<0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.26	<0.1	<5	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH16	0.4-0.5	15/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17	0.1-0.2	15/04/2015	-	<0.1	<0.1	<0.1	0.3	0.4	0.6	0.4	0.3	<0.1	0.6	<0.1	0.3	<0.1	3.9	0.3	<5	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH17	0.4-0.5	15/04/2015	-	<0.1	<0.1	<0.1	0.1	0.2	0.3	0.1	0.1	<0.1	0.3	<0.1	0.1	<0.1	1.7	0.1	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18	0.1-0.2	15/04/2015	-	<0.1	0.1	0.1	0.5	0.59	0.9	0.5	0.4	<0.1	1	<0.1	0.4	<0.1	6.3	0.7	<5	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH19	0.1-0.2	15/04/2015	<1	<0.1	0.3	0.4	1.7	2.2	3.4	2.2	1.6	0.2	2.9	<0.1	1.8	<0.1	21	1.2	<5	3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH20	0.1-0.2	15/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH20	0.4-0.5	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21	0.1-0.2	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH22	0.1-0.2	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH22	0.4-0.5	14/04/2015	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	<0.1	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23	0.1-0.2	15/04/2015	-	<0.1	0.1	<0.1	0.1	0.2	0.3	0.3	0.1	<0.1	0.2	<0.1	0.2	<0.1	2	0.1	<5	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

NOTES: ND - Not Detected at the laboratory reporting limit
NL - Not limiting
LOR - Limit of Reporting

			Organophosphorous Pesticides												Pesticides
			Heptachlor epoxide	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Ronnel	Parathion
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPC (2013) HIL D				2,500			2,000									
NEPC (2013) HSL D, vapour intrusion, sand, 0-<1m																
CRC Care (2011) HSL Intrusive Maintenance Worker, vapour intrusion, sand, 0-<2m																
CRC Care (2011) HSL D, direct contact																
CRC Care (2011) HSL, Intrusive Maintenance Worker, direct contact																
NEPC (2013) EIL, Commercial and Industrial																
NEPC (2013) ESL, Commerical and Industrial, coarse																
NEPC (2013) Management Limits, Commerical and Industrial, coarse soil																
Field_ID	**Sample_Depth_Range**	**Sampled_Date-Time**														
BH1	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH2	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH2	5.5-5.7	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH3	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH3	0.9-1	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH5	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH5	0.4-0.5	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH6	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH6	0.9-1	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH7	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH8	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH8	0.9-1	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH9	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH9	1.4-1.5	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH10	1.9-2	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11	0.2-0.3	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH11	0.9-1	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH13	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH13	0.9-1	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH14	0.9-1	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH16	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH16	0.4-0.5	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH17	0.4-0.5	15/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH19	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH20	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH20	0.4-0.5	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH22	0.1-0.2	14/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH22	0.4-0.5	14/04/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH23	0.1-0.2	15/04/2015	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

NOTES: ND - Not Detected at the laboratory reporting limit
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LOR - Limit of Reporting

				Metals										TPH									BTEX					MAH				
			B(a)P Total Potency Equivalent	Arsenic (Filtered)	Cadmium (Filtered)	Calcium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Magnesium (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)	C10-C16	C16-C34	C34-C40	<C10-C16 less NAPHTHALENE (F2)	C6 - C9	C10 - C14	C15 - C28	C29-C36	C6-C10 less BTEX (F1)	C6-C10	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	Isopropylbenzene	n-butylbenzene	n-propylbenzene
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.0005	0.001	0.0001	0.5	0.001	0.001	0.001	0.5	0.00005	0.001	0.001	0.05	0.1	0.1	0.05	0.01	0.05	0.1	0.1	0.01	0.01	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001
NEPC (2013) HSL D, vapour intrusion, sand, 4-<8m			-	-	-	-	-	-	-	-	-	-	-	-	-	-	NL	-	-	-	-	6	-	NL	NL	NL	NL		-	-	-	-	-
NEPC (2013) GILs, Fresh Waters			-	0.024	0.0002	-	0.001	0.0014	0.0034	-	0.00006	0.011	0.008	-	-	-	-	-	-	-	-	-	-	0.95	-	-	0.2	0.35	-	-	-	-	-
NEPC (2013) GILs, Drinking Water			-	0.01	0.002	-	0.05	2	0.01	-	0.001	0.02	-	-	-	-	-	-	-	-	-	-	-	0.001	0.3	0.8	0.6		-	-	-	-	-
LocCode	**WellCode**	**Sampled_Date-Time**																															
MW10		5/05/2015	<0.0005	<0.001	0.0005	160	<0.001	0.002	<0.001	1100	<0.00005	0.006	0.007	<0.05	<0.1	<0.1	<0.05	<0.1	<0.05	<0.1	<0.1	-	<0.1	<0.01	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW2		5/05/2015	<0.0005	<0.001	0.0003	230	<0.001	0.003	<0.001	750	<0.00005	0.002	0.006	0.23	<0.1	<0.1	0.21	14	0.73	<0.1	<0.1	5.2	15	1.7	0.48	4.7	2.1	0.79	0.24	0.067	0.014	0.002	0.032
MW23		5/05/2015	<0.0005	0.001	0.0001	150	<0.001	0.002	<0.001	430	<0.00005	0.01	0.014	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.01	<0.01	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW9		5/05/2015	<0.0005	<0.001	0.0001	140	<0.001	0.002	<0.001	710	<0.00005	0.006	0.021	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.01	<0.01	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW24		9/06/2015	<0.0005	<0.001	0.0001	-	<0.001	0.001	<0.001	-	<0.00005	0.004	0.016	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.01	<0.01	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW25		9/06/2015	<0.0005	0.002	0.0003	-	<0.001	<0.001	<0.001	-	<0.00005	0.006	0.03	<0.05	<0.1	<0.1	<0.05	<0.01	<0.05	<0.1	<0.1	<0.01	<0.01	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

							Chlorinated Hydrocarbons																									
			p-isopropyltoluene	sec-butylbenzene	Styrene	tert-butylbenzene	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	1,1-dichloropropene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	Bromochloromethane	Bromodichloromethane	Bromoform	Carbon tetrachloride	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Hexachlorobutadiene	Trichloroethene
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.01	0.001	0.01	0.001	0.001	0.001	0.001	0.001
NEPC (2013) HSL D, vapour intrusion, sand, 4-<8m			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEPC (2013) GILs, Fresh Waters			-	-	-	-	-	-	-	6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEPC (2013) GILs, Drinking Water			-	-	0.03	-	-	-	-	-	-	-	-	-	-	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0007	-
LocCode	**WellCode**	**Sampled_Date-Time**																														
MW10		5/05/2015	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.01	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
MW2		5/05/2015	<0.001	0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
MW23		5/05/2015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
MW9		5/05/2015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
MW24		9/06/2015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001
MW25		9/06/2015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001

