Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Waste Classification Assessment

Proposed
Synthetic Bowling Greens
Melbee Street, Rutherford, New South Wales

Prepared for
Maitland City Bowls Sports and Recreation

Project 39498.06
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Douglas Partners
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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		31 March 2015
Reviewer		31 March 2015

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Report on Waste Classification Assessment
Proposed Synthetic Bowling Greens
Melbee Street, Rutherford, New South Wales

1. Introduction

This report presents the results of a waste classification assessment of in-situ topsoil materials from No. 1 and No. 2 Bowling Greens located at Maitland City Bowling Club, Melbee Street, Rutherford, New South Wales. The work was carried out at the request of Mr Matt Johnston of Maitland City Bowls Sports and Recreation. The waste classification assessment of topsoil materials (upper 0.35 m) was required to assess re-use and / or off-site disposal options (if necessary) for the materials which are understood will be required for construction of the proposed synthetic bowling greens. Douglas Partners Pty Ltd (DP) also carried out a Geotechnical Investigation on the No. 1 Bowling Green, which was carried out in conjunction with the above assessment (Ref 4).

The assessment comprised the following:

- Brief review of available in-house historical aerial photographs and site inspection to identify possible sources of contamination (if any);
- Brief discussions with the site personnel familiar with site history and maintenance procedures for the greens;
- Drilling of nine boreholes within existing greens;
- Collection of in-situ soil samples from boreholes using hand tools;
- PID screening of samples to assess potential for volatile hydrocarbon impact;
- Laboratory analysis of the soil samples for a range of potential organic and inorganic contaminants; and
- Preparation of this report.

The assessment undertaken, with reference to the NSW EPA “Waste Classification Guidelines” (Ref 1) and the NSW EPA “The Excavated Natural Material Order 2014” (Ref 2).

The above-mentioned Resource Recovery Order (RRO) and associated exemption (RRE) are attached for reference.

2. Site Description & Regional Geology

Maitland City Bowling Club is situated between Arthur Street and Melbee Street, Rutherford. The site is bound by a retail precinct to the north, New England Highway to the west, parkland and fast food outlet to the north-west and residential areas to the east and south.

The proposed synthetic bowling greens (about 37 m x 37 m in dimension for each green) are to be constructed in the location of the existing No. 1 and No. 2 bowling greens as shown on the attached Drawing 1 shown in Figures 1 and 2 below.

Figure 1: Bowling Green No. 1 (right) and No. 2 (left) looking west

Figure 2: Bowling Green No. 2 looking south-west

Reference to the 1:100,000 Newcastle Coalfield Geology Map indicates that the site is underlain by Permian aged Branxton Formation of the Maitland Group which consists of conglomerate, sandstone and siltstone.

A brief review of the 1954, 1958, 1963, 1975 and 1996 historical aerial photos in the area indicated the following land use on-site:

- Vacant land prior to 1954;
- Possible quarry in the late 1950s; and
- Bowling club from early 1960s to present.

It is understood that prior to the current club construction, the site was a former quarry that was filled.

3. Field Work

3.1 Methods

Field work was undertaken on 2 March 2015 and comprised the following:

- Brief discussion with site personnel familiar with site history and maintenance procedures for the greens;
- Drilling of six boreholes to depths of 0.4 m to 0.45 m using a 75 mm diameter hand auger (Bores 102, 104 and 106 to 109);
- Drilling of three bores using a 3.5 tonne excavator with auger attachment to depths of 0.55 m to 1.6 m (Bores 101, 103 and 105) at accessible locations within No 1 green (geotechnical and waste classification assessment);
- Collection of soil samples from the bores (one soil sample minimum from each test location), based on an in-situ area of between 2,000 m^2 and 3,000 m^2, with reference to the Excavated Natural Material Order (Ref 2); and
- Screening of soil samples for volatile organic compounds (VOCs) using a Photoionisation detector (PID) calibrated to 100 ppm Isobutylene.

Samples for environmental purposes were collected by an Environmental Engineer from DP. Soil samples were collected using new disposable gloves from various depths within the borehole. Augers were decontaminated using a 3% phosphate free decontamination solution (Decon 90) to minimise cross contamination between locations.

All sampling data was recorded on DP chain of custody sheets and the general sampling procedure comprised:

- The use of disposable gloves for each sampling event;
- Transfer of soil samples for contamination testing into laboratory-prepared glass jars, and capping immediately;
- Collection of replicate soil samples in zip-lock plastic bags at each depth for PID screening;

- Labelling of sample containers with individual and unique identification, including project number and sample location;
- Placement of the sample jars and sample bags into a cooled, insulated and sealed container for transport to the laboratory; and
- Use of chain of custody (C-O-C) documentation ensuring that sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory. Copies of completed C-O-C forms are attached.

The approximate bore locations are shown on Drawing 1, attached.

A list of the procedures used and other information on quality assurance and quality control is included in the Quality Assurance / Quality Control report, attached.

3.2 Results

The soil conditions encountered within the boreholes are summarised in Table 1. Detailed borehole logs are attached. These should be read in conjunction with the attached notes, which explain the descriptive terms and classification methods.

Table 1: Summary of Subsurface Conditions

Test No.	Green No.	Depth Encountered Below Existing Ground Level (m)				
		Sandy Silt / Silty Sand Filling	Sandy Gravel / Gravel Filling	Clay Filling	Silty Clay / Clayey Silt	Bedrock
101	1	0.0 – 0.3	0.3 – 0.55	NE	NE	0.55
102	1	0.0 – >0.4	NE	NE	NE	NE
103	1	0.0 – 0.3	0.3 – 0.7	NE	0.7 – 1.6	1.6
104	1	0.0 – 0.3	0.3 – >0.45	NE	NE	NE
105	1	0.0 – 0.35	0.35 – 0.42*	0.42 – 1.4	NE	1.4
106	2	0.0 – 0.35	0.35 – >0.45	NE	NE	NE
107	2	0.0 – >0.4	NE	NE	NE	NE
108	2	0.0 – >0.45	NE	NE	NE	NE
109	2	0.0 – 0.3	0.3 – 0.4	NE	NE	NE
1[1]	2	0.0 – 0.35	0.35 – 0.8	0.8 – >1.1	NE	2.1#
2[1]	2	0.0 – 0.3	0.3 – 0.6	0.6 – 0.85	NE	0.85
3[1]	2	0.0 – 0.35	0.35 – >1.3	NE	NE	>3.0#

Notes to Table 1:
NE – Not encountered
1 – Previous investigation (Ref 1)
* Coal chitter with some slag
# inferred from Dynamic Penetrometer Test

Observations regarding the filling layers were as follows:

> **FILLING**: generally comprising dark brown fine grained sandy silt filling with rootlets from ground level to depths of up to 0.02 m to 0.04 m (all bores).
>
> **FILLING**: generally comprising grey / brown fine to coarse grained (varying fractions) sand filling with trace silt and varying fractions of fine to medium subrounded gravel (alluvial) from depths of 0.02 m to 0.04 m to depths of up to 0.3 m to 0.7 m (all bores).
>
> **FILLING**: generally comprising grey fine grained subrounded gravel (alluvial) from depths of 0.3 m to 0.55m (Bore 101).

A localised coal chitter layer was observed in Bore 105 from a depth of 0.35 m to 0.42 m. Trace coal chitter gravel was also observed in Bore 109 from a depth of 0.3 m to 0.5 m.

There were no obvious indications of gross chemical contamination at the surface or within boreholes (i.e. no obvious staining or odours).

The results of PID screening on the soils sampled generally suggest the absence of gross volatile hydrocarbon impact (<1 ppm).

3.3 Discussions with Site Personnel

Brief discussions with the site greenkeeper indicated the following:

- A variety of chemicals are utilised for bowling green maintenance including pesticides, growth retardants (recent use only), drying agents (Dec/Jan) and fertilizers; and
- The No. 2 bowling green was flooded in the June 2007 storms and the upper topsoil materials replaced with material from Flynn Haulage & Earthmoving Pty Ltd, Hinton quarry (fill layer >0.02 m) and topsoil from Bennedicts in Sydney (upper 0.02m).

The greenkeeper supplied a chemical application record for recent chemical application to No. 1 and No. 2 bowling greens (attached in Appendix B).

4. Laboratory Testing

4.1 Analytical Programme

Laboratory testing was undertaken by Envirolab Services Pty Ltd (Envirolab), a National Association of Testing Authorities, Australia (NATA) registered laboratories. Analytical methods used are shown on the laboratory report sheets in Appendix B.

A total of ten soil samples were selected for analysis for the in-situ assessment. The soil samples were tested for the following analyses and potential contaminants with reference the ENM order (Ref 2) and Coal Washery Rejects Order (Ref 3):

- Total Recoverable Hydrocarbons (TRH);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Benzene, Toluene, Ethyl Benzene, Xylene (BTEX);
- Organochlorine Pesticide (OCP);
- Organophosphorus Pesticides (OPP);
- Polychlorinated Biphenyl (PCB);
- Metals: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Iron (Fe), Lead (Pb), Mercury (Hg), Manganese (Mn), Nickel (Ni), Zinc (Zn);
- Electrical Conductivity (EC);
- pH; and
- Total sulphur on one sample due to presence of coal chitter.

It is noted that based on the absence of deleterious materials in the materials sampled, foreign material testing was not conducted.

Due to the application of pesticides on the bowling greens, a suite of typical pesticides were analysed for the assessment. While the list of pesticides analysed does not cover all the pesticides used on site, it does include pesticides used that have published assessment criteria and are considered suitable for preliminary assessment purposes.

Following initial testing for total contaminant concentrations, sample 105/0.32–0.45 was analysed for acid leachable (TCLP) concentrations of PAH (Benzo(a)Pyrene) to assist with waste classification.

4.2 Analytical Results

The results of chemical analysis of soil samples are presented in the laboratory report sheets attached, and are summarised in Tables 2 to 4.

Table 2: Laboratory Results for Metals, pH, EC and Total Sulphur in Soil

Sample ID	Depth (m)	PID (ppm)	Metal										pH (pH units)	EC (µS/cm)	Total Sulfur
			As	Cd	Cr [1]	Cu	Pb	Hg	Ni	Zn	Mn	Fe			
101	0.15	<1	<4	<0.4	12	6	6	0.6	12	27	140	11000	5.1	110	NT
102	0.3	<1	<4	<0.4	8	4	3	0.2	7	16	120	9500	5.6	25	NT
103	0.2	<1	<4	<0.4	9	4	4	0.6	7	17	110	9900	5.3	24	NT
104	0.1	<1	<4	<0.4	14	9	7	1.3	10	30	190	12000	6.2	55	NT
105	0-0.02	<1	<4	<0.4	8	10	6	0.3	5	28	280	8500	6.6	80	NT
105*	0.35-0.42	<1	<4	0.6	12	11	11	0.1	23	46	380	10000	5.6	64	250
106	0.1	<1	<4	<0.4	11	5	4	<0.1	11	17	150	10000	6.6	44	NT
107	0.35	<1	<4	<0.4	17	9	24	0.1	21	38	270	16000	5.9	48	NT
108	0.1	<1	<4	<0.4	11	5	4	0.1	11	18	160	10000	6.5	44	NT
109*	0.35	<1	<4	<0.4	11	6	5	0.3	11	28	190	12000	5.6	40	NT
Average of positive values			NA	**0.6**	11.3	6.9	7.4	0.4	12	27	199	10890	5.9	53	250
Laboratory PQL			4	0.4	1	1	1	0.1	1	1	1	1	0.1	1	-
NSW EPA - Excavated Natural Material - Maximum Average Concentration (Ref 2)			20	0.5	75	100	50	0.5	30	150	NC	NC	5 to 9	1500	NC
NSW EPA - Excavated Natural Material - Absolute Maximum Concentration (Ref 2)			40	1	150	200	100	1	60	300	NC	NC	4.5 to 10	3000	NC
NSW EPA - General Solid Waste Guidelines - CT1 (Ref 1)			100	20	100	NC	100	4	40 / 1050[2]	NC	NC	NC	NC	NC	NC
NSW EPA - Restricted Solid Waste Guidelines - CT2 (Ref 1)			400	80	400	NC	400	16	160 / 4200[2]	NC	NC	NC	NC	NC	NC
Coal Washery Rejects Absolute Maximum Concentration (Ref 3)			20	1	150	100	100	1	80	200	NC	NC	7 to 12	2000	5000

Notes to Table 2:
Total concentrations in mg/kg on a dry weight basis
CT - Concentration Threshold
NC - No Criteria
NT - Not Tested
PID - Photoionisation Detector
PQL - Practical Quantitation Limits
* Sample contains coal chitter
1 - Chromium (VI) (Conservative)
exceeds NSW EPA Waste Classification Guidelines for General Solid Waste without leachability testing
exceeds NSW EPA Waste Classification Guidelines for Restricted Solid Waste without leachability testing
Bold results exceed Excavated Natural Material Maximum Average Concentration
Underline results exceed Excavated Natural Material Absolute Maximum Concentration