					Halogenated Hydrocarbons															Solvents	PAH/Phenols									
			Tetrachloroethene	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Vinyl chloride	1,2-dibromoethane	Bromomethane	Dichlorodifluoromethane	Trichlorofluoromethane	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Chlorobenzene	Hexachlorobenzene	Cyclohexane	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b)&(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.001	0.001	0.001	0.01	0.001	0.01	0.01	0.01	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000001	0.001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001
NEPC (2013) HSL D, vapour intrusion, sand, 4-<8m			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEPC (2013) GILs, Fresh Waters			-	-	-	-	-	-	-	-	0.003	0.085	-	0.26	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEPC (2013) GILs, Drinking Water			0.05	-	-	0.0003	-	-	-	-	0.03	0.03	-	-	0.04	-	-	-	0.3	-	-	-	-	-	-	0.00001	-	-	-	-
LocCode	**WellCode**	**Sampled_Date-Time**																												
MW10		5/05/2015	<0.01	<0.01	<0.01	<0.1	<0.01	<0.1	<0.1	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.000001	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001
MW2		5/05/2015	<0.001	<0.001	<0.001	<0.01	0.004	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000001	0.071	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001
MW23		5/05/2015	<0.001	<0.001	<0.001	<0.01	<0.001	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001
MW9		5/05/2015	<0.001	<0.001	<0.001	<0.01	<0.001	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001
MW24		9/06/2015	<0.001	<0.001	<0.001	<0.01	<0.001	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001
MW25		9/06/2015	<0.001	<0.001	<0.001	<0.01	<0.001	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.000001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001

															Polychlorinated Biphenyls												
			Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	PAHs (Sum of total)	Phenanthrene	Phenolics Total	Pyrene	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	4,4-DDE	a-BHC	Aldrin	Dieldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.0001	0.0001	0.0001	0.0002		0.0001	0.05	0.0001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001
NEPC (2013) HSL D, vapour intrusion, sand, 4-<8m			-	-	-	NL	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEPC (2013) GILs, Fresh Waters			-	-	-	0.016	-	-	-			-	-	0.0003	-	0.00001	-	-	-	-	-	-	0.00003			-	-
NEPC (2013) GILs, Drinking Water			-	-	-	-	-	-	-			-	-	-	-	-	-	-	-	-	0.0003		-	0.002		-	-
LocCode	**WellCode**	**Sampled_Date-Time**																									
MW10		5/05/2015	<0.0001	<0.0001	<0.0001	<0.0002	0	<0.0001	<0.05	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001
MW2		5/05/2015	<0.0001	<0.0001	<0.0001	0.013 - 0.016	0.013	<0.0001	<0.05	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001
MW23		5/05/2015	<0.0001	<0.0001	<0.0001	<0.0002	0	<0.0001	<0.05	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001
MW9		5/05/2015	<0.0001	<0.0001	<0.0001	<0.0002	0	<0.0001	<0.05	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001
MW24		9/06/2015	<0.0001	<0.0001	<0.0001	<0.0002	0	<0.0001	<0.05	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001
MW25		9/06/2015	<0.0001	<0.0001	<0.0001	<0.0002	0	<0.0001	<0.05	<0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001

			Organochlorine Pesticides											Organophosphorous Pesticides								
			DDT	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Oxychlordane	Azinophos methyl	Azinphos Ethyl	Chlorfenvinphos E	Chlorfenvinphos Z	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.000001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
NEPC (2013) HSL D, vapour intrusion, sand, 4-<8m			-	-	-	-	-	-	-	-	-	-	-			-	-	-	-	-	-	-	-
NEPC (2013) GILs, Fresh Waters			0.000006	0.00003			0.00001	-	-	0.0002	0.00001	-	-			-	-	-	0.00001	-	0.00001	-	0.00015
NEPC (2013) GILs, Drinking Water			0.009	0.02			-	-	-	0.01	-	0.0003	-		0.03	-	0.002		0.01	-	0.004	0.005	0.007
LocCode	**WellCode**	**Sampled_Date-Time**																					
MW10		5/05/2015	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW2		5/05/2015	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW23		5/05/2015	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW9		5/05/2015	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW24		9/06/2015	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW25		9/06/2015	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.000001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

							Pesticides				
			Ethion	Fenitrothion	Fenthion	Malathion	Methyl parathion	Demeton-S-methyl	Parathion	Pirimiphos-methyl	Pirimphos-ethyl
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
EQL			0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
NEPC (2013) HSL D, vapour intrusion, sand, 4-<8m			-	-	-	-			-	-	
NEPC (2013) GILs, Fresh Waters			-	0.0002	-	0.00005			0.000004	-	
NEPC (2013) GILs, Drinking Water			0.004	0.007	0.007	0.07			0.02	0.09	
LocCode	**WellCode**	**Sampled_Date-Time**									
MW10		5/05/2015	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW2		5/05/2015	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW23		5/05/2015	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW9		5/05/2015	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW24		9/06/2015	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
MW25		9/06/2015	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

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Table 1: Summary Analytical Results - Sediment Samples