Table 3: Laboratory Results for TRH / BTEX and PAH (Naphthalene) in Soil

Sample ID	Depth (m)	PID (ppm)	Analyte								
			TRH				BTEX				
			C_6 - C_9	C_{10} - C_{14}	C_{15} - C_{28}	C_{29} - C_{36}	Benzene	Toluene	Ethyl Benzene	Xylene	Naphthalene
101	0.15	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
102	0.3	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
103	0.2	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
104	0.1	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
105	0-0.02	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
105*	0.35-0.42	<1	<25	<50	160	190	<0.2	<0.5	<1	<3	<1
106	0.1	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
107	0.35	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
108	0.1	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
109*	0.35	<1	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
Average of positive values			NA	NA	**160**	**190**	NA	NA	NA	NA	NA
Laboratory PQL			25	50	100	100	0.2	0.5	1	3	1
NSW EPA - General Solid Waste Guidelines - CT1 (Ref 1)			650 SCC1	10000 total SCC1			10	288	600	1000	NC
NSW EPA - Restricted Solid Waste Guidelines - CT2 (Ref 1)			2600 SCC2	40000 total SCC2			40	1152	2400	4000	NC
NSW EPA - Excavated Natural Material - Maximum Average Concentration (Ref 2)			NC	250 total			NC	NC	NC	NC	NC
NSW EPA - Excavated Natural Material - Absolute Maximum Concentration (Ref 2)			NC	500 total			0.5	65	25	15	NC

Notes to Table 3:
All results in mg/kg on a dry weight basis
CT - Concentration Threshold
SCC - Specific Contaminant Concentration
NC - No Criteria
PID - Photoionisation Detector
PQL - Practical Quantitation Limits
*Sample contains coal chitter

exceeds NSW EPA Waste Classification Guidelines for General Solid Waste without leachability testing

exceeds NSW EPA Waste Classification Guidelines for Restricted Solid Waste without leachability testing

Bold results exceed Excavated Natural Material Maximum Average Concentration

Underline results exceed Excavated Natural Material Absolute Maximum Concentration

Table 4: Laboratory Results for PAH, PCB, OPP and OCP in Soil

Sample ID	Depth (m)	PID (ppm)	Total Positive PAH	Benzo(a) Pyrene	Benzo(a) Pyrene TCLP	PCB [3]	Total OPP	Chlorpyrifos	Total OCP	Aldrin + Dieldrin	Chlordane	DDT+DDE +DDD	Endosulphan	Endrin	Heptachlor	HCB	Methoxychlor
101	0.15	<1	<1.55	<0.5	NT	<0.7	<1.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
102	0.3	<1	<1.55	<0.5	NT	<0.7	<1.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
103	0.2	<1	<1.55	<0.5	NT	<0.7	<1.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
104	0.1	<1	<1.55	<0.5	NT	<0.7	<1.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
105	0-0.02	<1	<1.55	<0.5	NT	<0.7	<1.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
105*	0.35-0.42	<1	46	9	<0.001	<0.7	<1.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
106	0.1	<1	<1.55	<0.5	NT	<0.7	<1.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
107	0.35	<1	<1.55	<0.5	NT	<0.7	<1.2	<0.1	<2.0	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
108	0.1	<1	<1.55	<0.5	NT	<0.7	<1.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
109*	0.35	<1	<1.55	<0.5	NT	<0.7	<1.2	<0.1	<2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Average of positive values			**46**	**9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Laboratory PQL			1.55	0.05		0.7	0.1 ea	0.1	0.1 ea	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NSW EPA - Excavated Natural Material - Maximum Average Concentration (Ref 2)			20	0.5	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NSW EPA - Excavated Natural Material - Absolute Maximum Concentration (Ref 2)			40	1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
NSW EPA - General Solid Waste Guidelines - CT1 (Ref 1)			200 SCC1	0.8 / 10[1]	0.04	50 SCC1	NC	4	NC	NC	NC	NC	60	NC	NC	NC	NC
NSW EPA - Restricted Solid Waste Guidelines - CT2 (Ref 1)			800 SCC2	3.2 / 23[1]	0.16	50 SCC2	NC	16	NC	NC	NC	NC	240	NC	NC	NC	NC

Notes to Table 4:
All total concentration results in mg/kg on a dry weight basis
TCLP results in mg/L
CT - Concentration Threshold
NC - No Criteria
NT - Not Tested
PID - Photoionisation Detector
PQL - Practical Quantitation Limits
SCC - Specific Contaminant Concentration
TCLP - Toxicity Characteristic Leaching Procedure
*Sample contains coal chitter
1- Criteriaconsidering leachability testing
exceeds NSW EPA Waste Classification Guidelines for General Solid Waste considering leachability testing
exceeds NSW EPA Waste Classification Guidelines for Restricted Solid Waste considering leachability testing
Bold results exceed Excavated Natural Material Maximum Average Concentration
Underline results exceed Excavated Natural Material Absolute Maximum Concentration

5. Assessment Criteria

The results of chemical analyses were compared to the following NSW EPA recommended guidelines:

- NSW EPA (2014) Waste Classification Guidelines – Part 1: Classifying waste (Ref 1);
- NSW EPA, "Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – The Excavated Natural Material Order 2014", November 2014 (Ref 2);
- NSW EPA, "Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – The Coal Washery Rejects Order 2014", November 2014 (Ref 3).

The NSW EPA Guidelines for Waste Classification (Ref 1) was used to assess soil conditions for possible off-site disposal to a licensed landfill.

The NSW EPA Excavated Natural Material Order (Ref 2) and Coal Washery Rejects Order (Ref 3) was used to assess possible re-use options for the materials at another site.

6. Comments

Based on the observations made and the results of laboratory testing the following is noted:

- All soil samples tested were within "General Solid Waste" criteria based on total and leachable contaminant concentrations and could therefore be considered for direct disposal to an appropriately licensed landfill, if required;
- The results of the laboratory testing conducted indicated soil contaminant concentrations were generally within the ENM criteria with the exception of the following:
    - Elevated total PAH and Benzo(a)pyrene concentrations in coal chitter fill materials (Bore 105 / 0.32-0.45) which exceeded the absolute maximum concentration criteria;
    - Elevated Cadmium, TRH C15 – C36 in coal chitter fill material (Base 105 / 0.32 – 0.45) which exceed the maximum average concentration criteria;
    - Elevated mercury in sample 104/0.1 m above the absolute maximum concentration criteria.

It is noted that trace Dieldrin was encountered with sample 107/0.35 m, however, results were within the NEPM 2013 (Ref 5) Health based investigation levels for standard residential land use (HIL A).

The NSW EPA ENM 2014 Recourse Recovery Order defines ENM as naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

a) been excavated from the ground;

b) contains at least 98% (by weight) natural material; and

c) does not meet the definition of Virgin Excavated Natural Material in the Act.

ENM does not include material located in a hotpot; that has been 'processed' or that contains asbestos, acid sulphate soils (ASS), potential acid sulphate soils (PASS) or sulfidic ores.

Due to the presence of elevated contamination concentrations above the ENM criteria, the coal reject material within the fill materials does not meet the criteria for re-use as ENM.

The remaining topsoil materials do generally meet the criteria for classification as ENM, however, due to the presence of mercury above the ENM criteria in one sample, trace pesticides concentrations in one sample, regular use of pesticide application (including some which have not been assessed at this stage) these materials are not considered suitable for classification as ENM.

Due to the relatively low contamination concentrations within this material, however, the material may still be suitable for re-use on another site subject to obtaining a NSW EPA site specific exemption. If re-use of this material under a site specific exemption is considered, additional testing is likely to be required by the NSW EPA for the application.

It is noted that the geotechnical investigation has indicated between 0.8 m and up to 2 m of fill / soil would require excavation for construction of the proposed synthetic bowling greens depending on the construction option selected. The current assessment has only assessed the upper 0.35 m of fill material. Further assessment would therefore be required to confirm re-use / disposal options for underlying fill / soil. It is recommended that this is conducted in conjunction with preparation of a site specific exemption application to minimise investigation requirements.

Alternatively, the materials assessed could be disposed as 'General Solid Waste' to an appropriately licensed landfill.

It is noted that the conditions set out in the relevant general RRE / RRO are designed to minimise the risk of potential harm to human health or the environment, however, they do not guarantee that human health or the environment will not be harmed. The suitability of any exempted material should be confirmed with respect to the particular use proposed (i.e. areas fit for purpose), as stated in the relevant exemptions.

During excavation, it is recommended that appropriate inspections are conducted and if any materials are encountered that are different to the materials sampled and tested or exhibit signs of contamination (e.g. anthropogenic inclusions, fibro fragments, staining or odours), these should be appropriately segregated for further assessment. The handling, transport and disposal / re-use of the materials should be conducted in accordance with regulatory and statutory requirements.

7. References

1. NSW EPA, "Waste Classification Guidelines, Part 1: Classifying Waste", November 2014.
2. NSW EPA, "Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – The Excavated Natural Material Order 2014", November 2014.

3. NSW EPA, "Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – The Coal Washery Rejects Order 2014", November 2014.

4. Douglas Partners Pty Ltd, "Report on Geotechnical Investigation, Proposed Synthetic Bowling Greens, Melbee Street, Rutherford, New South Wales", March 2015.

5. National Environment Protection Council (2013), "National Environment Protection (Assessment of Site Contamination) Measure 1999" (the ASC NEPM), April 2013 (NEPC 2013).

8. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at Melbee Street, Rutherford, NSW in accordance with DP proposal NCL150108-1 dated 23 February 2015 and order received from Mr Matt Johnston of Maitland City Bowls Sports and Recreation on 25 February 2015. This report is provided for the exclusive use of Maitland City Bowls Sports and Recreation for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the observed sub-surface conditions only at the specific sampling locations and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the Client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current

scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Please note that Part 5.6, Section 143 of the Protection of the Environment Operations (POEO) Act 1997 states that it is an offence for waste to be transported to a place that cannot lawfully be used as a facility to accept that waste. It is the duty of the owner and transporter of the waste to ensure that the waste is disposed of appropriately. DP accepts no liability for the unlawful disposal of waste materials from any site.

Douglas Partners Pty Ltd

Appendix A

About this Report
Sampling Methods
Soil Descriptions
Symbols and Abbreviations
Borehole Logs (Bores 101 to 109)

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

Douglas Partners

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core Drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General


Asphalt


Road base


Concrete


Filling

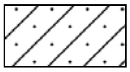
Soils


Topsoil

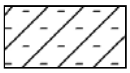

Peat


Clay

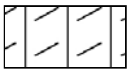

Silty clay

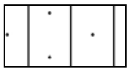

Sandy clay

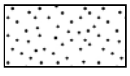

Gravelly clay

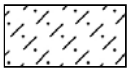

Shaly clay

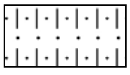

Silt


Clayey silt


Sandy silt

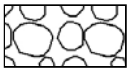

Sand

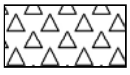

Clayey sand


Silty sand


Gravel


Sandy gravel


Cobbles, boulders

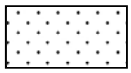

Talus

Sedimentary Rocks

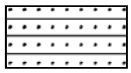

Boulder conglomerate

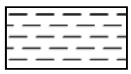

Conglomerate


Conglomeratic sandstone

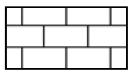

Sandstone


Siltstone


Laminite

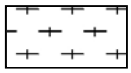

Mudstone, claystone, shale

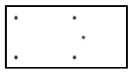

Coal


Limestone

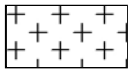
Metamorphic Rocks

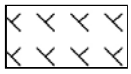

Slate, phyllite, schist

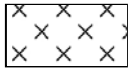

Gneiss

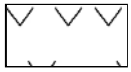

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: Maitland City Bowls Sports and Recreation
PROJECT: Geotechnical Investigation & Waste Classification
LOCATION: Maitland City Bowling Club, Melbee Street, Rutherford

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 101
PROJECT No: 39498.06
DATE: 2/3/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.04	FILLING - Generally comprising dark brown fine grained sandy silt filling with rootlets, moist							
		FILLING - Generally comprising brown, grey-brown fine grained sand filling, trace silt, trace fine to medium sized subrounded gravel		E	0.15		PID <1		
		From 0.2m, fine to coarse grained sand							
	0.3	FILLING - Generally comprising grey fine grained subrounded gravel filling, some sand, damp						▷	
		At 0.35m, 100mm diameter ag pipe							
	0.55	Bore discontinued at 0.55m, refusal on low strength sandstone							
	1								1
	2								2

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: Kobelco 3.5 tonne
DRILLER:
LOGGED: Benson
CASING: Uncased

TYPE OF BORING: 300mm Diameter Auger

WATER OBSERVATIONS: Seepage at 0.35m

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Maitland City Bowls Sports and Recreation
PROJECT: Geotechnical Investigation & Waste Classification
LOCATION: Maitland City Bowling Club, Melbee Street, Rutherford

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 102
PROJECT No: 39498.06
DATE: 2/3/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.02	FILLING - Dark grey fine grained sandy silt filling, moist							
		FILLING - Generally comprising grey-brown fine grained sand filling, trace silt, trace fine to medium subrounded gravel, moist		E	0.3		PID <1		
	0.4	Bore discontinued at 0.4m, limit of investigation							
	1								
	2								

Dynamic Penetrometer Test (blows per 150mm): 5, 10, 15, 20

RIG: Hand Tools **DRILLER:** Peade **LOGGED:** Peade **CASING:** Uncased
TYPE OF BORING: 75mm Diameter Hand Auger
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Maitland City Bowls Sports and Recreation
PROJECT: Geotechnical Investigation & Waste Classification
LOCATION: Maitland City Bowling Club, Melbee Street, Rutherford

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 103
PROJECT No: 39498.06
DATE: 2/3/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.04	FILLING - Generally comprising dark brown fine grained sandy silt filling with rootlets, moist							
		FILLING - Generally comprising brown, grey-brown fine grained sand filling , trace silt, trace fine to medium subrounded gravel		E	0.2		PID<1		
	0.3	FILLING - Generally comprising brown, fine to coarse grained sandy fine to medium sized subrounded gravel (river gravel), wet		B	0.6				
	0.7	SILTY CLAY - Stiff, orange-brown silty clay, M>Wp		B,pp	0.75		pp = 110-240	▽	
1		From 0.9m, very stiff From 1.0m, yellow-brown							1
	1.1	CLAYEY SILT - Hard, yellow-brown clayey silt, M<Wp							
		From 1.3m, grading to siltstone							
	1.6	Bore discontinued at 1.6m, limit of investigation, refusal on siltstone							
2									2

RIG: Kobelco 3.5 tonne **DRILLER:** **LOGGED:** Benson **CASING:** Uncased
TYPE OF BORING: 300mm Diameter Auger
WATER OBSERVATIONS: Seepage at 0.7m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

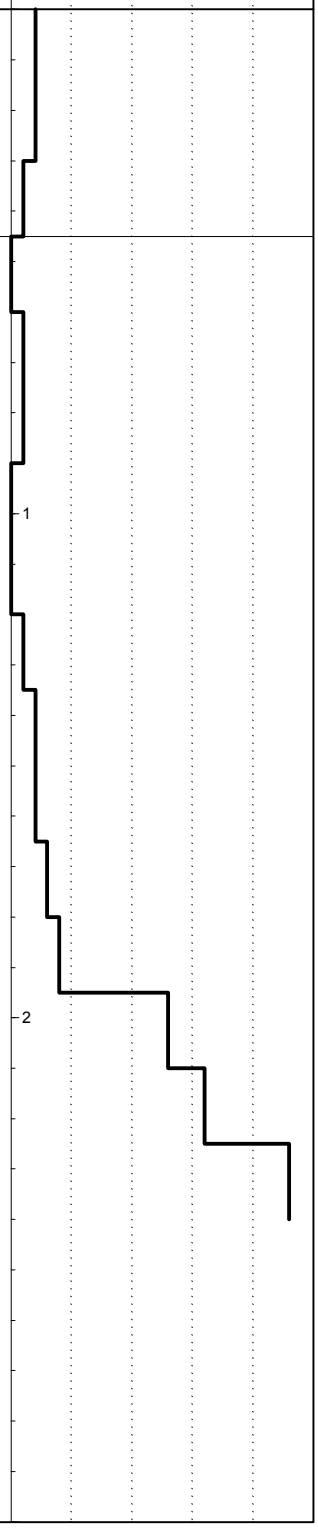
BOREHOLE LOG

CLIENT: Maitland City Bowls Sports and Recreation
PROJECT: Geotechnical Investigation & Waste Classification
LOCATION: Maitland City Bowling Club, Melbee Street, Rutherford

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 104
PROJECT No: 39498.06
DATE: 2/3/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 150mm)
	0.02	FILLING - Dark grey fine grained sandy silt filling, moist							
		FILLING - Generally comprising grey-brown fine grained sand filling, trace silt, trace fine to medium subrounded gravel, moist		E	0.1		PID <1		
		From approximately 0.3m to 0.35m, gravel content increasing		E	0.4		PID <1		
	0.45	Bore discontinued at 0.45m, limit of investigation							



RIG: Hand Tools **DRILLER:** Peade **LOGGED:** Peade **CASING:** Uncased
TYPE OF BORING: 75mm Hand Auger
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Maitland City Bowls Sports and Recreation
PROJECT: Geotechnical Investigation & Waste Classification
LOCATION: Maitland City Bowling Club, Melbee Street, Rutherford

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 105
PROJECT No: 39498.06
DATE: 2/3/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.04	FILLING - Generally comprising dark brown fine grained sandy silt with rootlets, moist		E	0.02		PID<1		
		FILLING - Generally comprising brown, grey-brown fine grained sand, trace silt, trace fine to medium sized subrounded gravel		E	0.2		PID<1		
	0.35	FILLING - Generally comprising coal chitter, some slag		E	0.35		PID<1		
	0.42	FILLING - Generally comprising orange-brown clay, trace silt, M>Wp		B,pp	0.42 0.5		pp = 90-150		
		From 0.8m, pale brown							
	1			B,pp	1.0		pp = 80-120		1
		From 1.2m, some silt (possible natural)							
				B,pp	1.35		pp = 100-150		
	1.4	Bore discontinued at 1.4m, limit of investigation, refusal on siltstone							
	2								2

RIG: Kobelco 3.5 tonne **DRILLER:** **LOGGED:** Benson **CASING:** Uncased
TYPE OF BORING: 300mm Diameter Auger
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⊻	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Maitland City Bowls Sports and Recreation
PROJECT: Geotechnical Investigation & Waste Classification
LOCATION: Maitland City Bowling Club, Melbee Street, Rutherford

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 106
PROJECT No: 39498.06
DATE: 2/3/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	FILLING - Dark grey fine grained sandy silt filling, moist							
		FILLING - Generally comprising grey-brown silty fine grained sand filling, moist		E	0.1		PID <1		
		From approximately 0.35m, some subrounded gravel and coarse grained sand		E	0.4		PID <1		
	0.45	Bore discontinued at 0.45m, limit of investigation							
	1								1
	2								2

RIG: Hand Tools **DRILLER:** Peade **LOGGED:** Peade **CASING:** Uncased
TYPE OF BORING: 75mm Hand Auger
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Maitland City Bowls Sports and Recreation
PROJECT: Geotechnical Investigation & Waste Classification
LOCATION: Maitland City Bowling Club, Melbee Street, Rutherford

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 107
PROJECT No: 39498.06
DATE: 2/3/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	FILLING - Dark grey fine grained sandy silt filling, moist							
		FILLING - Generally comprising grey-brown silty fine grained sand filling, moist		E	0.2		PID <1		
				E	0.35		PID <1		
	0.4	Bore discontinued at 0.4m, limit of investigation							
	1								1
	2								2

RIG: Hand Tools **DRILLER:** Peade **LOGGED:** Peade **CASING:** Uncased
TYPE OF BORING: 75mm Hand Auger
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Maitland City Bowls Sports and Recreation
PROJECT: Geotechnical Investigation & Waste Classification
LOCATION: Maitland City Bowling Club, Melbee Street, Rutherford

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 108
PROJECT No: 39498.06
DATE: 2/3/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	FILLING - Dark grey fine grained sandy silt filling, moist							
		FILLING - Generally comprising grey-brown silty fine grained sand filling, moist		E	0.1		PID<1		
				E	0.4		PID<1		
	0.45	Bore discontinued at 0.45m, limit of investigation							
	1								1
	2								2

RIG: Hand Tools **DRILLER:** Peade **LOGGED:** Peade **CASING:** Uncased
TYPE OF BORING: 75mm Hand Auger
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Maitland City Bowls Sports and Recreation
PROJECT: Geotechnical Investigation & Waste Classification
LOCATION: Maitland City Bowling Club, Melbee Street, Rutherford

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 109
PROJECT No: 39498.06
DATE: 2/3/2015
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	FILLING - Dark grey fine grained sandy silt filling, moist		E	0.0 0.02		PID <1		
		FILLING - Generally comprising grey-brown silty fine grained sand filling, moist		E	0.2		PID <1		
		From approximately 0.3m to 0.4m, some subangular gravel with trace coal chitter		E	0.35		PID <1		
	0.4	Bore discontinued at 0.4m, limit of investigation							
	1								1
	2								2

RIG: Hand Tools **DRILLER:** Peade **LOGGED:** Peade **CASING:** Uncased
TYPE OF BORING: 75mm Hand Auger
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	⧗	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

Appendix B

Chemical Application Record No.1 and No.2 Green
Laboratory Test Results
Quality Assurance / Quality Control
Chain of Custody (Field and Despatch)
Sample Receipts
PID Calibration Record
NSW EPA - Excavated Natural Material Order & Exemption 2014
NSW EPA – Coal Washery Rejects Order & Exemption 2014

No 1

1Time/date/weather	chemical	active	rate	Rate aplied	Total amount	Target/ Pest/disease	appli
630/7-1-15/fine 24 0bft	Strike-out meridian	Chloriphose thiamethoxam	60ml/100m 12ml/100m	400ml 120ml	520ml	Black beetle bill bug	pum
800/8-1-15/hot 28/0bft	dino0fert noculate complete	manure fertilizer	20/200m 20kg/100m	40kg 40kg	80kg	organic fertilizer	spre
700/11-1-15 showers/0 bft	dedicate	triflexystrobin	20ml/100m 20ml/100m	300ml	300ml	E.R.I	PUM rain
830/12-1-15/clearing showers 24 0bft SE	thumper	abamectin	10ml/100m	130ml	130ml	mites	pum
615/14-1-15/sunny 24 hot/0bft	soil &plant tonic oxy-rush organic supreme root max noculate hydretain kel-pro	soil and plant organic fertilizers	20-40lt/green 200ml/100m 200ml/100	30lt 2lt 3lt 2lt 2lt 2lt 2lt	43lt	soil organic's	pum
19-1-15/1030/showers 22 /0bft	heritage banner	azoxystrobin propiconazole	60ml/100m 50-100ml/100	800ml 800ml	1.6lt	pythium,brown patch spring dead	pum
20-1-15/630/clearing showers 22/0bft	thumper bounce	abamectin bifenthrin	10ml/100m 50ml/100m	130ml 400ml	530ml	mites black beetle	pum
23-1-15/630/sunny 22/0bft	nutra-feed 23	fertilizer	2-5kg/ha	5kg	5kg	fertilizer	pum
23-01-15/1230/sunny/29 /0bft	mancozeb rovral daconil	mancozeb iprodione chlorothalonil	1-2kg 90ml 130-200ml	3kg 1.6lt 1.8lt	6.4lt	brown patch dreschlera helmo	pum left c
1-2-15/700/sunny 24/0bft	shiba	tolclofos	80-100ml/100	800ml	800ml	soil/brown patch	punp 8x2
2-2-15/800/sunny/24/ 0bft	subdue	metalaxyl M	35ml/100m	400ml	400ml	pythium	pum 4-2
4-2-15/800/sunny 24/0bft	dedicate	triflexystrobin	20ml	300ml	300ml	E.R.I	8-4
7-2-15/900/sunny/28/ 0bft	anti-stress	fertilizer	20gr/1m	1x20kg	1x20kg	fertilizer	spre
12-2-15/sunny 29/se 0bft	organic supreme hardware mission	foliar fertilizer	2lt/green 2lt/green	2lt 2lt 7lt	4lt	fertilizer	pum on le

16-2-15/sunyy/23/0bft/630	noculate organic supreme kelpro U.M.X oxy rush root max	organic fertilizer	100-200ml/200ml 200ml 200ml 200-400ml 100-200ml	2lt 2lt 2lt 2lt 2lt 2lt	12lt	fertilizer	pum 10-5
16-2-15/sunny 32/0bft/NE/10	daconil transac-pro	chlorothalonil iprodione	130-200m 120ml/100	1.6lt 600ml	2.2lt	leaf brown patch helmo	left c leafr
18-2-15/sunny-19/0bft/630	thumper biff primer	abamectin bifenthrin wetter	10ml/100m 40ml/100ml	130ml 400ml 1lt	1530ml	left on leaf	
23-2-15/sunny 22 /0bft/630	heritage subdue banner	60ml/100m 35ml/100m 50-100ml/100	800ml 400ml 800ml	2lt	2lt		15-7
23-2-15/fine 24	T,M,TD signature	2.4 lt/green 1,2kg	2,4lt 1.2lt	3.6lt	3.6lt	left on leaf	

No2.

Time/date/weather	chemical	active	rate	applied	total	target	application
7am/7-1-15/fine 24 0bft	Strike-out meridian	Chlorpyifos thiamethoxam	60ml/100m 12m/100m	400ml 120ml	520ml	Beetle Bill bug	pump
1030/7-1-15/hot 28 0bft SE	perk-up pk fight protesyn	foliar fertilizer	5-10l/ha 10-20l/ha 20-30lt/ha	2lt 2lt 2lt	6lt	leaf feed	pump
800/11-1-15/rain	dedicate blytban	triflexystrobin propamocarb	20ml/100m 60ml/100m	300ml 700ml	1lt	ERI pythium	pump rain
630/11-1-15/rain	dino-fert anderson dg 17/11/12	manure	20kg/100	40kg 20kg	60kg	fertilizer	rain spreader
800/12-1-15/clearing showers 0bft SE	thumper	abamectin	10ml/100m	130ml	130ml	mites	pump
730/14-1-15/hot & sunny 24/0bft W	plant & soil tonic oxy-rush noculate kel-pro organic supreme hydretain	soil organic air to soil water retainer	20-40lt 200ml/100	30lt 2lt 2lt 2lt 3lt 2lt	41lt	soil organic fertilizer	pump at 10-5
1100/19-1-15/showers 22/0bft	banner maxx blightban	propiconazole propamocarb	50-100ml 65ml/100m	800ml 700ml	1.5lt	E.R.I pythium	showers
20-1-15/8am/clearing showers/22/0bft	thumper	abamectin	10ml/100m	130ml	130ml	mites	pump/left on leaf
23-1-15/7am/sunny 24/0bft	calcium nitrate	soil/and plant	----	10kg	10kg	fertilizer	pump 8-4
23-1-15/sunny 29/1pm/0bft	mancozeb rovral daconil	mancozeb iprodione chlorothalonil	1-2kg 90ml 130-200ml	3kg 1.6lt 1.8lt	6.4lt	brown patch dreschlera helmo	pump left on leaf
1-2-15/sunny 24/745/0bft	shiba	tolchlopos-methl	80-100ml/100	800ml	800ml	soil/brown patch	pump 15/7-8/4
1-2-15/sunny 24/9am/0bft	folimax amino phosphite	100-200ml/100m 60-150ml/100	2lt 2lt	4lt	4lt	foliar fertilizer	l;eft on lea