						Sample ID	Location 1 - 001	Location 1 - 002	Location 2 - 001
						Description	Sediment	Sediment	Sediment
						Sample Date	25/06/2014	25/06/2014	25/06/2014
						Batch	112131	112131	112131
			NEPM Soil Investigation Levels[1]						
Analyte	**Units**	**LOR**	**HILs - Commercial / industrial land use**	**HSL - D Vapour Instrusion Sand 0-1m**	**EILs / ESL - Commercial and Industrial Coarse Grain**	**Management limits Commercial / Industrial Coarse Grain**			
TRH (NEPM 2013)									
C6 - C10 Fraction		25				700	<25	<25	<25
C6 - C10 Fraction minus BTEX (F1)	mg/kg	25		260	215^		<25	<25	<25
>C10 - C16 Fraction	mg/kg	50				1000	<50	<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)	mg/kg	50		NL/20,000+	170^		<50	<50	<50
>C16 - C34 Fraction (F3)	mg/kg	100			1700	3500	<100	<100	<100
>C34 - C40 Fraction (F4)	mg/kg	100			3300	10000	<100	<100	<100
BTEX									
Benzene	mg/kg	0.2		3	75		<0.2	<0.2	<0.2
Toluene	mg/kg	0.5		NL/99,000+	135		<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	1		NL/27,000+	165		<1	<1	<1
meta- & para-Xylene	mg/kg	2		230/81,000*	95		<2	<2	<2
ortho-Xylene	mg/kg	1					<1	<1	<1
Inorganics									
Arsenic	mg/kg	4	3000		160		**6**	**5**	**9**
Cadmium	mg/kg	0.4	900				<0.4	<0.4	<0.4
Chromium	mg/kg	1	3600*				**15**	**21**	**26**
Copper	mg/kg	1	240000				**22**	**38**	**21**
Lead	mg/kg	1	1500		1800		**16**	**20**	**20**
Nickel	mg/kg	1	6000				**9**	**17**	**11**
Zinc	mg/kg	1	400000				**41**	**68**	**52**
Mercury	mg/kg	0.1	730[2]/180[3]				<0.1	<0.1	<0.1
Polycyclic Aromatic Hydrocarbons									
Naphthalene	mg/kg	0.1		NL/11,000+	370		<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1					<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1					<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1					<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1					<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1					<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1					<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1					<0.1	<0.1	<0.1
Benz(a)anthracene	mg/kg	0.1					<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1					<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	0.2					<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.05			1.4		<0.05	<0.05	<0.05
Indeno(1.2.3.cd)pyrene	mg/kg	0.1					<0.1	<0.1	<0.1
Dibenz(a.h)anthracene	mg/kg	0.1					<0.1	<0.1	<0.1
Benzo(g.h.i)perylene	mg/kg	0.1					**0.1**	<0.1	<0.1
Benzo(a)pyrene TEQ	mg/kg	0.5	40				<0.5	<0.5	<0.5
Total +ve	mg/kg	0.5	4000				**0.11**	-	-
Organochlorine Pesticides									
HCB	mg/kg	0.1	80				<0.1	<0.1	<0.1
alpha-BHC	mg/kg	0.1					<0.1	<0.1	<0.1
gamma-BHC (Lindane)	mg/kg	0.1					<0.1	<0.1	<0.1
beta-BHC	mg/kg	0.1					<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	50				<0.1	<0.1	<0.1
delta-BHC	mg/kg	0.1					<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	0.1					<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	0.1	530				<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	0.1					<0.1	<0.1	<0.1
Endosulfan I	mg/kg	0.1	2000				<0.1	<0.1	<0.1
Endosulfan II	mg/kg	0.1					<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	45				<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.1					<0.1	<0.1	<0.1
Endrin	mg/kg	0.1	100				<0.1	<0.1	<0.1
pp-DDE	mg/kg	0.1	3600				<0.1	<0.1	<0.1
pp-DDD	mg/kg	0.1					<0.1	<0.1	<0.1
pp-DDT	mg/kg	0.1			640		<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1					<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	0.1					<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	2500				<0.1	<0.1	<0.1
Organophosphorus Pesticides									
Diazinon	mg/kg	0.1					<0.1	<0.1	<0.1
Dimethoate	mg/kg	0.1					<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	0.1					<0.1	<0.1	<0.1
Ronnel	mg/kg	0.1					<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	0.1	2000				<0.1	<0.1	<0.1
Fenitrothion	mg/kg	0.1					<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	0.1					<0.1	<0.1	<0.1
Ethion	mg/kg	0.1					<0.1	<0.1	<0.1

Notes

-: Not Analysed

mg/kg: Milligram per kilogram

TRH: Total recoverable hydrocarbons

BTEXN: Benzene, toluene, ethylbenzene, xylene and naphthalene

LOR: Limits of Reporting

* Criteria for chromium (VI) adopted for total chromium.

^ ESLs are of low reliability except where indicated by ^ which indicates the ESL is of moderate reliability

+ HSLs for direct contact where HSL for vapour intrusion is non limiting (NL)

Criteria for course grained soils have been adopted as a conservative measure.

1: NEPC (2013), National Environmental Protection (Assessment of Site Contamination) Measure 1999. Guideline on the Investigation Levels for Soil and Groundwater, Health Based Investigation Levels (HILs) F (for commercial and industrial sites).

2: denotes criteria for inorganic mercury

3: denotes criteria for methyl mercury

Exceeds HILs - Commercial / industrial land use

Exceeds HSL - D Vapour Instrusion Sand 0-1m

Exceeds EIL / ESL - Commercial and Industrial Coarse Grain

Exceeds Management limits Commercial / Industrial Coarse Grain

Exceeds multiple critera

Prepared By: RB 17/7/2014

Checked By: SPD 17/7/2014

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Table 2: Summary Analytical Results - Water Samples

Sample ID	Location 1 - 001	Location 2 - 001
Description	Dam water	Dam water
Sample Date	25/06/2014	25/06/2014
Batch	112131	112131