2-2-15/sunny 24/730/0bft	vitalize LQ photo-bore	250ml/100m 2lt/green	2lt 2lt	4lt	4lt	foliar fertilizer	left on leaf
2-2-15/sunny 28/1230/0bft S	natra-kelp	2-4lt/green	3lt	3lt	3lt	foliar fertilizer	
12-2-15/sunny 24/645/0bft	dedicate blyt ban	triflexystrobin propamocarb	20ml/100m 60ml/100m	260ml 700ml	960ml	E.R.I pythium	8-4
14-2-15/sunny 22/600/0bft	nemacur	fenamiphose	19-20ml/100	1.3lt	1.3lt	nemato des	15-7
20-2-15/overcast 20/0bft SE	noculate complete M.A.P	fertilizer		20kgx2 3KG	43kg	fertilizer	10-5
23-2-15/SUNNY 22/0bft	heritage subdue	azoxystrobin metalaxyl M	50-100/100 35ml/100m	800ml 400ml	1.2lt	brown patch pythium	10-5

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CERTIFICATE OF ANALYSIS 124434

Client:

Douglas Partners Newcastle
Box 324 Hunter Region Mail Centre
Newcastle
NSW 2310

Attention: Ian Benson, Angela Peade, C Bozinovski, M Blackert

Sample log in details:

Your Reference:	**39498.06, Rutherford**		
No. of samples:	10 soils		
Date samples received / completed instructions received	03/03/15	/	03/03/15

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	10/03/15	/	10/03/15
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	124434-1	124434-2	124434-3	124434-4	124434-5
Your Reference	----------	101	102	103	104	105
Depth	----------	0.15	0.3	0.2	0.1	0-0.02
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Date analysed	-	05/03/2015	05/03/2015	05/03/2015	05/03/2015	05/03/2015
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	89	95	89	91

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	124434-6	124434-7	124434-8	124434-9	124434-10
Your Reference	----------	105	106	107	108	109
Depth	----------	0.35-0.42	0.1	0.35	0.1	0.35
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Date analysed	-	05/03/2015	05/03/2015	05/03/2015	05/03/2015	05/03/2015
TRHC$_6$ - C$_9$	mg/kg	<25	<25	<25	<25	<25
TRHC$_6$ - C$_{10}$	mg/kg	<25	<25	<25	<25	<25
vTPHC$_6$ - C$_{10}$ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	96	93	86	96

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	124434-1	124434-2	124434-3	124434-4	124434-5
Your Reference	----------	101	102	103	104	105
Depth	----------	0.15	0.3	0.2	0.1	0-0.02
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Date analysed	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	104	103	89	89	105

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	124434-6	124434-7	124434-8	124434-9	124434-10
Your Reference	----------	105	106	107	108	109
Depth	----------	0.35-0.42	0.1	0.35	0.1	0.35
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Date analysed	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	160	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	190	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	320	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	103	105	90	105	95

PAHs in Soil						
Our Reference:	UNITS	124434-1	124434-2	124434-3	124434-4	124434-5
Your Reference	----------	101	102	103	104	105
Depth	----------	0.15	0.3	0.2	0.1	0-0.02
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Date analysed	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total Positive PAHs	mg/kg	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	89	84	88	87	87

PAHs in Soil						
Our Reference:	UNITS	124434-6	124434-7	124434-8	124434-9	124434-10
Your Reference	----------	105	106	107	108	109
Depth	----------	0.35-0.42	0.1	0.35	0.1	0.35
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Date analysed	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	2.9	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.9	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	4.5	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	5.2	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	3.5	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	3.7	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	7.9	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	6.7	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	5.2	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	0.5	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	4.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	9.0	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	9.0	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	9.0	<0.5	<0.5	<0.5	<0.5
Total Positive PAHs	mg/kg	46	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	89	90	87	86	87

Organochlorine Pesticides in soil						
Our Reference:	UNITS	124434-1	124434-2	124434-3	124434-4	124434-5
Your Reference	----------	101	102	103	104	105
Depth	----------	0.15	0.3	0.2	0.1	0-0.02
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Date analysed	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	75	72	72	85	81

Organochlorine Pesticides in soil						
Our Reference:	UNITS	124434-6	124434-7	124434-8	124434-9	124434-10
Your Reference	----------	105	106	107	108	109
Depth	----------	0.35-0.42	0.1	0.35	0.1	0.35
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Date analysed	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	76	75	72	77	73

Organophosphorus Pesticides						
Our Reference:	UNITS	124434-1	124434-2	124434-3	124434-4	124434-5
Your Reference	----------	101	102	103	104	105
Depth	----------	0.15	0.3	0.2	0.1	0-0.02
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Date analysed	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	75	72	72	85	81

Organophosphorus Pesticides						
Our Reference:	UNITS	124434-6	124434-7	124434-8	124434-9	124434-10
Your Reference	----------	105	106	107	108	109
Depth	----------	0.35-0.42	0.1	0.35	0.1	0.35
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Date analysed	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	76	75	72	77	73

PCBs in Soil						
Our Reference:	UNITS	124434-1	124434-2	124434-3	124434-4	124434-5
Your Reference	----------	101	102	103	104	105
Depth	----------	0.15	0.3	0.2	0.1	0-0.02
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Date analysed	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	75	72	72	85	81

PCBs in Soil						
Our Reference:	UNITS	124434-6	124434-7	124434-8	124434-9	124434-10
Your Reference	----------	105	106	107	108	109
Depth	----------	0.35-0.42	0.1	0.35	0.1	0.35
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date extracted	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Date analysed	-	04/03/2014	04/03/2014	04/03/2014	04/03/2014	04/03/2014
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	76	75	72	77	73

Acid Extractable metals in soil						
Our Reference:	UNITS	124434-1	124434-2	124434-3	124434-4	124434-5
Your Reference	----------	101	102	103	104	105
Depth	----------	0.15	0.3	0.2	0.1	0-0.02
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date digested	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Date analysed	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	8	9	14	8
Copper	mg/kg	6	4	4	9	10
Lead	mg/kg	6	3	4	7	6
Mercury	mg/kg	0.6	0.2	0.6	1.3	0.3
Nickel	mg/kg	12	7	7	10	5
Zinc	mg/kg	27	16	17	30	28
Manganese	mg/kg	140	120	110	190	280
Iron	mg/kg	11,000	9,500	9,900	12,000	8,500

Acid Extractable metals in soil						
Our Reference:	UNITS	124434-6	124434-7	124434-8	124434-9	124434-10
Your Reference	----------	105	106	107	108	109
Depth	----------	0.35-0.42	0.1	0.35	0.1	0.35
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date digested	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Date analysed	-	04/03/2015	04/03/2015	04/03/2015	04/03/2015	04/03/2015
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	0.6	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	11	17	11	11
Copper	mg/kg	11	5	9	5	6
Lead	mg/kg	11	4	24	4	5
Mercury	mg/kg	0.1	<0.1	0.1	0.1	0.3
Nickel	mg/kg	23	11	21	11	11
Zinc	mg/kg	46	17	38	18	28
Manganese	mg/kg	380	150	270	160	190
Iron	mg/kg	10,000	10,000	16,000	10,000	12,000
Sulphur	mg/kg	250	[NA]	[NA]	[NA]	[NA]

Misc Inorg - Soil						
Our Reference:	UNITS	124434-1	124434-2	124434-3	124434-4	124434-5
Your Reference	----------	101	102	103	104	105
Depth	----------	0.15	0.3	0.2	0.1	0-0.02
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	9/03/2015	9/03/2015	9/03/2015	9/03/2015	9/03/2015
Date analysed	-	9/03/2015	9/03/2015	9/03/2015	9/03/2015	9/03/2015
pH 1:5 soil:water	pH Units	5.1	5.6	5.3	6.2	6.6
Electrical Conductivity 1:5 soil:water	µS/cm	110	25	24	55	80

Misc Inorg - Soil						
Our Reference:	UNITS	124434-6	124434-7	124434-8	124434-9	124434-10
Your Reference	----------	105	106	107	108	109
Depth	----------	0.35-0.42	0.1	0.35	0.1	0.35
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	9/03/2015	9/03/2015	9/03/2015	9/03/2015	9/03/2015
Date analysed	-	9/03/2015	9/03/2015	9/03/2015	9/03/2015	9/03/2015
pH 1:5 soil:water	pH Units	5.6	6.6	5.9	6.5	5.6
Electrical Conductivity 1:5 soil:water	µS/cm	64	44	48	44	40

Moisture						
Our Reference:	UNITS	124434-1	124434-2	124434-3	124434-4	124434-5
Your Reference	----------	101	102	103	104	105
Depth	----------	0.15	0.3	0.2	0.1	0-0.02
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	4/03/2015	4/03/2015	4/03/2015	4/03/2015	4/03/2015
Date analysed	-	5/03/2015	5/03/2015	5/03/2015	5/03/2015	5/03/2015
Moisture	%	19	12	8.9	14	21

Moisture						
Our Reference:	UNITS	124434-6	124434-7	124434-8	124434-9	124434-10
Your Reference	----------	105	106	107	108	109
Depth	----------	0.35-0.42	0.1	0.35	0.1	0.35
Date Sampled		02/03/2015	02/03/2015	02/03/2015	02/03/2015	02/03/2015
Type of sample		soil	soil	soil	soil	soil
Date prepared	-	4/03/2015	4/03/2015	4/03/2015	4/03/2015	4/03/2015
Date analysed	-	5/03/2015	5/03/2015	5/03/2015	5/03/2015	5/03/2015
Moisture	%	25	11	15	23	9.7

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25oC in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/03/2015	124434-1	04/03/2015 || 04/03/2015	LCS-2	04/03/2015
Date analysed	-			05/03/2015	124434-1	05/03/2015 || 05/03/2015	LCS-2	05/03/2015
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	124434-1	<25 || <25	LCS-2	120%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	124434-1	<25 || <25	LCS-2	120%
Benzene	mg/kg	0.2	Org-016	<0.2	124434-1	<0.2 || <0.2	LCS-2	124%
Toluene	mg/kg	0.5	Org-016	<0.5	124434-1	<0.5 || <0.5	LCS-2	120%
Ethylbenzene	mg/kg	1	Org-016	<1	124434-1	<1 || <1	LCS-2	117%
m+p-xylene	mg/kg	2	Org-016	<2	124434-1	<2 || <2	LCS-2	120%
o-Xylene	mg/kg	1	Org-016	<1	124434-1	<1 || <1	LCS-2	120%
naphthalene	mg/kg	1	Org-014	<1	124434-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	101	124434-1	91 || 90 || RPD: 1	LCS-2	100%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/03/2015	124434-1	04/03/2015 || 04/03/2015	LCS-2	04/03/2015
Date analysed	-			04/03/2015	124434-1	04/03/2015 || 04/03/2015	LCS-2	04/03/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	124434-1	<50 || <50	LCS-2	117%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	124434-1	<100 || <100	LCS-2	128%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	124434-1	<100 || <100	LCS-2	101%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	124434-1	<50 || <50	LCS-2	117%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	124434-1	<100 || <100	LCS-2	128%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	124434-1	<100 || <100	LCS-2	101%
Surrogate o-Terphenyl	%		Org-003	95	124434-1	104 || 102 || RPD: 2	LCS-2	120%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/03/2015	124434-1	04/03/2015 || 04/03/2015	LCS-2	04/03/2015
Date analysed	-			04/03/2015	124434-1	04/03/2015 || 04/03/2015	LCS-2	04/03/2015
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	LCS-2	96%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	LCS-2	97%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	LCS-2	92%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	LCS-2	92%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	LCS-2	108%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	LCS-2	89%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	124434-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	124434-1	<0.05 || <0.05	LCS-2	109%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	88	124434-1	89 || 86 || RPD: 3	LCS-2	91%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/03/2014	124434-1	04/03/2014 || 04/03/2014	LCS-1	04/03/2014
Date analysed	-			04/03/2014	124434-1	04/03/2014 || 04/03/2014	LCS-1	04/03/2014
HCB	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	107%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	108%
Heptachlor	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	103%
delta-BHC	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	106%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	107%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	108%
Dieldrin	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	107%
Endrin	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	111%
pp-DDD	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	118%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	LCS-1	105%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	75	124434-1	75 || 71 || RPD: 5	LCS-1	74%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/03/2014	124434-1	04/03/2014 || 04/03/2014	LCS-1	04/03/2014
Date analysed	-			04/03/2014	124434-1	04/03/2014 || 04/03/2014	LCS-1	04/03/2014
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	LCS-1	91%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	LCS-1	102%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	LCS-1	103%
Dimethoate	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	LCS-1	105%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	LCS-1	88%
Malathion	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	LCS-1	87%
Parathion	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	LCS-1	124%
Ronnel	mg/kg	0.1	Org-008	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-008	75	124434-1	75 || 71 || RPD: 5	LCS-1	75%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/03/2014	124434-1	04/03/2014 || 04/03/2014	LCS-1	04/03/2014
Date analysed	-			04/03/2014	124434-1	04/03/2014 || 04/03/2014	LCS-1	04/03/2014
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221	mg/kg	0.1	Org-006	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	124434-1	<0.1 || <0.1	LCS-1	99%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	124434-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	75	124434-1	75 || 71 || RPD: 5	LCS-1	101%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			04/03/2015	124434-1	04/03/2015 || 04/03/2015	LCS-1	04/03/2015
Date analysed	-			04/03/2015	124434-1	04/03/2015 || 04/03/2015	LCS-1	04/03/2015
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	124434-1	<4 || <4	LCS-1	111%
Cadmium	mg/kg	0.4	Metals-020 ICP-AES	<0.4	124434-1	<0.4 || <0.4	LCS-1	107%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	124434-1	12 || 13 || RPD: 8	LCS-1	107%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	124434-1	6 || 5 || RPD: 18	LCS-1	109%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	124434-1	6 || 5 || RPD: 18	LCS-1	103%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	124434-1	0.6 || 0.4 || RPD: 40	LCS-1	97%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	124434-1	12 || 10 || RPD: 18	LCS-1	105%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	124434-1	27 || 24 || RPD: 12	LCS-1	103%
Manganese	mg/kg	1	Metals-020 ICP-AES	<1	124434-1	140 || 120 || RPD: 15	LCS-1	113%
Iron	mg/kg	1	Metals-020 ICP-AES	<1	124434-1	11000 || 11000 || RPD: 0	LCS-1	111%
Sulphur	mg/kg	10	Metals-020 ICP-AES	<10	[NT]	[NT]	LCS-1	103%