Analyte	Units	LOR	ANZECC 95% Fresh Guidelines		
TRH (NEPM 2013)					
C6 - C10 Fraction	µg/L	10		<10	<10
C6 - C10 Fraction minus BTEX (F1)	µg/L	10		<10	<10
>C10 - C16 Fraction	µg/L	50		<50	<50
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	50		<50	<50
>C16 - C34 Fraction (F3)	µg/L	100		<100	**310**
>C34 - C40 Fraction (F4)	µg/L	100		<100	<100
BTEX					
Benzene	µg/L	1	950	<1	<1
Toluene	µg/L	1		<1	<1
Ethylbenzene	µg/L	1		<1	<1
meta- & para-Xylene	µg/L	2	200*	<2	<2
ortho-Xylene	µg/L	1	350	<1	<1
Inorganics					
Arsenic	µg/L	1	13^	**1**	**1**
Cadmium	µg/L	0.1	0.2	<0.1	<0.1
Chromium	µg/L	1	1**	<1	<1
Copper	µg/L	1	1.4	<1	<1
Lead	µg/L	1	3.4	<1	<1
Nickel	µg/L	1	11	<1	<1
Zinc	µg/L	1	8.0	**1**	<1
Mercury	µg/L	0.05	0.6	<0.05	<0.05
Polycyclic Aromatic Hydrocarbons					
Naphthalene	µg/L	1	16	<1	<1
Acenaphthylene	µg/L	1		<1	<1
Acenaphthene	µg/L	1		<1	<1
Fluorene	µg/L	1		<1	<1
Phenanthrene	µg/L	1		<1	<1
Anthracene	µg/L	1		<1	<1
Fluoranthene	µg/L	1		<1	<1
Pyrene	µg/L	1		<1	<1
Benz(a)anthracene	µg/L	1		<1	<1
Chrysene	µg/L	1		<1	<1
Benzo(b+k)fluoranthene	µg/L	2		<2	<2
Benzo(a)pyrene	µg/L	1		<1	<1
Indeno(1.2.3.cd)pyrene	µg/L	1		<1	<1
Dibenz(a.h)anthracene	µg/L	1		<1	<1
Benzo(g.h.i)perylene	µg/L	1		<1	<1
Benzo(a)pyrene TEQ	µg/L	5		<5	<5
Total +ve	µg/L	1		-	-
Organochlorine Pesticides					
HCB	µg/L	0.2		<0.2	<0.2
alpha-BHC	µg/L	0.2		<0.2	<0.2
gamma-BHC (Lindane)	µg/L	0.2	0.2	<0.2	<0.2
beta-BHC	µg/L	0.2		<0.2	<0.2
Heptachlor	µg/L	0.2	0.09	<0.2	<0.2
delta-BHC	µg/L	0.2		<0.2	<0.2
Aldrin	µg/L	0.2		<0.2	<0.2
Heptachlor Epoxide	µg/L	0.2		<0.2	<0.2
gamma-Chlordane	µg/L	0.2	0.08	<0.2	<0.2
alpha-Chlordane	µg/L	0.2		<0.2	<0.2
Endosulfan I	µg/L	0.2	0.2	<0.2	<0.2
Endosulfan II	µg/L	0.2		<0.2	<0.2
pp-DDE	µg/L	0.2		<0.2	<0.2
Dieldrin	µg/L	0.2		<0.2	<0.2
Endrin	µg/L	0.2	0.02	<0.2	<0.2
pp-DDD	µg/L	0.2		<0.2	<0.2
pp-DDT	µg/L	0.2	0.01	<0.2	<0.2
Endrin Aldehyde	µg/L	0.2		<0.2	<0.2
Endosulfan Sulphate	µg/L	0.2		<0.2	<0.2
Methoxychlor	µg/L	0.2		<0.2	<0.2
Organophosphorus Pesticides					
Diazinon	µg/L	0.2	0.01	<0.2	<0.2
Dimethoate	µg/L	0.2	0.15	<0.2	<0.2
Chlorpyriphos-methyl	µg/L	0.2		<0.2	<0.2
Ronnel	µg/L	0.2		<0.2	<0.2
Chlorpyriphos	µg/L	0.2	0.01	<0.2	<0.2
Fenitrothion	µg/L	0.2	0.2	<0.2	<0.2
Bromophos-ethyl	µg/L	0.2		<0.2	<0.2
Ethion	µg/L	0.2		<0.2	<0.2

Notes

-: Not analysed

µg/L: Microgram per litre

TPH: Total Petroluem Hydrocarbons

BTEX: Benzene, toluene, ethylbenzene, xylene

LOR: Limits of reporting

* criteria for para-xylene

** criteria for chromium VI

^ criteria for arsenic V

Exceeds ANZECC 95% Freshwater Criteria

Prepared By: RB 17/07/2014

Checked By: SPD 17/7/2014

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Table 3: Acid Sulfate Soils Analysis Results

Sample ID	TP07	TP07	TP10
Depth	0.1-0.3	0.3-0.5	0.3-0.5
Soil Type	Sandy Clay	Clay	Clay
Sample Date	7/07/2014	7/07/2014	7/07/2014
Batch	112656	112656	112656

Analyte	Units	LOR	ASSMAC Assessment Guidelines 1-1000 tonnes disturbed, medium texture	ASSMAC Assessment Guidelines 1-1000 tonnes disturbed, fine texture			
pH kcl	pH units				4.7	4.6	5.3
s-TAA pH 6.5	%w/w S	0.01			0.02	0.03	<0.01
TAA pH 6.5	moles H+/t	5	36	62	10	17	5
Chromium Reducible Sulfur	%w/w	0.005	0.06	0.1	<0.005	<0.005	<0.005
a-Chromium Reducible Sulfur	moles H+/t	3			<3	<3	<3
S_{KCl}	%w/w S	0.005			0.058	0.061	0.049
ANC_{BT}	% CaCO3	0.05			<0.05	<0.05	<0.05
s-ANC_{BT}	%w/w S	0.05			<0.05	<0.05	<0.05
s-Net Acidity	%w/w S	0.01			0.02	0.03	0.01
a-Net Acidity	moles H+/t	10			12	19	<10
Liming rate	kg CaCO3/t	0.75			0.93	1.4	<0.75
a-Net Acidity without ANCE	moles H+/t	10			12	19	<10
Liming rate without ANCE	kg CaCO3/t	0.75			0.93	1.4	<0.75

Notes

ASSMAC Assessment Guidelines 1-1000 tonnes disturbed, medium texture

ASSMAC Assessment Guidelines 1-1000 tonnes disturbed, fine texture

Prepared By: RB 17/07/2014

Checked By: SPD 17/7/2014

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Table 4: Asbestos Analysis Results

Sample ID	Fibro1_26/06/14	Fibro2_03/07/14	Pit2_030714	Pit3_030714
Depth	Not applicable	Not applicable	Fill material	Fill material
Sample Date	26/06/2014	3/07/2014	3/07/2014	3/07/2014
Batch	112755	112755	112755	112755

Analyte	**Units**	**LOR**				
Sample Description	-	-	Grey compressed fibre cement material	Grey fibre cement material	Brown coarse- grained soil & rocks	Brown coarse- grained soil & rocks
Sample mass / dimension tested	g		50x40x5mm	75x55x5mm	Approx 40g	Approx 40g
Asbestos ID	g/kg	0.1	Chrysotile asbestos detected, Amosite asbestos detected	Chrysotile asbestos detected	No asbestos detected	No asbestos detected
Trace Analysis	-	-	-	-	No respirable fibres detected	No respirable fibres detected

Notes

-: Not Analysed

Prepared By: RB 17/07/2014

Checked By: SPD 17/7/2014

Table T1: Summary of Metals and BTEX in soils

			Metals								BTEX			
	Total Nitrogen	Phosphorus	Lead	Mercury	Nickel	Arsenic	Cadmium	Chromium	Copper	Zinc	Benzene	Toluene	Ethylbenzene	Xylene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	10	10	1	0.1	1	4	0.4	1	1	1	0.2	0.5	1	1
HIL A / HSL A	**-**	**-**	**300**	**40**	**400**	**100**	**20**	**100**	**6000**	**7400**	**0.7**	**480**	**NL**	**110**
Ecological	-	-	1100	-	270	100	-	320	190	270	65	105	125	45
TP01 0.0-0.2	-	-	23	<0.1	33	5	<0.4	30	41	63	-	-	-	-
TP 0.2 0.5	-	-	55	<0.1	15	9	0.6	24	29	170	<0.2	<0.5	<1	<1
TP03 0.2	-	-	23	<0.1	14	<4	<0.4	6	22	52	<0.2	<0.5	<1	<1
TP04 0.2	-	-	30	<0.1	39	<4	<0.4	39	48	95	-	-	-	-
TP05 0.2-0.3	-	-	35	<0.1	12	5	<0.4	11	42	110	-	-	-	-
TP06 0.2-0.3	630	200	68	<0.1	11	<4	<0.4	8	15	31	-	-	-	-
TP06 0.6-0.7	-	-	11	<0.1	5	5	<0.4	17	20	20	-	-	-	-
TP07 0.5-0.6	-	-	17	<0.1	15	7	<0.4	26	32	38	-	-	-	-
TP07 0.8-0.9	-	-	13	<0.1	6	7	<0.4	18	19	26	-	-	-	-
TP08 0.5-0.6	-	-	21	<0.1	12	8	<0.4	19	31	44	-	-	-	-
TP08 0.8-0.9	-	-	13	<0.1	6	6	<0.4	16	24	26	-	-	-	-
TP09 0.3-0.4	-	-	22	<0.1	61	4	<0.4	81	29	78	-	-	-	-
TP10 0.1-0.2	-	-	18	<0.1	6	11	<0.4	14	18	37	-	-	-	-
TP11 0.2-0.3	-	-	20	<0.1	10	8	<0.4	21	41	53	-	-	-	-
TP12 0.1-0.2	-	-	19	<0.1	11	8	<0.4	21	35	46	-	-	-	-
TP13 0.1-0.2	-	-	17	<0.1	11	7	<0.4	18	28	43	-	-	-	-
TP14 0.3-0.4	-	-	16	<0.1	10	7	<0.4	18	29	46	-	-	-	-
TP14 0.9-1.0	-	-	19	<0.1	10	5	<0.4	12	50	47	-	-	-	-
TP15 0.1-0.2	-	-	16	<0.1	9	7	<0.4	19	28	40	-	-	-	-
TP16 0.2-0.3	-	-	19	<0.1	9	7	<0.4	21	29	33	-	-	-	-
TP16 0.7-0.8	-	-	11	<0.1	5	6	<0.4	15	24	19	-	-	-	-
TP17 0.1-0.2	830	510	18	<0.1	10	8	<0.4	25	32	43	-	-	-	-
TP17 0.5-0.6	-	-	14	<0.1	11	7	<0.4	22	25	46	-	-	-	-
TP18 0.1-0.2	710	260	10	<0.1	7	7	<0.4	15	25	33	-	-	-	-
TP19 0.1-0.2	2100	870	14	<0.1	13	7	<0.4	17	34	63	-	-	-	-
TP19 0.3-0.4	450	280	12	<0.1	12	6	<0.4	17	29	47	-	-	-	-
TP19 0.9-1.0	-	-	16	<0.1	12	7	<0.4	18	40	71	-	-	-	-
TP20 0.1-0.2	-	-	18	<0.1	12	6	<0.4	23	32	50	-	-	-	-
TP21 0.2-0.3	-	-	13	<0.1	10	5	<0.4	17	27	44	-	-	-	-
TP22 0.2-0.3	-	-	19	<0.1	12	6	<0.4	14	17	42	-	-	-	-
TP23 0.2-0.3	-	-	12	<0.1	9	5	<0.4	18	25	31	-	-	-	-
TP23 0.5-0.6	-	-	13	<0.1	12	6	<0.4	21	31	48	-	-	-	-
TP24 0.2-0.3	-	-	15	<0.1	21	14	<0.4	23	26	40	-	-	-	-
TP24 0.7-0.8	-	-	15	<0.1	16	<4	<0.4	13	38	60	-	-	-	-
TP25 0.2-0.3	-	-	19	<0.1	15	5	<0.4	16	20	46	-	-	-	-
TP26 0.1-0.2	-	-	14	<0.1	9	5	<0.4	19	21	36	-	-	-	-
TP27 0.1-0.2	-	-	100	<0.1	8	8	<0.4	22	14	29	-	-	-	-
TP28 0.2-0.3	-	-	22	<0.1	11	6	<0.4	21	22	42	-	-	-	-
TP29 0.1-0.2	-	-	16	<0.1	10	5	<0.4	18	20	36	-	-	-	-
TP30 0.1-0.2	-	-	14	<0.1	7	10	<0.4	22	20	24	-	-	-	-
TP31 0.3-0.4	-	-	15	<0.1	9	6	<0.4	20	23	36	-	-	-	-
TP32 0.1-0.2	-	-	14	<0.1	8	8	<0.4	19	21	24	-	-	-	-
TP33 0.2-0.3	-	-	17	<0.1	6	8	<0.4	26	10	14	-	-	-	-
TP34 0.1-0.2	-	-	17	<0.1	9	6	<0.4	21	14	23	-	-	-	-
TP35 0.2-0.3	-	-	14	<0.1	8	7	<0.4	24	15	19	-	-	-	-
TP36 0.1-0.2	900	200	14	<0.1	8	7	<0.4	20	10	17	-	-	-	-
TP37 0.2-0.3	-	-	16	<0.1	10	5	<0.4	21	15	30	-	-	-	-
TP38 0.1-0.2	-	-	13	<0.1	7	6	<0.4	19	27	27	-	-	-	-
TP39 0.3-0.4	-	-	14	<0.1	7	7	<0.4	22	19	25	-	-	-	-
TP40 0.2-0.3	-	-	11	<0.1	8	7	<0.4	22	19	23	-	-	-	-
TP41 0.1-0.2	-	-	19	<0.1	13	<4	<0.4	13	38	55	<0.2	<0.5	<1	<1
TP42 0.1-0.2	-	-	21	<0.1	14	<4	<0.4	19	21	45	<0.2	<0.5	<1	<1
TP43 0.4-0.5	-	-	16	<0.1	7	<4	<0.4	18	26	31	<0.2	<0.5	<1	<1
HA01 0.1-0.2	-	-	57	<0.1	22	7	<0.4	24	52	110	-	-	-	-
HA02 0.0-0.1	-	-	26	<0.1	8	6	<0.4	17	26	80	<0.2	<0.5	<1	<1
HA03 0.1-0.2	2900	350	19	<0.1	9	5	<0.4	15	29	46	-	-	-	-
HA04 0.0-0.4	3300	430	-	-	-	-	-	-	-	-	-	-	-	-
HA05 0.1-0.2	2900	1100	16	<0.1	10	7	<0.4	16	29	60	-	-	-	-
HA06 0.0-0.1	4800	630	-	-	-	-	-	-	-	-	-	-	-	-
HA07 0.2-0.3	-	520	40	<0.1	16	8	<0.4	24	38	120	-	-	-	-