QUALITY CONTROL Misc Inorg - Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			09/03/2015	124434-4	9/03/2015 || 9/03/2015	LCS-1	09/03/2015
Date analysed	-			09/03/2015	124434-4	9/03/2015 || 9/03/2015	LCS-1	09/03/2015
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	124434-4	6.2 || 6.1 || RPD: 2	LCS-1	100%
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	124434-4	55 || 54 || RPD: 2	LCS-1	103%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	124434-2	04/03/2015
Date analysed	-	[NT]	[NT]	124434-2	05/03/2015
TRHC$_6$ - C$_9$	mg/kg	[NT]	[NT]	124434-2	115%
TRHC$_6$ - C$_{10}$	mg/kg	[NT]	[NT]	124434-2	115%
Benzene	mg/kg	[NT]	[NT]	124434-2	121%
Toluene	mg/kg	[NT]	[NT]	124434-2	116%
Ethylbenzene	mg/kg	[NT]	[NT]	124434-2	112%
m+p-xylene	mg/kg	[NT]	[NT]	124434-2	114%
o-Xylene	mg/kg	[NT]	[NT]	124434-2	115%
naphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	124434-2	95%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	124434-2	04/03/2015
Date analysed	-	[NT]	[NT]	124434-2	04/03/2015
TRHC$_{10}$ - C$_{14}$	mg/kg	[NT]	[NT]	124434-2	120%
TRHC$_{15}$ - C$_{28}$	mg/kg	[NT]	[NT]	124434-2	130%
TRHC$_{29}$ - C$_{36}$	mg/kg	[NT]	[NT]	124434-2	85%
TRH>C$_{10}$-C$_{16}$	mg/kg	[NT]	[NT]	124434-2	120%
TRH>C$_{16}$-C$_{34}$	mg/kg	[NT]	[NT]	124434-2	130%
TRH>C$_{34}$-C$_{40}$	mg/kg	[NT]	[NT]	124434-2	85%
Surrogate o-Terphenyl	%	[NT]	[NT]	124434-2	117%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	124434-6	04/03/2015 || 04/03/2015	124434-2	04/03/2015
Date analysed	-	124434-6	04/03/2015 || 04/03/2015	124434-2	04/03/2015
Naphthalene	mg/kg	124434-6	<0.1 || 0.1	124434-2	96%
Acenaphthylene	mg/kg	124434-6	0.2 || 0.4 || RPD: 67	[NR]	[NR]
Acenaphthene	mg/kg	124434-6	0.2 || 0.1 || RPD: 67	[NR]	[NR]
Fluorene	mg/kg	124434-6	0.2 || 0.5 || RPD: 86	124434-2	96%
Phenanthrene	mg/kg	124434-6	2.9 || 6.6 || RPD: 78	124434-2	93%
Anthracene	mg/kg	124434-6	0.9 || 1.8 || RPD: 67	[NR]	[NR]
Fluoranthene	mg/kg	124434-6	4.5 || 7.1 || RPD: 45	124434-2	92%
Pyrene	mg/kg	124434-6	5.2 || 7.8 || RPD: 40	124434-2	108%
Benzo(a)anthracene	mg/kg	124434-6	3.5 || 4.4 || RPD: 23	[NR]	[NR]
Chrysene	mg/kg	124434-6	3.7 || 4.1 || RPD: 10	124434-2	89%
Benzo(b,j+k)fluoranthene	mg/kg	124434-6	7.9 || 7.6 || RPD: 4	[NR]	[NR]
Benzo(a)pyrene	mg/kg	124434-6	6.7 || 6.3 || RPD: 6	124434-2	108%
Indeno(1,2,3-c,d)pyrene	mg/kg	124434-6	5.2 || 3.8 || RPD: 31	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	124434-6	0.5 || 0.8 || RPD: 46	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	124434-6	4.1 || 3.4 || RPD: 19	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	124434-6	89 || 98 || RPD: 10	124434-2	90%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	124434-2	04/03/2014
Date analysed	-	[NT]	[NT]	124434-2	04/03/2014
HCB	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	[NT]	[NT]	124434-2	106%
gamma-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	[NT]	[NT]	124434-2	105%
Heptachlor	mg/kg	[NT]	[NT]	124434-2	101%
delta-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	[NT]	[NT]	124434-2	105%
Heptachlor Epoxide	mg/kg	[NT]	[NT]	124434-2	105%
gamma-Chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	[NT]	[NT]	124434-2	105%
Dieldrin	mg/kg	[NT]	[NT]	124434-2	105%
Endrin	mg/kg	[NT]	[NT]	124434-2	108%
pp-DDD	mg/kg	[NT]	[NT]	124434-2	115%
Endosulfan II	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	[NT]	[NT]	124434-2	102%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Methoxychlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%	[NT]	[NT]	124434-2	72%
QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	124434-2	04/03/2014
Date analysed	-	[NT]	[NT]	124434-2	04/03/2014
Azinphos-methyl (Guthion)	mg/kg	[NT]	[NT]	124434-2	72%
Bromophos-ethyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	mg/kg	[NT]	[NT]	124434-2	99%
Chlorpyriphos-methyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	[NT]	[NT]	[NR]	[NR]
Dichlorvos	mg/kg	[NT]	[NT]	124434-2	94%
Dimethoate	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	[NT]	[NT]	124434-2	98%
Fenitrothion	mg/kg	[NT]	[NT]	124434-2	82%
Malathion	mg/kg	[NT]	[NT]	124434-2	78%
Parathion	mg/kg	[NT]	[NT]	124434-2	116%
Ronnel	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%	[NT]	[NT]	124434-2	73%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	124434-2	04/03/2014
Date analysed	-	[NT]	[NT]	124434-2	04/03/2014
Arochlor 1016	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1221	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	[NT]	[NT]	124434-2	94%
Arochlor 1260	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	124434-2	99%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	124434-2	04/03/2015
Date analysed	-	[NT]	[NT]	124434-2	04/03/2015
Arsenic	mg/kg	[NT]	[NT]	124434-2	101%
Cadmium	mg/kg	[NT]	[NT]	124434-2	107%
Chromium	mg/kg	[NT]	[NT]	124434-2	106%
Copper	mg/kg	[NT]	[NT]	124434-2	109%
Lead	mg/kg	[NT]	[NT]	124434-2	103%
Mercury	mg/kg	[NT]	[NT]	124434-2	86%
Nickel	mg/kg	[NT]	[NT]	124434-2	107%
Zinc	mg/kg	[NT]	[NT]	124434-2	103%
Manganese	mg/kg	[NT]	[NT]	124434-2	108%
Iron	mg/kg	[NT]	[NT]	124434-2	#
Sulphur	mg/kg	[NT]	[NT]	[NR]	[NR]

Report Comments:

METALS_S: # Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 124434-A

Client:

Douglas Partners Newcastle
Box 324 Hunter Region Mail Centre
Newcastle
NSW 2310

Attention: Ian Benson, Angela Peade, C Bozinovski, M Blackert

Sample log in details:

Your Reference:	**39498.06, Rutherford**
No. of samples:	Additional Testing on 1 Soil
Date samples received / completed instructions received	03/03/15 / 16/03/15

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	23/03/15 / 18/03/15
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Jacinta Hurst
Laboratory Manager

PAHs in TCLP (USEPA 1311)		
Our Reference:	UNITS	124434-A-6
Your Reference	----------	105
Depth	----------	0.35-0.42
Date Sampled		02/03/2015
Type of sample		soil
pH of soil for fluid# determ.	pH units	8.7
pH of soil for fluid # determ. (acid)	pH units	1.7
Extraction fluid used	-	1
pH of final Leachate	pH units	4.9
Date extracted	-	17/03/2015
Date analysed	-	17/03/2015
Naphthalene in TCLP	mg/L	<0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	<0.001
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	<0.001
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	<0.001
Pyrene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Total +ve PAH's	mg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	101

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311 and in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/03/2015	[NT]	[NT]	LCS-W1	17/03/2015
Date analysed	-			17/03/2015	[NT]	[NT]	LCS-W1	17/03/2015
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	82%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	83%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	88%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	94%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	94%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	84%
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	96%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	83	[NT]	[NT]	LCS-W1	96%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
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Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
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Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Quality Assurance / Quality Control Report
Waste Classification Assessment
Proposed Synthetic Bowling Greens
Melbee Street, Rutherford, New South Wales

Quality Assurance (QA) was maintained by:

- Compliance with a Project Quality Plan written for the objectives of the study;
- Using qualified engineers / scientists to undertake the field supervision and sampling;
- Following the Douglas Partners Pty Ltd (DP) operating procedures for sampling, field testing and decontamination as presented in Table D1; and
- Using National Association of Testing Authorities, Australia (NATA) registered laboratories for sample testing that generally utilise standard laboratory methods of the US EPA, the APHA and NSW EPA.

Table D1: Field Procedures

Abbreviation	Procedure Name
FPM LOG	Logging
FPM DECONT	Decontamination of Personnel and Equipment
FPM ENVID	Sample Identification, Handling, Transport and Storage of Contamination Samples
FPM PIDETC	Operation of Field Analysers
FPM ENVSAMP	Sampling of Contaminated Soils

Notes to Table D1:

From DP Field Procedures Manual

Quality Control (QC) of the laboratory programme was achieved by the following means:

- Method blanks - the laboratory ran reagent blanks to confirm the equipment and standards used were uncontaminated;
- Laboratory replicates - the laboratory split samples internally and conducted tests on separate extracts; and,
- Laboratory spikes - samples were spiked by the laboratory with a known concentration of contaminants and subsequently tested for percent recovery.

Discussion

A. Method Blanks

All method blanks returned results lower than the laboratory detection limit, therefore are acceptable.

B. Laboratory Replicates

An RPD data quality objective of up to 50% is generally considered to be acceptable for organic analysis, and 35% for inorganics (i.e. Metals).

The average RPD for individual contaminants ranged from 0% to 46% and were generally considered to be within acceptable limits with the exception of the following in soil:

- Mercury (40%); and
- PAH (67% to 86%).

The elevated RPDs may be attributed to the heterogeneity of fill material and relatively low concentrations, which can result in high RPDs.

C. Laboratory Spikes

Recoveries in the order of 70% to 130% are generally considered to be acceptable for inorganic material and 60% to 140% for organic material. The average percent recovery for individual contaminants ranged from 72% to 130%, which is within the quality control objectives. The results should however be qualified and may slightly under-estimate or over-estimate contaminant concentrations in certain samples (i.e. biased low or high respectively).

Conclusions

In summary, while some elevated results were found, they can be attributed to heterogeneity of filling material and relatively low concentration of contaminants.

It is also noted that the magnitude of RPDs for field replicates (i.e. blind replicates) are generally higher than those for laboratory replicates. Field replicates results generally show greater variability than laboratory replicates, because they measure both field and laboratory reproducibility.

The accuracy and precision of the soil testing procedures, as inferred by the laboratory QA / QC data is considered to be of sufficient standard to allow the data reported to be used in interpret site contamination conditions.