Table T2: Soil Results for TRH/TPH and PAHs

		TRH NEPM 2013				PAH															
		F1 (C6-C10 less BTEX)	F2 (>C10-C16 less Naphthalene)	>C16-C34	>C34-C40	Pyrene	Benzo(g,h,i)perylene	Indeno(1,2,3-c,d)pyrene	Fluoranthene	Acenaphthylene	Benzo(b,j,k)fluoranthene	Chrysene	Benzo(a)pyrene	Dibenz(a,h)anthracene	Benz(a)anthracene	Acenaphthene	Phenanthrene	Fluorene	Benzo(a)pyrene TEQ calc (zero)	Naphthalene	Total PAHs
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		25	50	100	100	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.5	1	0
HIL/HSL A, Clay 0-1m.		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3**	**5**	**300**
NEPM 2013 EIL / ESLs - Urban Residential		-	120	1300	5600	-	-	-	-	-	-	-	0.7	-	-	-	-	-	-	170	-
Field ID	**Location**																				
TP01 0.0-0.2	TP01 0.0-0.2	-	<50	180	150	0.3	0.1	<0.1	0.2	<0.1	<0.2	0.1	0.1	<0.1	0.1	<0.1	0.2	<0.1	<0.5	<0.1	1.2
TP 0.2 0.5	TP 0.2 0.5	<25	<50	<100	<100	0.3	0.2	0.2	0.3	<0.1	0.4	0.2	0.2	<0.1	0.2	<0.1	0.1	<0.1	<0.5	<1	2.2
TP03 0.2	TP03 0.2	<25	<50	<100	<100	0.2	<0.1	<0.1	0.2	<0.1	<0.2	0.2	<0.05	<0.1	<0.1	<0.1	1.3	<0.1	<0.5	<1	3.4
TP04 0.2	TP04 0.2	-	<50	180	<100	0.3	<0.1	<0.1	0.2	<0.1	0.2	0.2	0.2	<0.1	0.1	<0.1	0.6	<0.1	<0.5	0.4	2.4
TP05 0.2-0.3	TP05 0.2-0.3	-	<50	120	<100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP07 0.5-0.6	TP07 0.5-0.6	-	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP08 0.5-0.6	TP08 0.5-0.6	-	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP09 0.3-0.4	TP09 0.3-0.4	-	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP13 0.1-0.2	TP13 0.1-0.2	-	<50	<100	<100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP19 0.3-0.4	TP19 0.3-0.4	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP21 0.2-0.3	TP21 0.2-0.3	-	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP23 0.2-0.3	TP23 0.2-0.3	-	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP24 0.2-0.3	TP24 0.2-0.3	-	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP25 0.2-0.3	TP25 0.2-0.3	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP26 0.1-0.2	TP26 0.1-0.2	-	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP32 0.1-0.2	TP32 0.1-0.2	-	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.1	ND
TP34 0.1-0.2	TP34 0.1-0.2	-	<50	<100	<100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP38 0.1-0.2	TP38 0.1-0.2	-	<50	<100	<100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TP41 0.1-0.2	TP41 0.1-0.2	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<1	ND
TP42 0.1-0.2	TP42 0.1-0.2	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<1	ND
TP43 0.4-0.5	TP43 0.4-0.5	<25	<50	<100	<100	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<1	ND
HA02 0.0-0.1	HA02 0.0-0.1	<25	<50	<100	<100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-

Table T3: Soil Results for Phenols, Organophosphorous Pesticides, Organochlorine Pesticides

	Phenols Total	Total Organophosphorous Pesticides	Total Organochlorine Pesticides	Aldrin (guideline aldrin+dieldrin)	Dieldrin (guideline aldrin+dieldrin)	Endosulfan II (guideline endosulfan)	DDT (guideline DDT+DDE+DDD)	Chlordane (cis) (guideline chlordane)	chlordane	Endrin	DDD (guideline DDT+DDE+DDD)	DDE (guideline DDT+DDE+DDD)	Heptachlor	Endosulfan I (guideline endosulfan)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
HIL A / HSL A	**3000**	**-**	**-**	**6**	**6**	**270**	**240**	**50**	**50**	**10**	**240**	**-**	**6**	**270**
EIL / ESLs	-	-	-	-	-	-	180	-	-	-	-	-	-	-
TP01 0.0-0.2	-	-	ND	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP 0.2 0.5	<5	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP03 0.2	<5	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP04 0.2	<5	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP05 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP06 0.2-0.3	-	-	ND	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP06 0.6-0.7	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP07 0.5-0.6	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP08 0.5-0.6	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1
TP10 0.1-0.2	-	ND	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP11 0.2-0.3	-	ND	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP12 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP13 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP14 0.3-0.4	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP15 0.1-0.2	-	ND	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP16 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP17 0.1-0.2	-	ND	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP18 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP19 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP20 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP21 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP22 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP23 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP24 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP25 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP26 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP27 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP28 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP30 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP32 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP33 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP35 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP36 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP38 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TP42 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA03 0.1-0.2	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1
HA06 0.0-0.1	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
HA07 0.2-0.3	-	-	ND	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Table T4: Summary of Asbestos Results