Douglas Partners
Geotechnics · Environment · Groundwater

CHAIN OF CUSTODY FIELD SHEET

Client: Maitland City Bowls Sports and Recreation

Project: Waste Classification Assessment Project No: 39498.06

Location: Maitland City Bowling Club, Melbee Street, Rutherford

Field								DP Office	Despatch	Notes
Sample ID	Depth (m)	Duplicate/ Replicate Sample	Sample Type S-soil W-water	Container Type G-glass P-plastic	Sampling By	Sampling Date	Sampling Time	Received by: ALP Date: 3/2/15 Storage Location*	☑ Envirolab Date: 3/2/15	
101	0.15	D1	S	G, P	ALP	2/3/15	8:40am	Estey	✓	
103	0.2	–	↓	↓	↓	↓	↓	↓	✓	
105	0.2	–								
104	0.1	–							✓	
104	0.4	–								
107	0.2	–								
107	0.35	D2							✓	
106	0.1	–							✓	
106	0.4	–								
109	0.2	–								
109	0.35	–							✓	
108	0.1	–							✓	
108	0.4	–					10:00am			
105	0.35-0.42	–					10:32am		✓	
105	0-0.02	–					10:35am		✓	
107	0-0.02	–					10:40am			
102	0.3	–	↓	↓	↓	↓	9.00 am	↓	✓	

Default containers for soil: glass = clear 125/250 mL with teflon liner, plastic =press seal bag
*Default storage: Glass containers in fridge, plastic containers shelved, all water samples in fridge

0-0°C.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project Name: Rutherford
Project No: 39498.06 DP Order No: 118338
DP Contact Person: Ian Benson / Angela Peade
Prior Storage: esky / fridge / freezer / shelved (circle)

To: Envirolab Services Pty Ltd
12 Ashley Street
CHATSWOOD NSW 2067
Ph: (02) 9910 6200
Attn: Jacinta Hurst

Sample ID	Date Sampled	Sample Type S-soil W-water	Lab ID	Analytes: TRH	BTEX	#Metals	PAH	OCP	OPP	PCB	pH/EC	total S				Notes
101/0.15	2/3/15	S	1	✓	✓	✓	✓	✓	✓	✓	✓					Combo6 + pH/EC
102/0.3			2	✓	✓	✓	✓	✓	✓	✓	✓					"
103/0.2			3	✓	✓	✓	✓	✓	✓	✓	✓					"
104/0.1			4	✓	✓	✓	✓	✓	✓	✓	✓					"
105/0-0.02			5	✓	✓	✓	✓	✓	✓	✓	✓					"
105/0.35-0.42			6	✓	✓	✓	✓	✓	✓	✓	✓	✓				"
106/0.1			7	✓	✓	✓	✓	✓	✓	✓	✓					"
107/0.35			8	✓	✓	✓	✓	✓	✓	✓	✓					"
108/0.1			9	✓	✓	✓	✓	✓	✓	✓	✓					"
109/0.35			10	✓	✓	✓	✓	✓	✓	✓	✓					"
PQL (S)		mg/kg														
PQL (W)		mg/L														

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 124434
Date Received: 3/3/15
Time Received: 09:00
Received by: JYH
Temp: Cool / Ambient 6.0°C
Cooling: Ice / Icepack
Security: Intact / Broken / None

PQL = practical quantitation limit *As per Laboratory Method (Detection Limit)
# - Metals to Analyse (Please circle) As Cd Cr Cu Pb Zn Hg Ni Mn Fe Other
Date relinquished: 2/3/15
Total number of samples in container: 10
Results required by:
TAT (Circle): Standard 72 hr 48hr 24hr

SAMPLES RECEIVED
Please sign and date to acknowledge receipt of samples and return by fax
Signature:
Date: 3/3/15 Lab Ref: 1244

Send results to:
Douglas Partners Pty Ltd
Address:
BOX 324 Hunter Region Mail Centre
NSW 2310
Fax: (02) 4960 9601

Aileen Hie

From: Dana Wilson <Dana.Wilson@douglaspartners.com.au>
Sent: Monday, 16 March 2015 8:31 AM
To: Jacinta Hurst; Aileen Hie
Cc: Ian Benson; Chris Bozinovski; Angela Peade
Subject: Additional TCLP Testing - 124434
Attachments: 124434 rev coc.pdf

Jacinta/Aileen

Can you please undertake TCLP testing for PAH on sample **124434-6** (DP sample 105/0.35-0.42).

Standard TAR. Please invoice under PO 119506.

Regards,

Dana Wilson | Project Manager
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
15 Callistemon Close Warabrook NSW 2304 | Box 324 Hunter Region Mail Centre NSW 2310
P: 02 4960 9600 | F: 02 4960 9601 | M: 0402 057 144 | E: Dana.Wilson@douglaspartners.com.au

Envirolab Ref: 124434 A

Due: 23/3/15

Std TAT.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Douglas Partners Newcastle
Attention	Ian Benson, Angela Peade, C Bozinovski, M Blackert

Sample Login Details	
Your Reference	39498.06, Rutherford
Envirolab Reference	124434
Date Sample Received	03/03/2015
Date Instructions Received	03/03/2015
Date Results Expected to be Reported	10/03/2015

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	10 soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	0.0
Cooling Method	Ice
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples
Total S added to sample 105/0.35-0.42

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
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Sample Id	*Acid Extractable metals in soil*	*Electrical Conductivity 1:5 soil:water*	*Organochlorine Pesticides in soil*	*Organophosphorus Pesticides*	*PAHs in Soil*	*PCBs in Soil*	*pH 1:5 soil:water*	*svTRH (C10-C40) in Soil*	*vTRH(C6-C10)/BTEXN in Soil*
101-0.15	✓	✓	✓	✓	✓	✓	✓	✓	✓
102-0.3	✓	✓	✓	✓	✓	✓	✓	✓	✓
103-0.2	✓	✓	✓	✓	✓	✓	✓	✓	✓
104-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓
105-0-0.02	✓	✓	✓	✓	✓	✓	✓	✓	✓
105-0.35-0.42	✓	✓	✓	✓	✓	✓	✓	✓	✓
106-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓
107-0.35	✓	✓	✓	✓	✓	✓	✓	✓	✓
108-0.1	✓	✓	✓	✓	✓	✓	✓	✓	✓
109-0.35	✓	✓	✓	✓	✓	✓	✓	✓	✓

Douglas Partners
Geotechnics | Environment | Groundwater

Photoionisation Detector (PID)
CALIBRATION RECORD

PROJECT: Waste Classification - Rutherford	**PROJECT NO:** 39498.06

PID: PhotoVAC 2020 Pro Plus MiniRAE 2000 (MiniRAE 3000 - NE291 ✓) MiniRae LITE (circle)	**LAMP** : 10.6 eV **Unit NE number:**

CALIBRATION	
ZERO AIR: Ambient	
RESPONSE FACTOR: 1.0	
SPAN GAS: Isobutylene	**CONCENTRATION:** 100 ppm

OPERATOR:	ALP	**SIGNED:**		**DATE:**	2/3/15

M:\Environmental\Templates\Field Templates\Calibration Sheets\PID Calibration – May 2014

Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014

The excavated natural material order 2014

Introduction

This order, issued by the Environment Protection Authority (EPA) under clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation), imposes the requirements that must be met by suppliers of excavated natural material to which 'the excavated natural material exemption 2014' applies. The requirements in this order apply in relation to the supply of excavated natural material for application to land as engineering fill or for use in earthworks.

1. Waste to which this order applies

1.1. This order applies to excavated natural material. In this order, excavated natural material means naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

a) been excavated from the ground, and
b) contains at least 98% (by weight) natural material, and
c) does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.

2. Persons to whom this order applies

2.1. The requirements in this order apply, as relevant, to any person who supplies excavated natural material, that has been generated, processed or recovered by the person.

2.2. This order does not apply to the supply of excavated natural material to a consumer for land application at a premises for which the consumer holds a licence under the POEO Act that authorises the carrying out of the scheduled activities on the premises under clause 39 'waste disposal (application to land)' or clause 40 'waste disposal (thermal treatment)' of Schedule 1 of the POEO Act.

3. Duration

3.1. This order commences on 24 November 2014 and is valid until revoked by the EPA by notice published in the Government Gazette.

4. Generator requirements

The EPA imposes the following requirements on any generator who supplies excavated natural material.

Sampling requirements

4.1. On or before supplying excavated natural material, the generator must:

4.1.1. Prepare a written sampling plan which includes a description of sample preparation and storage procedures for the excavated natural material.

4.1.2. Undertake sampling and testing of the excavated natural material as required under clauses 4.2, 4.3, and 4.4 below. The sampling must be carried out in accordance with the written sampling plan.

4.2. The generator must undertake sampling and analysis of the material for ASS and PASS, in accordance with the NSW Acid Sulfate Soil Manual, Acid Sulfate Soils Management Advisory Council, 1998 and the updated Laboratory Methods Guidelines version 2.1 – June 2004 where:

4.2.1. the pH measured in the material is below 5, and/or

4.2.2. the review of the applicable Acid Sulfate Soil Risk Maps (published by the former Department of Land and Water Conservation and available at http://www.environment.nsw.gov.au/acidsulfatesoil/riskmaps.htm) indicates the potential presence of ASS.

4.3. For stockpiled material, the generator must:

4.3.1. undertake sampling in accordance with Australian Standard 1141.3.1-2012 Methods for sampling and testing aggregates – Sampling – Aggregates (or equivalent);

4.3.2. undertake characterisation sampling by collecting the number of samples listed in Column 2 of Table 1 with respect to the quantity of the waste listed in Column 1 of Table 1 and testing each sample for the chemicals and other attributes listed in Column 1 of Table 4. For the purposes of characterisation sampling the generator must collect:

4.3.2.1. composite samples for attributes 1 to 10 and 18 in Column 1 of Table 4.

4.3.2.2. discrete samples for attributes 11 to 17 in Column 1 of Table 4.

4.3.2.3. The generator must carry out sampling in a way that ensures that the samples taken are representative of the material from the entire stockpile. All parts of the stockpile must be equally accessible for sampling.

4.3.2.4. for stockpiles greater than 4,000 tonnes the number of samples described in Table 1 must be repeated.

4.3.3. store the excavated natural material appropriately until the characterisation test results are validated as compliant with the maximum average concentration or other value listed in Column 2 of Table 4 and the absolute maximum concentration or other value listed in Column 3 of Table 4.

Table 1

Sampling of Stockpiled Material		
Column 1	**Column 2**	**Column 3**
Quantity (tonnes)	**Number of samples**	**Validation**
<500	3	Required
500 – 1,000	4	
1,000 – 2,000	5	
2,000 – 3,000	7	
3,000 – 4,000	10	

4.4. For in situ material, the generator must:

4.4.1. undertake sampling by collecting discrete samples. Compositing of samples is not permitted for in-situ materials.

4.4.2. undertake characterisation sampling for the range of chemicals and other attributes listed in Column 1 of Table 4 according to the requirements listed in Columns 1, 2 and 3 of Table 2. When the ground surface is not comprised of soil (e.g. concrete slab), samples must be taken at the depth at which the soil commences.

4.4.3. undertake sampling at depth according to Column 1 of Table 3.

4.4.4. collect additional soil samples (and analyse them for the range of chemicals and other attributes listed in Column 1 of Table 4), at any depth exhibiting discolouration, staining, odour or other indicators of contamination inconsistent with soil samples collected at the depth intervals indicated in Table 3.

4.4.5. segregate and exclude hotspots identified in accordance with Table 2, from material excavated for reuse.

4.4.6. subdivide sites larger than 50,000 m² into smaller areas and sample each area as per Table 2.

4.4.7. store the excavated natural material appropriately until the characterisation test results are validated as compliant with the maximum average concentration or other value listed in Column 2 of Table 4 and the absolute maximum concentration or other value listed in Column 3 of Table 4.

Table 2

***In Situ* Sampling at surface**				
Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**
Size of *in situ* area (m^2)	**Number of systematic sampling points recommended**	**Distance between two sampling points** (m)	**Diameter of the hot spot that can be detected with 95% confidence** (m)	**Validation**
500	5	10.0	11.8	Required
1000	6	12.9	15.2	
2000	7	16.9	19.9	
3000	9	18.2	21.5	
4000	11	19.1	22.5	
5000	13	19.6	23.1	
6000	15	20.0	23.6	
7000	17	20.3	23.9	
8000	19	20.5	24.2	
9000	20	21.2	25.0	
10,000	21	21.8	25.7	
15,000	25	25.0	28.9	
20,000	30	25.8	30.5	
25,000	35	26.7	31.5	
30,000	40	27.5	32.4	
35,000	45	27.9	32.9	
40,000	50	28.3	33.4	
45,000	52	29.3	34.6	
50,000	55	30.2	35.6	

Table 2 has been taken from NSW EPA 1995, *Contaminated Sites Sampling Design Guidelines*, NSW Environment Protection Authority.

Table 3

***In Situ* Sampling at Depth**	
Column 1	**Column 2**
Sampling Requirements *	**Validation**
1 soil sample at 1.0 m bgl from each surface sampling point followed by 1 soil sample for every metre thereafter. From 1.0 m bgl, sample at the next metre interval until the proposed depth of excavation of the material is reached. If the proposed depth of excavation is between 0.5 to 0.9 m after the last metre interval, sample at the base of the proposed depth of excavation.	Required if the depth of excavation is equal to or greater than 1.0 m bgl

* Refer to Notes for examples

Chemical and other material requirements

4.5. The generator must not supply excavated natural material waste to any person if, in relation to any of the chemical and other attributes of the excavated natural material:

4.5.1. The chemical concentration or other attribute of any sample collected and tested as part of the characterisation of the excavated natural material exceeds the absolute maximum concentration or other value listed in Column 3 of Table 4:

4.5.2. The average concentration or other value of that attribute from the characterisation of the excavated natural material (based on the arithmetic mean) exceeds the maximum average concentration or other value listed in Column 2 of Table 4.

4.6. The absolute maximum concentration or other value of that attribute in any excavated natural material supplied under this order must not exceed the absolute maximum concentration or other value listed in Column 3 of Table 4.

Table 4

Column 1	Column 2	Column 3
Chemicals and other attributes	**Maximum average concentration for characterisation** (mg/kg 'dry weight' unless otherwise specified)	**Absolute maximum concentration** (mg/kg 'dry weight' unless otherwise specified)
1. Mercury	0.5	1
2. Cadmium	0.5	1
3. Lead	50	100
4. Arsenic	20	40
5. Chromium (total)	75	150
6. Copper	100	200
7. Nickel	30	60
8. Zinc	150	300
9. Electrical Conductivity	1.5 dS/m	3 dS/m
10. pH *	5 to 9	4.5 to 10
11. Total Polycyclic Aromatic Hydrocarbons (PAHs)	20	40
12. Benzo(a)pyrene	0.5	1
13. Benzene	NA	0.5
14. Toluene	NA	65
15. Ethyl-benzene	NA	25
16. Xylene	NA	15
17. Total Petroleum Hydrocarbons C_{10}-C_{36}	250	500
18. Rubber, plastic, bitumen, paper, cloth, paint and wood	0.05%	0.10%

* The ranges given for pH are for the minimum and maximum acceptable pH values in the excavated natural material.