			Asbestos ID	ACM >7mm	FA / AF	Trace
				% w/w	**% w/w**	
NEPM 2013 HIL/HSL A Soil			**-**	**0.01%**	**0.001%**	
Sample ID	**Field ID**	**Matrix***				
-	-	-				
146058-81	TP01	SOIL	Not detected	na	na	-
146058-82	TP02	SOIL	**Chrysotile, amosite, crocidolite**	**1.2347**	**0.1522**	-
146058-83	TP05	SOIL	Not detected	na	na	-
146058-84	PT06	SOIL	Not detected	na	na	-
146058-85	TP07	SOIL	Not detected	na	na	-
146058-86	TP08	SOIL	Not detected	na	na	-
146058-87	TP11	SOIL	Not detected	na	na	-
146058-88	TP17	SOIL	Not detected	na	na	-
146058-89	TP19	SOIL	Not detected	na	na	-
146058-90	TP24	SOIL	Not detected	na	na	-
146058-91	TP40	SOIL	Not detected	na	na	-
146058-92	TP41	SOIL	Not detected	na	na	-
146058-93	TP42	SOIL	Not detected	na	na	-
146058-94	TP43	SOIL	Not detected	na	na	-

T5: Summary of QA/QC Results for Soil Investigation

				Moisture	Lead	Mercury (guidelines mercury - inorganic)	Nickel	Arsenic	Cadmium	Chromium (III+VI) (guidelines chromium VI and III)	Copper	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (m & p) (guideline xylene total)	Xylene (o) (guideline xylene total)	C6-C10	C6 - C9
				%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample ID	**Field ID**	**Location**	**Sample Date**																
146058-12	TP06 0.6-0.7	TP06 0.6-0.7	3/05/2016	24	11	<0.1	5	5	<0.4	17	20	20	-	-	-	-	-	-	-
146058-95	DUP1	TP06 0.6-0.7	3/05/2016	20	12	<0.1	6	6	<0.4	19	17	22	-	-	-	-	-	-	-
RPD %				***18***	***9***	***-***	***18***	***18***	***-***	***11***	***16***	***10***	-	-	-	-	-	-	-
146058-52	TP24 0.7-0.8	TP24 0.7-0.8	3/05/2016	18	15	<0.1	16	<4	<0.4	13	38	60	-	-	-	-	-	-	-
146058-96	DUP2 (A)	TP24 0.7-0.8	3/05/2016	15	15	<0.1	18	6	<0.4	15	35	66	-	-	-	-	-	-	-
RPD %				*18*	*0*	-	*12*	*40*	-	*14*	*8*	*10*							
ES1609818001	DUP2(B)	TP24 0.7-0.8	3/05/2016	17.2	17	<0.1	16	6	<1	15	30	55	-	-	-	-	-	-	-
RPD %				*5*	*13*	-	*0*	*40*	-	*14*	*24*	*9*							
146058-79	HA07 0.2-0.3	HA07 0.2-0.3	3/05/2016	19	40	<0.1	16	8	<0.4	24	38	120	-	-	-	-	-	-	-
ES1609818002	DUP3	HA07 0.2-0.3	3/05/2016	23.3	42	<0.1	15	12	<1	27	32	179	-	-	-	-	-	-	-
RPD %				*20*	*5*	-	*6*	*40*	-	*12*	*17*	*39*							
146058-97	TS	Trip Spike	2/05/2016	-	-	-	-	-	-	-	-	-	105	105	104	102	102	-	-
146058-98	TB	Trip Blank	2/05/2016	0.2	-	-	-	-	-	-	-	-	<0.2	<0.5	<1	<2	<1	<25	<25

Table T6: Summary of Groundwater Results for Inorganics, Heavy Metals, BTEX and Naphthalene

							Inorganics						Metals								BTEXN					
							Nitrogen (Total)	Alkalinity (Bicarbonate as CaCO3)	Alkalinity (total) as CaCO3	Alkalinity (Carbonate as CaCO3)	Alkalinity (Hydroxide) as CaCO3	Phosphorus - Total	Arsenic (guidelines arsenic III and V)	Cadmium	Chromium (III+VI) (guidelines chromium VI and III)	Copper	Lead	Mercury (guidelines mercury - inorganic)	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (m & p) (guideline xylene total)	Xylene (o) (guideline xylene total)	Naphthalene
							mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL							0.1	5	5	5	5	0.05	1	0.1	1	1	1	0.05	1	1	1	1	1	2	1	1
NEPM 2013 GIL Fresh Waters							TBD	-	-	-	-	-	13	0.2	-	1.4	3.4	0.06	11	8	950	-	-	-	350	16
NEPM 2013 GIL Drinking Water							-	-	-	-	-	-	10	2	-	2000	10	1	20	-	1	800	300	-	-	-
NEPM 2013 HSL A&B Groundwater - Residential. Clay 4m to <8m							-	-	-	-	-	-	-	-	-	-	-	-	-	-	5000	NL	NL	-	-	NL
Sample ID	**Field ID**	**Well code**	**Date**	**GW Depth**	**Depth Cat.**																					
146064-1	MW2	MW2	3/05/2016	7.2	4-<8m		-	-	-	-	-	-	<1	<0.1	<1	<1	6	<0.05	5	1	800	4300	1400	4900	2100	420
146064-2	MW9	MW9	3/05/2016	7.8	4-<8m		-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	<1	<1	<2	<1	<1
146064-3	MW24	MW24	3/05/2016	6.7	4-<8m		-	-	-	-	-	-	<1	<0.1	<1	<1	<1	<0.05	2	6	<1	<1	<1	<2	<1	<1
146064-4	MW25	MW25	3/05/2016	5.7	4-<8m		-	460	460	<5	<5	-	<1	0.5	<1	4	<1	<0.05	10	14	<1	<1	<1	<2	<1	<1
146064-5	DAM1	DAM1	3/05/2016	0	-		44	-	-	-	-	3.7	1	<0.1	<1	2	<1	<0.05	<1	<1	-	-	-	-	-	-
146064-6	DAM2	DAM2	3/05/2016	0	-		1.8	-	-	-	-	0.08	1	<0.1	<1	<1	<1	<0.05	<1	<1	-	-	-	-	-	-