Test methods

4.7. The generator must ensure that any testing of samples required by this order is undertaken by analytical laboratories accredited by the National Association of Testing Authorities (NATA), or equivalent.

4.8. The generator must ensure that the chemicals and other attributes (listed in Column 1 of Table 4) in the excavated natural material it supplies are tested in accordance with the test methods specified below or other equivalent analytical methods. Where an equivalent analytical method is used the detection limit must be equal to or less than that nominated for the given method below.

4.8.1. Test methods for measuring the mercury concentration.

4.8.1.1. Analysis using USEPA SW-846 Method 7471B Mercury in solid or semisolid waste (manual cold vapour technique), or an equivalent analytical method with a detection limit < 20% of the stated absolute maximum concentration in Column 3 of Table 2 (i.e. < 0.20 mg/kg dry weight).

4.8.1.2. Report as mg/kg dry weight.

4.8.2. Test methods for measuring chemicals 2 to 8.

4.8.2.1. Sample preparation by digesting using USEPA SW-846 Method 3051A Microwave assisted acid digestion of sediments, sludges, soils, and oils (or an equivalent analytical method).

4.8.2.2. Analysis using USEPA SW-846 Method 6010C Inductively coupled plasma - atomic emission spectrometry, or an equivalent analytical method with a detection limit < 10% of the stated absolute maximum concentration in Column 3 of Table 2, (e.g. 10 mg/kg dry weight for lead).

4.8.2.3. Report as mg/kg dry weight.

4.8.3. Test methods for measuring electrical conductivity and pH.

4.8.3.1. Sample preparation by mixing 1 part excavated natural material with 5 parts distilled water.

4.8.3.2. Analysis using Method 103 (pH) and 104 (Electrical Conductivity) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).

4.8.3.3. Report electrical conductivity in deciSiemens per metre (dS/m).

4.8.4. Test method for measuring Polynuclear Aromatic Hydrocarbons (PAHs) and benzo(a)pyrene.

4.8.4.1. Analysis using USEPA SW-846 Method 8100 Polynuclear Aromatic Hydrocarbons (or an equivalent analytical method).

4.8.4.2. Calculate the sum of all 16 PAHs for total PAHs.

4.8.4.3. Report total PAHs as mg/kg dry weight.

4.8.4.4. Report benzo(a)pyrene as mg/kg.

4.8.5. Test method for measuring benzene, toluene, ethylbenzene and xylenes (BTEX).

4.8.5.1. Method 501 (Volatile Alkanes and Monocyclic Aromatic Hydrocarbons) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).

4.8.5.2. Report BTEX as mg/kg.

4.8.6. Test method for measuring Total Petroleum Hydrocarbons (TPH).

4.8.6.1. Method 506 (Petroleum Hydrocarbons) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).

4.8.6.2. Report as mg/kg dry weight.

4.8.7. Test method for measuring rubber, plastic, bitumen, paper, cloth, paint and wood.

4.8.7.1. NSW Roads & Traffic Authority Test Method T276 Foreign Materials Content of Recycled Crushed Concrete (or an equivalent method).

4.8.7.2. Report as percent.

Notification

4.9. On or before each transaction, the generator must provide the following to each person to whom the generator supplies the excavated natural material:

- a written statement of compliance certifying that all the requirements set out in this order have been met;
- a copy of the excavated natural material exemption, or a link to the EPA website where the excavated natural material exemption can be found; and
- a copy of the excavated natural material order, or a link to the EPA website where the excavated natural material order can be found.

Record keeping and reporting

4.10. The generator must keep a written record of the following for a period of six years:

- the sampling plan required to be prepared under clause 4.1.1;
- all characterisation sampling results in relation to the excavated natural material supplied;
- the volume of detected hotspot material and the location;
- the quantity of the excavated natural material supplied; and
- the name and address of each person to whom the generator supplied the excavated natural material.

4.11. The generator must provide, on request, the characterisation and sampling results for that excavated natural material supplied to the consumer of the excavated natural material.

5. Definitions

In this order:

application or apply to land means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

Bgl means below ground level, referring to soil at depth beneath the ground surface.

composite sample means a sample that combines five discrete sub-samples of equal size into a single sample for the purpose of analysis.

consumer means a person who applies, or intends to apply excavated natural material to land.

discrete sample means a sample collected and analysed individually that will not be composited.

generator means a person who generates excavated natural material for supply to a consumer.

hotspot means a cylindrical volume which extends through the soil profile from the ground surface to the proposed depth of excavation, where the level of any contaminant listed in Column 1 of Table 2 is greater than the absolute maximum concentration in Column 3 of Table 2.

***in situ* material** means material that exists on or below the ground level. It does not include stockpiled material.

***in situ* sampling** means sampling undertaken on *in situ* material.

N/A means not applicable.

stockpiled material means material that has been excavated from the ground and temporarily stored on the ground prior to use.

systematic sampling means sampling at points that are selected at even intervals and are statistically unbiased.

transaction means:

- in the case of a one-off supply, the supply of a batch, truckload or stockpile of excavated natural material that is not repeated.
- in the case where the supplier has an arrangement with the recipient for more than one supply of excavated natural material, the first supply of excavated natural material as required under the arrangement.

Manager Waste Strategy and Innovation

Environment Protection Authority

(by delegation)

Notes

The EPA may amend or revoke this order at any time. It is the responsibility of each of the generator and processor to ensure it complies with all relevant requirements of the most current order. The current version of this order will be available on ' www.epa.nsw.gov.au

In gazetting or otherwise issuing this order, the EPA is not in any way endorsing the supply or use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this order are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this order nor the accompanying exemption guarantee that the environment, human health or agriculture will not be harmed.

Any person or entity which supplies excavated natural material should assess whether the material is fit for the purpose the material is proposed to be used for, and whether this use may cause harm. The supplier may need to seek expert engineering or technical advice.

Regardless of any exemption or order provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The supply of excavated natural material remains subject to other relevant environmental regulations in the POEO Act and Waste Regulation. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 126), or does not meet the special requirements for asbestos waste (Part 7 of the Waste Regulation), regardless of this order, is guilty of an offence and subject to prosecution.

This order does not alter the requirements of any other relevant legislation that must be met in supplying this material, including for example, the need to prepare a Safety Data Sheet. Failure to comply with the conditions of this order constitutes an offence under clause 93 of the Waste Regulation.

Examples

In situ sampling at depth

Example 1.

If the proposed depth of ENM excavation is between 1 m bgl and 1.4 m bgl, then:

- 1 sample on surface (as per the requirements of Table 2).
- 1 sample at 1 m bgl.
- No further depth sampling after 1 m bgl, unless required under section 4.4.4.

Example 2.

If the proposed depth of ENM excavation is at 1.75 m bgl, then:

- 1 sample on surface (as per the requirements of Table 2).
- 1 sample at 1 m bgl.
- 1 sample at 1.75 m bgl.
- No further depth sampling after 1.75 m bgl, unless required under section 4.4.4.

Example 3.

If the proposed depth of ENM excavation is at 2.25 m bgl, then:

- 1 sample on surface (as per the requirements of Table 2).
- 1 sample at 1 m bgl.
- 1 sample at 2 m bgl.
- No further depth sampling after 2 m bgl, unless required under section 4.4.4.

Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014

The excavated natural material exemption 2014

Introduction

This exemption:

- is issued by the Environment Protection Authority (EPA) under clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation); and
- exempts a consumer of excavated natural material from certain requirements under the *Protection of the Environment Operations Act 1997* (POEO Act) and the Waste Regulation in relation to the application of that waste to land, provided the consumer complies with the conditions of this exemption.

This exemption should be read in conjunction with 'the excavated natural material order 2014'.

1. Waste to which this exemption applies

1.1. This exemption applies to excavated natural material that is, or is intended to be, applied to land as engineering fill or for use in earthworks.

1.2. Excavated natural material is naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

a) been excavated from the ground, and
b) contains at least 98% (by weight) natural material, and
c) does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated natural material does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.

2. Persons to whom this exemption applies

2.1. This exemption applies to any person who applies or intends to apply excavated natural material to land as set out in 1.1.

3. Duration

3.1. This exemption commences on 24 November 2014 and is valid until revoked by the EPA by notice published in the Government Gazette.

4. Premises to which this exemption applies

4.1. This exemption applies to the premises at which the consumer's actual or intended application of excavated natural material is carried out.

5. Revocation

5.1. 'The excavated natural material exemption 2012' which commenced 19 October 2012 is revoked from 24 November 2014.

6. Exemption

6.1. Subject to the conditions of this exemption, the EPA exempts each consumer from the following provisions of the POEO Act and the Waste Regulation in relation to the consumer's actual or intended application of excavated natural material to land as engineering fill or for use in earthworks at the premises:

- section 48 of the POEO Act in respect of the scheduled activities described in clauses 39 of Schedule 1 of the POEO Act;
- Part 4 of the Waste Regulation;
- section 88 of the POEO Act; and
- clause 109 and 110 of the Waste Regulation.

6.2. The exemption does not apply in circumstances where excavated natural material is received at the premises for which the consumer holds a licence under the POEO Act that authorises the carrying out of the scheduled activities on the premises under clause 39 'waste disposal (application to land) or clause 40 'waste disposal' (thermal treatment) of Schedule 1 of the POEO Act.

7. Conditions of exemption

The exemption is subject to the following conditions:

7.1. At the time the excavated natural material is received at the premises, the material must meet all chemical and other material requirements for excavated natural material which are required on or before the supply of excavated natural material under 'the excavated natural material order 2014'.

7.2. The excavated natural material can only be applied to land as engineering fill or for use in earthworks.

7.3. The consumer must keep a written record of the following for a period of six years:

- the quantity of any excavated natural material received; and
- the name and address of the supplier of the excavated natural material received.

7.4. The consumer must make any records required to be kept under this exemption available to authorised officers of the EPA on request.

7.5. The consumer must ensure that any application of excavated natural material to land must occur within a reasonable period of time after its receipt.

8. Definitions

In this exemption:

application or apply to land means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

consumer means a person who applies, or intends to apply excavated natural material to land.

Manager Waste Strategy and Innovation

Environment Protection Authority

(by delegation)

Notes

The EPA may amend or revoke this exemption at any time. It is the responsibility of the consumer to ensure they comply with all relevant requirements of the most current exemption The current version of this exemption will be available on www.epa.nsw.gov.au

In gazetting or otherwise issuing this exemption, the EPA is not in any way endorsing the use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this exemption are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this exemption nor the accompanying order guarantee that the environment, human health or agriculture will not be harmed.

The consumer should assess whether or not the excavated natural material is fit for the purpose the material is proposed to be used for, and whether this use will cause harm. The consumer may need to seek expert engineering or technical advice.

Regardless of any exemption provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The receipt of excavated natural material remains subject to other relevant environmental regulations in the POEO Act and the Waste Regulation. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 126), or does not meet the special requirements for asbestos waste (Part 7 of the Waste Regulation), regardless of having an exemption, is guilty of an offence and subject to prosecution.

This exemption does not alter the requirements of any other relevant legislation that must be met in utilising this material, including for example, the need to prepare a Safety Data Sheet (SDS).

Failure to comply with the conditions of this exemption constitutes an offence under clause 91 of the Waste Regulation.

Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014

The coal washery rejects order 2014

Introduction

This order, issued by the Environment Protection Authority (EPA) under clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation), imposes the requirements that must be met by suppliers of coal washery rejects to which 'the coal washery rejects exemption 2014' applies. The requirements in this order apply in relation to the supply of coal washery rejects for application to land in earthworks for civil engineering applications.

1. Waste to which this order applies

1.1 This order applies to coal washery rejects. In this order, coal washery rejects means the waste resulting from washing coal (including substances such as coal fines, soil, sand and rock resulting from that process).

2. Persons to whom this order applies

2.1 The requirements in this order apply, as relevant, to any person who supplies coal washery rejects that have been generated, processed or recovered by the person.

2.2 This order does not apply to the supply of coal washery rejects to a consumer for land application purposes at a premises for which the consumer holds a licence under the POEO Act that authorises the carrying out of the scheduled activities on the premises under clause 39 'waste disposal (application to land)' or clause 40 'waste disposal (thermal treatment)' of Schedule 1 of the POEO Act.

3. Duration

3.1 This order commences on 24 November 2014 and is valid until revoked by the EPA by notice published in the Government Gazette.

4. Generator requirements

The EPA imposes the following requirements on any generator who supplies coal washery rejects.

Sampling requirements

4.1 On or before supplying coal washery rejects, the generator must:

4.1.1 Prepare a written sampling plan which includes a description of sample preparation and storage procedures for the coal washery rejects.

4.1.2 Undertake sampling and testing of the coal washery rejects as required under clauses 4.2 and 4.3 below. The sampling must be carried out in accordance with the written sampling plan and Australian Standard 1141.3.1-2012 Methods for sampling and testing aggregates – Sampling – Aggregates (or equivalent).

4.2 Where the coal washery rejects are generated as part of a continuous process, the processor must undertake the following sampling:

4.2.1. Characterisation of the coal washery rejects by collecting 20 composite samples of the waste and testing each sample for the chemicals and other attributes listed in Column 1 of Table 1. Each composite sample must be taken from a batch, truckload or stockpile that has not been previously sampled for the purposes of characterisation. Characterisation must be conducted for coal washery rejects generated and processed during each 2-year period following the commencement of the continuous process; and

4.2.2. Routine sampling of the coal washery rejects by collecting either 5 composite samples from every 10,000 tonnes (or part thereof) processed or 5 composite samples every 6 months (whichever is the lesser); and testing each sample for the chemicals and other attributes listed in Column 1 of Table 1 other than those listed as 'not required' in Column 3. Each composite sample must be taken from a batch, truckload or stockpile that has not been previously sampled for the purposes of routine sampling. However, if characterisation sampling occurs at the same frequency as routine sampling, any sample collected and tested for the purposes of characterisation under clause 4.2.1 may be treated as a sample collected and tested for the purposes of routine sampling under clause 4.2.2.