Table T7: Summary of Groundwater Results for TRH/TPH and MAHs

Notes:

a. all VOC results below detection limit, with the exception of cyclohexane

					TRH NEPM 2013						TPH				Monocyclic aromatic hydrocarbons									Total Organochlorine Pesticides	Total Chlorinated Hydrocarbons	Total Halogenated Hydrocarbons	Total Halogenated Benzenes	Total VOCs
					C6-C10	>C10-C16	>C16-C34	>C34-C40	F1 (C6-C10 less BTEX)	F2 (>C10-C16 less Naphthalene)	C6 - C9	C10 - C14	C15 - C28	C29-C36	Styrene (Vinyl benzene)	n-propylbenzene	n-butylbenzene	1,3,5-trimethylbenzene	sec-butylbenzene	1,2,4-trimethylbenzene	tert-butylbenzene	isopropylbenzene	p-isopropyltoluene					
					µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL					10	50	100	100	10	50	10	50	100	100	1	1	1	1	1	1	1	1	1	0.2	1	1	1	1
NEPM 2013 GIL Fresh Waters					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NEPM 2013 GIL Drinking Water					-	-	-	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-	-
NEPM 2013 HSL A&B Groundwater - Residential. Clay 4m to <8m					-	-	-	-	NL	NL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Well code	**Date**	**GW Depth**	**Depth Cat.**	**Matrix**																								
MW2	3/05/2016	7.2	4-<8m	clay	37000	420000	67000	<10000	23000	420000	28000	520000	130000	<10000	<10	460	65	580	32	3300	<10	100	13	-	ND	ND	ND	ND / 380[d]
MW9	3/05/2016	7.8	4-<8m	clay	<10	<50	<100	<100	<10	<50	<10	<50	<100	<100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW24	3/05/2016	6.7	4-<8m	clay	<10	<50	<100	<100	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	ND	ND	ND	ND
MW25	3/05/2016	5.7	4-<8m	clay	<10	<50	<100	<100	<10	<50	<10	<50	<100	<100	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	ND	ND	ND	ND
DAM1	3/05/2016	-	-	SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	ND	-
DAM2	3/05/2016	-	-	SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND	-	-	ND	-

T8: Summary of QA/QC Results for Groundwater Investigation

Notes:

- RPD: Relative Percent Difference

				Metals								BTEXN							TRH NEPM 2013						TPH			
				Arsenic (guidelines arsenic III and V)	Cadmium	Chromium (III+VI) (guidelines chromium VI and III)	Copper	Lead	Mercury (guidelines mercury - inorganic)	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (m & p) (guideline xylene total)	Xylene (o) (guideline xylene total)	Naphthalene	C6-C10	>C10-C16	>C16-C34	>C34-C40	F1 (C6-C10 less BTEX)	F2 (>C10-C16 less Naphthalene)	C6 - C9	C10 - C14	C15 - C28	C29-C36
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
EQL				1	0.1	1	1	1	0.05	1	1	1	1	1	2	1	1	10	50	100	100	10	50	10	50	100	100
Sample ID	**Field ID**	**Well code**	**Date**																									
146064-7	DUP1	MW24	3/05/2016	<1	<0.1	<1	<1	<1	<0.05	2	6	<1	<1	<1	<2	<1	<1	<10	<50	<100	<100	<10	<50	<10	<50	<100	<100
146064-3	MW24	MW24	3/05/2016	<1	<0.1	<1	<1	<1	<0.05	2	6	<1	<1	<1	<2	<1	<1	<10	<50	<100	<100	<10	<50	<10	<50	<100	<100
RPD %				-	-	-	-	-	-	*0*	*0*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
146064-9	TB	TB	2/05/2016	-	-	-	-	-	-	-	-	<1	<1	<1	<2	<1	<1	<10	-	-	-	<10	-	<10	-	-	-
146064-10	TS	TS	2/05/2016	-	-	-	-	-	-	-	-	99	98	100	106	105	-	-	-	-	-	-	-	-	-	-	-

Appendix F Regulatory Search Results

Office of Environment & Heritage

Home > Topics > Heritage places and items > Search for heritage

Search for NSW heritage

Return to search page where you can refine/broaden your search.

Statutory listed items

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

- **Section 1** - contains Aboriginal Places declared by the **Minister for the Environment** under the National Parks and Wildlife Act. This information is provided by the Heritage Division.
- **Section 2** - contains heritage items listed by the **Heritage Council of NSW** under the NSW Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 136 of the NSW Heritage Act. This information is provided by the Heritage Division.
- **Section 3** - contains items listed by **local councils** on Local Environmental Plans under the Environmental Planning and Assessment Act, 1979 and **State government agencies** under s.170 of the Heritage Act. This information is provided by local councils and State government agencies.

Section 1. Aboriginal Places listed under the National Parks and Wildlife Act.

Your search did not return any matching results.

Section 2. Items listed under the NSW Heritage Act.

Your search did not return any matching results.

Section 3. Items listed by Local Government and State Agencies.

Your search returned 1 record.

Item name	Address	Suburb	LGA	Information source
Bare Cottage & Landscape	Lot 351 Fifteenth Avenue	West Hoxton	Liverpool	LGOV

There was a total of 1 records matching your search criteria.

Key:
LGA = Local Government Area
GAZ= NSW Government Gazette (statutory listings prior to 1997), HGA = Heritage Grant Application, HS = Heritage Study, LGOV = Local Government, SGOV = State Government Agency.
Note: While the Heritage Division seeks to keep the Inventory up to date, it is reliant on State agencies and local councils to provide their data. Always check with the relevant State agency or local council for the most up-to-date information.

Search Results

No results found.

Enter at least one search criterion.

Search Hints

Search Reset form

Place name

Street name
fifteenth avenue

Town or suburb
west hoxton

State
New South Wales

Country

Advanced search options

List
All Lists
Different lists will provide different status and class options

Local Government Area

Place ID number

Legal status
--All--

Class
--All--

Keyword Search

Description Statement of Significance Place history

Latitude/Longitude

N

Latitude 1

Longitude 1 S Longitude 2

W E Latitude 2 E **E**

S

S

Wholly within region
Wholly or partially within region

Longitude coordinates should be entered as ddd.mmss
Latitude coordinates should be entered as dd.mmss

Map Ref No

1:100,000 eg 2357
1:250,000 eg SF-50-01

Search Hints

- Not all fields need to be filled in. The fewer you fill in the more results you will get.
- If you cannot find a place, check spelling and try alternative names. Reduce the number of words that you include and use fewer fields.
- The Local Government field used on its own will provide a comprehensive list of places in an area.

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