4.3. Where the coal washery rejects are not generated as part of a continuous process, the generator must undertake one-off sampling of discrete batches, truckloads or stockpiles, by collecting 10 composite samples from every 4,000 tonnes (or part thereof) generated and testing each sample for the chemicals and other attributes listed in Column 1 of Table 1. The test results for each composite sample must be validated as compliant with the maximum average concentration or other value listed in Column 2 of Table 1 and the absolute maximum concentration or other value listed in Column 4 of Table 1 prior to the supply of the coal washery rejects.

Chemical and other material requirements

4.4. The processor must not supply coal washery rejects to any person if, in relation to any of the chemical and other attributes of the coal washery rejects:

4.4.1. The concentration or other value of that attribute of any sample collected and tested as part of the characterisation or the routine or one-off sampling of the coal washery rejects exceeds the absolute maximum concentration or other value listed in Column 4 of Table 1, or

4.4.2. The average concentration or other value of that attribute from the characterisation or one-off sampling of coal washery rejects (based on the arithmetic mean) exceeds the maximum average concentration or other value listed in Column 2 of Table 1, or

4.4.3. The average concentration or other value of that attribute from the routine sampling of coal washery rejects (based on the arithmetic mean) exceeds the maximum average concentration or other value listed in Column 3 of Table 1.

4.5. The absolute maximum concentration or other value of that attribute in any coal washery rejects supplied under this order must not exceed the absolute maximum concentration or other value listed in Column 4 of Table 1.

Table 1

Column 1	Column 2	Column 3	Column 4
Chemicals and other attributes	**Maximum average concentration for characterisation** (mg/kg 'dry weight' unless otherwise specified)	**Maximum average concentration for routine testing** (mg/kg 'dry weight' unless otherwise specified)	**Absolute maximum concentration** (mg/kg 'dry weight' unless otherwise specified)
1. Mercury	0.5	Not required	1
2. Cadmium	0.5	Not required	1
3. Lead	50	50	100
4. Arsenic	10	Not required	20
5. Chromium (total)	75	75	150
6. Copper	50	50	100
7. Nickel	40	40	80
8. Selenium	2	Not required	5
9. Zinc	100	100	200
10. Electrical Conductivity	1 dS/m	1dS/m	2 dS/m
11. pH*	8 to 11	Not required	7 to 12
12. Combustible content	30%	30%	40%
13. Sulphur %	0.5%	0.5%	1%

*Note: The ranges given for pH are for the minimum and maximum acceptable pH values in the coal washery rejects.

Test methods

4.6. The generator must ensure that any testing of samples required by this order is undertaken by analytical laboratories accredited by the National Association of Testing Authorities (NATA), or equivalent.

4.7. The generator must ensure that the chemicals and other attributes (listed in Column 1 of Table 1) in the coal washery rejects it supplies are tested in accordance with the test methods specified below or other equivalent analytical methods. Where an equivalent analytical method is used the detection limit must be equal to or less than that nominated for the given method below.

4.7.1. Test method for measuring the mercury concentration:

4.7.1.1. Analysis using USEPA SW-846 Method 7471B Mercury in solid or semisolid waste (manual cold-vapor technique), or an equivalent analytical method with a detection limit < 20% of the stated absolute maximum concentration in Table 1, Column 4 (i.e. < 0.2 mg/kg dry weight).

4.7.1.2. Report as mg/kg dry weight.

4.7.2. Test methods for measuring chemicals 2 - 9:

4.7.2.1. Sample preparation by digestion using USEPA SW-846 Method 3051A Microwave assisted acid digestion of sediments, sludges, soils, and oils.

4.7.2.2. Analysis using USEPA SW-846 Method 6010C Inductively coupled plasma - atomic emission spectrometry, or an equivalent analytical method with an appropriate detection limit.

4.7.2.3. Report as mg/kg dry weight.

4.7.3. Test methods for measuring the electrical conductivity and pH:

4.7.3.1. Sample preparation by mixing 1 part coal washery rejects with 5 parts distilled water.

4.7.3.2. Analysis using Method 103 (pH) and 104 (Electrical Conductivity) in Schedule B (3): Guideline on Laboratory Analysis of Potentially Contaminated Soils, National Environment Protection (Assessment of Site Contamination) Measure 1999 (or an equivalent analytical method).

4.7.3.3. Report electrical conductivity in deciSiemens per metre (dS/m).

4.7.4. Test methods for measuring the combustible content and sulphur content:

4.7.4.1. Australian Standard 1038 Coal and coke (or an equivalent analytical method).

4.7.4.2. Report combustible content and sulphur content as %.

Notification

4.8. On or before each transaction, the generator must provide the following to each person to whom the generator supplies the coal washery rejects:

- a written statement of compliance certifying that all the requirements set out in this order have been met;
- a copy of the coal washery rejects exemption, or a link to the EPA website where the coal washery rejects exemption can be found; and
- a copy of the coal washery rejects order, or a link to the EPA website where the coal washery rejects order can be found.

Record keeping and reporting

4.9. The generator must keep a written record of the following for a period of six years:

- the sampling plan required to be prepared under clause 4.1.1;
- all characterisation, routine and/or one-off sampling results in relation to the coal washery rejects supplied;
- the quantity of the coal washery rejects supplied; and

- the name and address of each person to whom the generator supplied the coal washery rejects.

4.10. The generator must provide, on request, the most recent characterisation and sampling (whether routine or one-off or both) results for coal wash rejects supplied to any consumer of the coal washery rejects.

4.11. The generator must notify the EPA within seven days of becoming aware that it has not complied with any requirement in clause 4.1 to 4.7.

5. Definitions

In this order:

application or apply to land means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

composite sample means a sample that combines five discrete sub-samples of equal size into a single sample for the purpose of analysis.

consumer means a person who applies, or intends to apply, coal washery rejects to land.

continuous process means a process that produces coal washery rejects on an ongoing basis.

generator means a person who generates coal washery rejects.

transaction means:

- in the case of a one-off supply, the supply of a batch, truckload or stockpile of coal washery rejects that is not repeated.
- in the case where the supplier has an arrangement with the recipient for more than one supply of coal washery rejects, the first supply of coal washery rejects as required under the arrangement.

Manager Waste Strategy and Innovation

Environment Protection Authority

(by delegation)

Notes

The EPA may amend or revoke this order at any time. It is the responsibility of each of the generator and processor to ensure it complies with all relevant requirements of the most current order. The current version of this order will be available on www.epa.nsw.gov.au

In gazetting or otherwise issuing this order, the EPA is not in any way endorsing the supply or use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this order are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this order nor the accompanying exemption guarantee that the environment, human health or agriculture will not be harmed.

Any person or entity which supplies coal washery rejects should assess whether the material is fit for the purpose the material is proposed to be used for, and whether this use may cause harm. The supplier may need to seek expert engineering or technical advice.

Regardless of any exemption or order provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The supply of coal washery rejects remains subject to other relevant environmental regulations in the POEO Act and Waste Regulation. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 126), or does not meet the special requirements for asbestos waste (Part 7 of the Waste Regulation), regardless of this order, is guilty of an offence and subject to prosecution.

This order does not alter the requirements of any other relevant legislation that must be met in supplying this material, including for example, the need to prepare a Safety Data Sheet. Failure to comply with the conditions of this order constitutes an offence under clause 93 of the Waste Regulation.

Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014

The coal washery rejects exemption 2014

Introduction

This exemption:

- is issued by the Environment Protection Authority (EPA) under clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 (Waste Regulation); and
- exempts a consumer of coal washery rejects from certain requirements under the *Protection of the Environment Operations Act 1997* (POEO Act) and the Waste Regulation in relation to the application of that waste to land, provided the consumer complies with the conditions of this exemption.

This exemption should be read in conjunction with 'the coal washery rejects order 2014'.

1. Waste to which this exemption applies

1.1. This exemption applies to coal washery rejects that are, or are intended to be, applied to land in earthworks for civil engineering applications.

1.2. Coal washery rejects is the waste resulting from washing coal (including substances such as coal fines, soil, sand and rock resulting from that process).

2. Persons to whom this exemption applies

2.1. This exemption applies to the any person who applies, or intends to apply, coal washery rejects to land as set out in 1.1.

3. Duration

3.1. This exemption commences on 24 November 2014 and is valid until revoked by the EPA by notice published in the Government Gazette.

4. Premises to which this exemption applies

4.1. This exemption applies to the premises at which the consumer's actual or intended application of coal washery rejects is carried out.

5. Revocation

5.1. 'The coal washery rejects general exemption 2009' which commenced on 1 November 2009, is revoked from 24 November 2014.

6. Exemption

6.1. Subject to the conditions of this exemption, the EPA exempts each consumer from the following provisions of the POEO Act and the Waste Regulation in relation to the consumer's actual or intended application of coal washery rejects to land in earthworks for civil engineering applications at the premises:

- section 48 of the POEO Act in respect of the scheduled activities described in clauses 39 and 42 of Schedule 1 of the POEO Act;
- Part 4 of the Waste Regulation;
- section 88 of the POEO Act; and
- clause 109 and 110 of the Waste Regulation.

6.2. The exemption does not apply in circumstances where coal washery rejects are received at the premises for which the consumer holds a licence under the POEO Act that authorises the carrying out of the scheduled activities on the premises under clause 39 'waste disposal (application to land)' or clause 40 'waste disposal (thermal treatment)' of Schedule 1 of the POEO Act.

7. Conditions of exemption

The exemption is subject to the following conditions:

7.1. At the time the coal washery rejects are received at the premises, the material must meet all chemical and other material requirements for coal washery rejects which are required on or before the supply of coal washery rejects under 'the coal washery rejects order 2014'.

7.2. The coal washery rejects can only be applied to land in earthworks for civil engineering applications. Approval does not apply to any of the following applications:

7.2.1. Construction of dams or related water storage infrastructure,

7.2.2. Mine site rehabilitation,

7.2.3. Quarry rehabilitation,

7.2.4. Sand dredge pond rehabilitation,

7.2.5. Back-filling of quarry voids,

7.2.6. Raising or reshaping of land used for agricultural purposes, and

7.2.7. Construction of roads on private land unless:

(a) the coal washery rejects are applied to land to the minimum extent necessary for the construction of a road, and
(b) a development consent for the development has been granted under the relevant Environmental Planning Instrument (EPI), or
(c) it is to provide access (temporary or permanent) to a development approved by a Council, or
(d) the works undertaken are either exempt or complying development.

7.3. The consumer can only apply coal washery rejects to land where it is not applied in or beneath water, including groundwater.

7.4. The consumer must keep a written record of the following for a period of six years:

- the quantity of any coal washery rejects received; and
- the name and address of the supplier of the coal washery rejects received.

7.5. The consumer must make any records required to be kept under this exemption available to authorised officers of the EPA on request.

7.6. The consumer must ensure that any application of coal washery rejects to land must occur within a reasonable period of time after its receipt.

8. Definitions

In this exemption:

application or apply to land means applying to land by:

- spraying, spreading or depositing on the land; or
- ploughing, injecting or mixing into the land; or
- filling, raising, reclaiming or contouring the land.

consumer means a person who applies, or intends to apply, coal washery rejects to land.

Manager Waste Strategy and Innovation

Environment Protection Authority

(by delegation)

Notes

The EPA may amend or revoke this exemption at any time. It is the responsibility of the consumer to ensure they comply with all relevant requirements of the most current exemption. The current version of this exemption will be available on www.epa.nsw.gov.au

In gazetting or otherwise issuing this exemption, the EPA is not in any way endorsing the use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this exemption are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this exemption nor the accompanying order guarantee that the environment, human health or agriculture will not be harmed.

The consumer should assess whether or not the coal washery rejects is fit for the purpose the material is proposed to be used for, and whether this use will cause harm. The consumer may need to seek expert engineering or technical advice.

Regardless of any exemption provided by the EPA, the person who causes or permits the application of the substance to land must ensure that the action is lawful and consistent with any other legislative requirements including, if applicable, any development consent(s) for managing operations on the site(s).

The receipt of coal washery rejects remains subject to other relevant environmental regulations in the POEO Act and the Waste Regulation. For example, a person who pollutes land (s. 142A) or water (s. 120), or causes air pollution through the emission of odours (s. 126), or does not meet the special requirements for asbestos waste (Part 7 of the Waste Regulation), regardless of having an exemption, is guilty of an offence and subject to prosecution.

This exemption does not alter the requirements of any other relevant legislation that must be met in utilising this material, including for example, the need to prepare a Safety Data Sheet (SDS).

Failure to comply with the conditions of this exemption constitutes an offence under clause 91 of the Waste Regulation.

Appendix C

Drawing 1 – Test Location Plan

Legend

300 mm diameter bore 75 mm diameter bore 75 mm diameter bore (Previous Investigation)

Douglas Partners Geotechnics / Environment / Groundwater	**Approximate Location of Tests** **Proposed Synthetic Bowling Greens, Melbee Street, Rutherford**	PROJECT: 39498.06 DWG No: 1 REV: A
	CLIENT: Maitland City Bowls Sports and Recreation	DATE: 30.03.2015